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An Empirical Study with French Data

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Abstract

This paper deals with the impact of social contributions and tax cuts (which are considered as operating subsidies) on new firms' probability of survival and economic performance. We use a rich matched database of French firms that were newly created in 1998 and that include entrepreneurs' individual characteristics and firm economic and financial variables. We implement propensity score matching models and show that (i) subsidized firms are more likely to survive after the first two years; (ii) bank loans increase the probability of survival, be they subsidized or not; and (iii) operating subsidies allow firms to increase their turnover. However, no significant effects of these subsidies on other performance criteria are found.

Keywords: firm survival, matched database, propensity score matching, firm performance

JEL Classification: D21, H25, L38.

1. Introduction.

Over the last decade, economists have devoted more and more attention to firm entry and exit. In developed countries, high turnover (entry and exit) rates are observed every year (Bartelsman, Scarpetta and Schivardi, 2003). The theoretical approach to this phenomenon focuses on the process of creative destruction from an evolutionary perspective (Baldwin, 1995; Geroski, 1995; Jovanovic, 1982; Ericson and Pakes, 1995, 1998). It recognizes that firms are heterogeneous and that the shift in sectoral composition that takes place via firm turnover is essential for technological progress. However, the ability of firms to survive also depends on institutional and regulatory settings. In Europe and North America, public and private institutions have developed a large range of services and forms of support to help start-ups and small firms to survive and develop (Gu *et al.*, 2006).

In this paper, we assess the impact of public operating subsidies on newly created firms' survival and economic performance. We use a rich matched database of a cohort of French firms that were newly created in 1998. We follow these firms year by year over the 1998-2006 period. This database enables us to control not only for new firms' annual characteristics (financial variables) but also for entrepreneurs' background (e.g., education, previous experience before starting the new business). Because approximately one third of our sample consists of subsidized firms and public support is not randomly distributed, we use a propensity score matching method to control for selection bias and estimate the impact of operating subsidies on newly created firms' probabilities to survive and to develop.

Our results show that subsidized start-up firms are more likely to survive after the first two years of existence. We also find that operating subsidies have a positive impact on the turnover growth rate. However, we find no significant effect on other performance criteria (apparent labor productivity, apparent capital productivity, profitability and value-added growth) in either absolute or growth rate terms.

The paper is organized as follows. Section 2 reviews the literature on the impact of public support on firm survival and economic performance. Section 3 analyzes the regulations concerning public financial support of start-ups in France. Section 4 describes the data we use in our empirical analyses. Section 5 explains the econometric strategy. Section 6 presents our results. Section 7 concludes.

2. Firm demography and public support of new firms.

In all developed countries, firm demography is characterized by high entry and exit rates. Bartelsman, Scarpetta and Schivardi (2003) show that a large proportion of firms enter a given market as a similar percentage exit the same market. Because these two phenomena tend to offset each other, the static view of the enterprise demography is very different from the dynamic view. Among a cohort of newly created firms, 80% survive the first year following entry, 50% survive five years after entry, and approximately 30% remain seven years after entry. This turnover is part of the creative destruction process: for a given market, a substantial proportion of firm entrants replace a similar proportion of exiters. In the context of firms' ability to adapt to their economic environment, some are able to grow and survive, while the others are obliged to exit the market (Jovanovic, 1982). This process of creative destruction is analyzed through the heterogeneity among firms' behavior, which results in permanent changes in the composition of the population of firms (Baldwin, 1995). Some firms entering a given market unseat older ones because the latter are unable to adapt to new technologies and production processes. Learning models (Jovanovic, 1982; Ericson and Pakes, 1995) suggest that firms may enter an industry at sub-optimal scale to obtain the

opportunity to learn and will subsequently expand if successful. In the early years following entry, firms have to find the most efficient organizational structure and determine the optimal scale at which they can be competitive. Thus, two potential factors may have an impact on a firm's probability of survival: a "learning by doing effect", which is the ability of a firm to adapt to its environment, and an "expectation effect", which is the ability of the firm to forecast the evolution of its market.

The flows of small firms entering and exiting the market each year are very important as these small firms represent the large majority of firms. In 2006, 99.9% of the nearly 26 million firms in the U.S. were businesses with fewer than 500 employees, and 97.5% were businesses with 20 employees or fewer (Gu et al., 2008). The figures are substantively identical for France. The importance of the creation of new firms explains why, in all OECD countries, public authorities have developed programs to finance and assist new small firms. All of these programs aim at supporting new or existing small firms. Gu et al. (2008) single out sixteen main programs in the U.S.: nine are devoted to assistance (entrepreneurship and management education, consulting, services), two to loan supply and credit guarantee, two to grants, and three are jointly devoted to business assistance and loan supply. Most of these programs target people who are considered as disadvantaged in economic competition because of their ethnic origin, their gender or their geographical location. Despite their policy importance, such programs have not been evaluated using the most rigorous methods to ensure that causal program effects are correctly measured. The main obstacles to reliable evaluations of these programs are the small sample sizes of firms that are studied, the firms' low response rates to surveys, and weak evaluation methodologies.

The following studies use econometric methods that are designed to eliminate selection bias and evaluate whether the difference in the outcomes can be attributed to public support. Pfeiffer and Reize (2000) study the effect of public subsidies on survival of firms created by unemployed people in eastern and western Germany. Unexpectedly, estimations show that the firms created by unemployed people that receive public support in eastern Germany have a lower probability of survival than do those firms that receive no support. The same pattern is not observed for western Germany. The authors explain this paradoxical result for eastern Germany by a "cash and carry effect": some people receiving public subsidies when creating their businesses only want to get the financial support and close their business soon after. However, Pfeiffer and Reize (2000) analyze business survival one year after creation. Almus (2001) studies the same sample of firms but extends the period to five years. He finds that, in eastern Germany, firms' survival and employment growth are positively related to the receipt of public subsidies. According to his conclusions, five years after firm creation, the effect of public support overcomes the cash and carry effect.

Oh et al. (2009) evaluate the effect of the credit guarantee policy in South Korea, which was intended to support small and medium firms following the 1999 financial crisis. Their results show that credit guarantees positively influence firms' survival rate and employment but not their investment and productivity growth. Using French data, Crépon and Duguet (2003) study the impacts of capital subsidies from public administration and loans from banks on firms created in 1994 during the subsequent three years. The main public subsidy is a lump sum¹ that is granted to unemployed people who start a new business. They estimate a multinomial logit model of the financial structure of each new business distinguishing between public subsidies, bank loans and a combination of both. Then they use a matching process to compare firms' survival according to their financial resources. They find a positive effect of this subsidy on survival of new firms created by both short-term and

¹ It amounts to 32,000 francs or approximately 5,000 Euros.

long-term unemployed people. In addition, bank loans alone have no positive effect, but they reinforce the effect of public subsidies on firm survival.

3. What public financial support is given to new firms in France?

In this paper, we use a large sample of new firms that is representative of all firms that were created in France in 1998, including firms consisting of one self-employed person. When starting their businesses, 34.5% of new entrepreneurs received public financial support; 22.2% were subsidized by the ACCRE program (*Aide aux Chômeurs Créant ou Reprenant une Entreprise*). This is a special public support program for unemployed people who create or take over a firm. The remaining 12.3% of new entrepreneurs received subsidies or tax reductions (exemptions) from local or regional authorities.

Two categories of new entrepreneurs are eligible for the ACCRE: unemployed people who receive public unemployment benefits before starting their businesses and people who receive social income from the public administration. In 1998, the ACCRE was devoted to persons who created a firm, whatever the legal status of their firm and the entrepreneur's personal status (according to French legislation, he or she can be a wage earner, a professional, or an employer). Any applicant to the ACCRE must complete a form that is sent to the district labor administration. The labor administration controls the conditions of eligibility of the applicant and evaluates the survival and profitability prospects of the proposed project. For those who are entitled to the ACCRE, there are two advantages. First, from the creation of their business, they are fully exempted from paying social contributions for one year². In addition, those who are entitled to social income continue to receive it during a period of six months following the creation of their business. During the next six months, their business income is taken into account to revise the amount of the social income. This second form of support is important because during the first six months, and to a lesser degree during the first year, the entrepreneur receives an income each month that is similar to a subsidy and is the equivalent of 50% of the minimum wage (for a single person). This income can increase to 100% of the minimum wage if the entrepreneur is married with two or more children.

The ACCRE is a form of public support that is granted at the very beginning of the business for a one-year period. It takes the form of a social contribution for the people who received unemployment benefits before starting their business and the payment of a social income for those who were already entitled to this income. Furthermore, if the business does not succeed, eligible people retain their rights to unemployment benefits and social income (i.e., during the operation of the business, the payment of these benefits is interrupted but not suppressed). Therefore, the ACCRE is a real incentive for the unemployed to create their own firms. It is one of the instruments of public policy that aims at reducing unemployment in the French economy. First, it aims at suppressing any barriers to firm creation because new entrepreneurs do not lose their rights to social benefits even if their new business fails. In addition, they can take advantage of a one-year exemption from social contributions when starting their business and, under certain conditions, can still receive support from social income programs.

The ACCRE is a form of support that we call "operating subsidies" to distinguish it from capital subsidy programs, where a lump sum is granted when the business starts. However, these contribution cuts must be carefully distinguished from the programs of social

² In France, social contributions, which must be paid on wages as well as on the incomes of professionals and independent workers, amount to approximately 50% of the compensation (payment).

contribution reduction for low wage earners that have been implemented in France since the middle of the 1990s. In these programs, the social contribution cuts are focused on low-paid jobs and are in force for a long period of time. They aim at creating low-paid jobs through the substitution between unskilled and skilled workers and reducing the prices of goods and services produced by industries that employ a high proportion of low-paid workers.

New entrepreneurs who were already employed before starting their businesses are not entitled to the ACCRE, but they are able to benefit from different tax cuts and exemptions that are usually decided at the local or regional level³. They represented 12.3% of all new entrepreneurs in 1998. While the conditions of eligibility for these supports are clearly different from the ACCRE, from an economic point of view they also concern tax cuts, which can be compared to public operating subsidies.

Table 1 - Subsidies to New Firms in France

	Number of firms created in 1998	Percentage
ACCRE	2351	22.2
Other social contribution exemptions and tax cuts	1305	12.3
No public subsidy	6799	64.4
No answer	104	0.1
Total	10559	100

Source: 1998-2006 FICUS and 1998 SINE Survey. ACCRE: social contribution exemptions and social income granted to unemployed people who start a business (see explanation above in section 2).

4. The Data

In this paper, we use an original and rich statistical dataset created by matching two data sources from INSEE (the French Institute of Statistics): an entrepreneur survey (SINE) and a database (FICUS).

4.1 The data sources

The objective of the SINE (*"système d'information sur les nouvelles entreprises"*) survey is to follow a generation of newly created firms over a period of five years. We concentrate on the 1998 cohort (all the firms were created during the first semester). Our sample consists of 30,000 firms and is representative of all firms created during this period. Sample firms were surveyed three times: early in the entry process, three years after firm creation and five years after firm creation. The firms surveyed operate in the manufacturing, construction, trade and services sectors (except financial activities). SINE includes micro-firms, in particular those in the services sector, which represent the majority of start-ups: nearly 60% of new firms are created in the trade and other services sectors (see Table 2). More than 85% of firms in the sample have one or two jobs, including firms made up of only

³ The most important of these taxes is the "taxe professionnelle", which is levied by local authorities.

one self-employed person⁴. We only retained "ex-nihilo creations" - that is, firms that use new means of production – in our sample (i.e., a new store or a new firm that did not exist before 1998 and that produces goods or services).

Firm datasets (*FICUS*) give information for all firms that are subject to the two major tax regimes. These regimes cover virtually the entire productive system, representing roughly 95 percent of taxable firms in terms of sales. The data were kept for the period of 1998-2006. For each year, we have a sample of approximately 2.5 million firms. The datasets mostly contain various economic situation indicators, e.g., value-added, capital investment, profits, and turnover.

⁴ In France in 1998, there was no legal differentiation between firms with and without wage earners (in the latter case, there is only one self-employed person).

Table 2: Statistics on Subsidized and Non-Subsidized Firms (in %)

	Subsidized Firms	Non-Subsidized Firms
<i>Gender</i>		
Male	74.89	73.42
Female	25.11	26.58
<i>Initial Amount Of Capital (Euros)</i>		
Less than 2,000		
	10.55	19.45
2,000 to 4,000	14.45	11.86
4,000 to 8,000	15.01	10.39
8,000 to 16,000		
	30.49	33.10
16,000 to 40,000		
	18.67	13.49
40,000 to 80,000		
	6.55	6.25
More than 80,000		
	4.28	5.47
<i>Previous Activity on The Labor Market</i>		
Employee	25.03	60.92
Unemployed Less Than one Year	39.75	13.04
Unemployed More Than one Year	29.14	10.32
Inactive	6.08	15.72
<i>Sector</i>		
Agriculture	0.03	0.02
Food Industry	2.38	1.79
Non Food Industry	11.09	7.25
Construction	25.64	17.14
Trade	25.53	23.76
Transportation	4.51	5.93
Real Estate Activity	1.93	5.88
Firms Services	14.47	19.78
Individuals Services	11.25	9.58
Education and Health	3.08	8.87

Source: 1998-2006 FICUS and 1998 SINE Survey

4.2 The matched database

After matching, the database contains 10,570 newly created firms. It contains an important amount of information, including both entrepreneur and firm characteristics (economic and financial variables), and gives the opportunity to follow firms from birth to potential death between 1998 and 2006. Some firms created in 1998 only appear in FICUS in 1999 due to delays in administrative record keeping. In contrast, some firms are still recorded even after they have failed. We delete all such firms. We concentrate on entry without considering takeovers or juridical transformations. Due to recording problems, some firms disappear for one year within the period but exist in both the year before and the year after. These firms are also dropped.

Table 3 presents the number of firms in the database over the 1998-2006 period. It shows that 56.6% of firms survived five years and 46.1% eight years after their creation. These results are consistent with the literature (Bartelsman et al., 2003). Considering only subsidized firms, 61.6% survived five years and 50.7% survived eight years after their creation. Based on Table 2, it appears that operating subsidies help firms to survive. However,

as entrepreneurs who receive operating subsidies are chosen based on observable or unobservable characteristics, these characteristics could explain the difference in survival rates.

Table 3: Number of Firms in the Sample per Year

Year	Number of Firms	Subsidized Firms	Mean number of Employees
1998	10570	3659	1
1999	9210	3310	1.5
2000	8174	2952	2
2001	6839	2527	2.4
2002	6493	2411	2.5
2003	5979	2255	2.6
2004	5661	2132	2.7
2005	4945	1881	2.8
2006	4870	1854	2.9

Source: 1998-2006 FICUS and 1998 SINE Survey

5. Econometric Strategy

In this paper, we evaluate the effect of operating subsidies on firm survival and economic performance. Entrepreneurs who receive start-up subsidies are not randomly distributed: the public administration decides to grant subsidies based on entrepreneurs' profiles and project prospects. Thus, subsidized start-ups face a selection process that depends on entrepreneurs' characteristics (education, professional skills, previous status on the labor market, initial amount of capital). To control for this selection bias, we estimate propensity score matching (PSM) models (Rubin, 1974; Heckman *et al.*, 1999). The aim of these models is to build a control group from the population of entrepreneurs who do not get start-up subsidies and to ensure that this control group is as similar as possible (with respect to observable characteristics) to the group of entrepreneurs who get start-up subsidies.

With our database, we identify the subsidized firms in 1998 (the treated group, indicated by a dummy variable $PB_{1998} = 1$). The impact of operating subsidies on firm survival is measured with the outcome variable y_i . Each firm presents two possible results: y_0 (if $PB_{1998} = 0$) and y_1 (if $PB_{1998} = 1$). The effect of subsidies on firm survival ($C = y_1 - y_0$) is unobservable and individual (its distribution is consequently unidentifiable) because y_1 and y_0 are never simultaneously observed. Only the realized result is observed: $Y = y_1 PB_{1998} + y_0(1 - PB_{1998})$. Y denotes the firm survival rate or firm performance criteria (turnover, profitability, apparent labor productivity, apparent capital productivity, value-added growth and employment growth). Let Y_i be the vector of resulting variables: $Y_i = (D_i)$. D denotes whether or not the firm exits. The unique couple (Y, PB_{1998}) is observed for each firm, and when latent variables of result are independent from treatment, *i.e* when the treatment is random, the average effect on the treated firms $C_{treated} = E(y_1 - y_0 | PB_{1998}=1)$ can be identified. The identification condition is based on observable characteristics X (control variables). From the available literature on firm survival, we choose two types of control variables. First, we use "common" firm characteristics (size, sector of activity, region). Second, we control for entrepreneur characteristics (gender, age, education, etc.). If too many

control variables are used, finding a counterfactual can be difficult. In addition, independence conditional to the set of variables X is equivalent to independence in relation to propensity score $P(X)$ corresponding to a one-dimensional summary of matching variables and estimating the probability of being exposed to treatment conditionally to these variables (Rubin and Rosenbaum, 1983): $(y_0, y_1) \perp PB_{1998}|P(X)$. Moreover, we impose a maximal distance between propensity scores of the treated firms and their neighbors and a common support condition (see Figure 1 in the Appendix). First, we implement a logit model to estimate propensity scores. In a second step, several matching methods can be used: kernel matching, nearest-neighbor, radius matching or interval matching (see Caliendo and Kopeinig, 2008, for a detailed presentation of these methods). In our dataset, approximately one third of firms are subsidized, so we use the nearest-neighbor method with replacement (the robustness of our results is tested using other methods).

6. Results

The likelihood of receiving operating subsidies is explained with a logit model. Table A1 in the Appendix reports estimates. The model contains variables representing entrepreneurs' characteristics (gender, age, nationality, education, professional skills, labor market status before creating the firm: employee, unemployed or inactive), initial amount of capital and financial resources (bank loans, personal resources, other types of loans and paid-up capital from other companies or specific organizations) and a few firm characteristics (sector, location and franchise). The results of the logit model show that the oldest people have a lower probability of receiving operating subsidies. In addition, French entrepreneurs are favored in receiving subsidies in comparison with foreigners (both European and non-European). The likelihood of receiving operating subsidies does not depend on the entrepreneur's gender. People who were employed before starting their business have the lowest probability of receiving public support. Moreover, formerly inactive persons are less likely to get this support than short-term and long-term unemployed persons are. These results are not surprising if we consider the French regulation concerning public support of start-up firms (presented in section 3 above). Entrepreneurs who had already started another firm prior to 1998 are less likely to be granted public support than are those who are starting their first business. Moreover, high initial amounts of capital and financing from personal resources or bank loans are significantly and positively correlated with operating subsidies. The location of a firm outside Paris and the surrounding region increases the probability of obtaining operating subsidies. Compared with the building industry, entrepreneurs in the trade, transportation and services sectors are less likely to receive subsidies.

6.1 The effect of operating subsidies on firm survival

Table 4 reports the matching estimates (average treatment on the treated, ATT) of the effect of operating subsidies on firm survival at different periods of time (one-year, two-year, four-year, six-year and eight-year periods). The variable of interest is the survival rate. The first column presents the period; the second and third columns give the survival rates of the treated and the control groups; the fourth column gives the ATT estimates (difference between the two preceding columns); and the fifth column presents standard errors. Table A2 in the Appendix shows the results of the balancing test for the first model. It confirms the validity of the matching method, which reduces the bias by approximately 90% for almost all of the variables. The balancing test measures the 'similarity' of observations remaining after the matching process. Columns (2) and (3) indicate the means of each variable prior to

matching for the treated and untreated groups, respectively, and column (4) gives the mean for the untreated group after matching. Column (5) indicates the bias reduction.

We find that operating subsidized firms are more likely to survive than other firms at each duration, except for the one-year and two-year periods. Such a difference between the short-term and long-term effects of public support on firm survival has already been found in research aiming at evaluating the efficiency of these policies (see above in Section 2 our comments on Pfeiffer and Reise, 2000). For France, in 1998, we must consider that the main public support given was not a lump sum (which can cause the “cash and carry effect”) but operating subsidies *that are granted for one year*. In particular, this is the case for new entrepreneurs who are entitled to social income and who continue to receive it for one year. After running their business for a year, if their business income is lower than their social income, it is in their interest to give up their business to remain entitled to receive their social income.

The case of unemployed people is more complex because their unemployment benefits are no longer paid when they start their business. However, they have no social contribution to pay, an advantage that they lose after one year. In addition, if they give up their business, they are again entitled to unemployment benefits because their right to these benefits is ‘deferred but not suppressed’ when they start their business. Here, again, if their income from their business is low, it is in the unemployed person’s interest to close the business. It is noteworthy that the right to deferred unemployment benefits, which is an incentive to start a new business, is also an incentive to give it up if the entrepreneur’s short-term expectations are not fulfilled.

However, it is remarkable that in the long run (until eight years after the start-up’s creation) the impact of operating subsidies on firm survival is still positive. This impact can be explained by the very small sizes of the start-up firms that are included in our sample⁵. More than 25% of start-up firms have capital of less than 4000 Euros. Operating subsidies amount to more than this if the entrepreneur is entitled to a minimum social income. For micro-firms, operating subsidies may be a supplement to a very small initial capital and a substitute for credit rationing.

Table 4 - ATT Estimates of Firm Survival Rate for Different Periods

Periods	Treated	Controls	Difference	S.E.
1998-1999	.909	.890	.0190	.0113
1998-2000	.800	.779	.0212	.0159
1998-2002	.650	.615	.0348***	.0186
1998-2004	.583	.538	.0446***	.0191
1998-2006	.509	.462	.0468***	.0192
Number of Observations	10 452	3 653	6 799	

Sources: FICUS 1998-2006 and SINE 1998

Notes: Stars indicate statistical significance at the 10% (*), 5% (**) and 1% (***) levels, respectively.

⁵ This is a characteristic of start-up firms in all developed countries. However, in most countries micro-firms are not taken into account by administrative sources or firm surveys.

Table 5 presents the estimations using the PSM kernel method of the impact of operating subsidies on different subsamples of firms (with bank loans, without bank loans, receiving subsidies other than the ACCRE, receiving the ACCRE only) over the 1998-2006 period. Like Crépon and Duguet (2003) with French data, we find that firms with bank loans have the highest probability of survival, be they subsidized or not. This result is not surprising considering Blanchflower and Oswald's (1998) statement about "secured loans (*i.e.*, with collateral) that are a rational response by bankers to imperfect knowledge about the different projects". That is, bankers finance the projects with the best chance of success and, as a consequence, select projects with specific characteristics. Unsurprisingly, we also find that operating subsidies coupled with bank loans allow firms to survive longer. If we decompose operating subsidies into the ACCRE and other subsidies (granted by local or regional authorities), we find that both kinds of public support have a positive impact on firm survival. It is also noteworthy that the group that only receives the ACCRE (without bank loans) has a relatively low probability of surviving after eight years, but the ACCRE has the highest impact on firm survival.

Table 5 – ATT Estimates of Firm Survival Rate for Different Subgroups (1998-2006)

	Sample	Treated	Controls	Difference	S.E.
<i>Firms with bank loans</i>		.5724	.5172	.0551***	.0270
Number of observations	3 466	1 656	1 810		
<i>Firms with no bank loans</i>		.4552	.3930	.0622***	.0191
Number of observations	6 986	1 997	4 989		
<i>Firms receiving subsidies other than the ACCRE</i>		.5311	.4889	.0421***	.016
Number of observations	8 102	1 303	6 799		
<i>Firms receiving the ACCRE only</i>		.4814	.4048	.0766 ***	.0217
Number of observations	8 317	1 518	6 799		

Sources: FICUS 1998-2006 and SINE 1998

Notes: Stars indicate statistical significance at the 10% (*), 5% (**) and 1% (***) levels, respectively.

6.2 The effect of operating subsidies on firm performance

Even if subsidized firms survive longer, we do not know the nature of the effect of these subsidies on efficiency and profitability. Indeed, operating subsidies can lead less productive firms to remain in the market. Table 6 presents PSM estimations on firm turnover over the eight-year period. A significant effect is found on the turnover level, specifically its absolute variation but not its growth rate during this period. Employment growth is the second indicator with significant results (not reported here). Operating subsidies allow firms to hire more wage earners. However, this result must be interpreted cautiously because there are two different components of this evolution. First, some self-employed persons may become wage earners as the firm grows, and second, new jobs may be created. Moreover, no significant effect was found on other performance criteria (apparent labor productivity, apparent capital productivity, profitability and value-added growth) in terms of either absolute variations or growth rates. To sum up our results, operating subsidies for the first year of a firm's operation enable more firms to survive after a period of eight years and to hire more wage earners.

However, if we consider different efficiency and profitability indicators, firms that receive public support do not perform differently than others. They do not lag behind the unsubsidized firms because in the long run, most firms that are less efficient than average have been eliminated from the market, be they subsidized or not.

Table 6 – ATT Estimates of Firm Turnover

Variable	Treated	Controls	Difference	S.E.
<i>Turnover</i>	526.155	324.481	201.673***	97.157
<i>Turnover Absolute Variation</i>	405.959	227.180	178.779***	83.64
<i>Turnover Growth Rate</i>	13.021	5.404	7.617	6.604
Number of Observations	4,732	1,854	3,009	

Sources: FICUS 1998-2006 and SINE 1998

Notes: Stars indicate statistical significance at the 10% (*), 5% (**) and 1% (***) levels, respectively.

6.3 Tests of robustness

Table 7 represents the operating subsidy effects estimated by three alternative PSM models: (i) We use a nearest-neighbor method without replacement; that is, we use one and only one firm from the control group to correspond to a treated one. (ii) In the Nearest-Neighbor method, we diminish the caliper from 10^{-4} to 10^{-3} . This modifies the size of the common support of both distributions. Even if this support is larger than in the previous situation, the significantly positive effect of start-up subsidies remains. (iii) We use a kernel matching method that uses weighted averages of all individuals in the control group to construct the counterfactual outcome. All alternative models confirm the results of our preferred model that operating subsidies allow more firms to survive.

We also run a biprobit model of simultaneous equations explaining the receipt of start-up subsidies in the first equation and estimating survival in the second one. We use bank loans as an instrument as they are highly correlated with the receipt of subsidies. The first equation presents results similar to those of the logit of the PSM first step. The second probit shows that start-up subsidies have a significantly positive impact on survival: subsidized firms are more likely to survive than others. At the same time, the greater the initial amount of capital, the higher the firm's probability of survival. Residuals in the model of start-up subsidies are negatively correlated with the residuals in the model of firm survival. Thus, subsidies are allocated to entrepreneurs to start up firms that, all other factors being equal, are less likely to survive than are those that do not receive start-up subsidies.

Table 7 - Tests of Robustness of the Estimates of Firm Survival Rate

Periods	Treated	Controls	Difference	S.E.
<i>PSM Nearest Neighbor</i>	.505	.464	.041***	.0181
<i>With 0.0001 Caliper No Replacement</i>				
<i>PSM Nearest Neighbor</i>	.503	.459	.043***	.0191
<i>With 0.001 Caliper</i>				
<i>With Replacement</i>				
<i>PSM Kernel Method</i>	.506	.448	.059***	.016
Number of Observations	10,452			

Sources: FICUS 1998-2006 and SINE 1998

Notes: Stars indicate statistical significance at the 10% (*), 5% (**) and 1% (***) levels, respectively.

7. Concluding remarks

In this paper, we create an original and rich statistical dataset by matching two data sources including the characteristics of entrepreneurs who created firms in 1998 in France and economic and financial variables related to these firms over the 1998-2006 period. We evaluate the effect of operating public subsidies on firm survival and on firm performance. As the distribution of entrepreneurs who get start-up subsidies is not random, we face a selectivity process depending on entrepreneurs' characteristics. To control for this selection bias, we use propensity score matching (PSM) models.

Our results first show that firms that received operating subsidies for one year are more likely to survive after their first two years of life. Second, bank loans increase the probability of firm survival, be they subsidized or not. Third, operating subsidies allow firms to increase their turnover and their employment of wage earners. However, we find no significant effect on the profitability and the efficiency of their factors of production.

Finally, the long-term effect of the operating subsidies is significant. Higher firm survival and turnover and job creation are obtained at a rather limited cost to the public administration. Indeed, these subsidies are partly counterbalanced by the unemployment benefits that are saved when unemployed people start a business. In addition, these subsidies prove to be effective for the social groups that are particularly targeted by the ACCRE program.

Some weaknesses remain to be corrected in the future. First, to take into account economic and financial variables each year and increase the amount of information we use for our econometric estimation, we have to implement discrete duration models. Second, the ACCRE changed at the beginning of the 2000s. With subsequent waves of the SINE survey (2002 and 2006), we will be able to test the effect of the ACCRE reforms on firm survival. Moreover, in these new surveys we know the exact date of firm failure, which will enable us to implement continuous duration models.

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Appendix

Figure 1 - Common Support

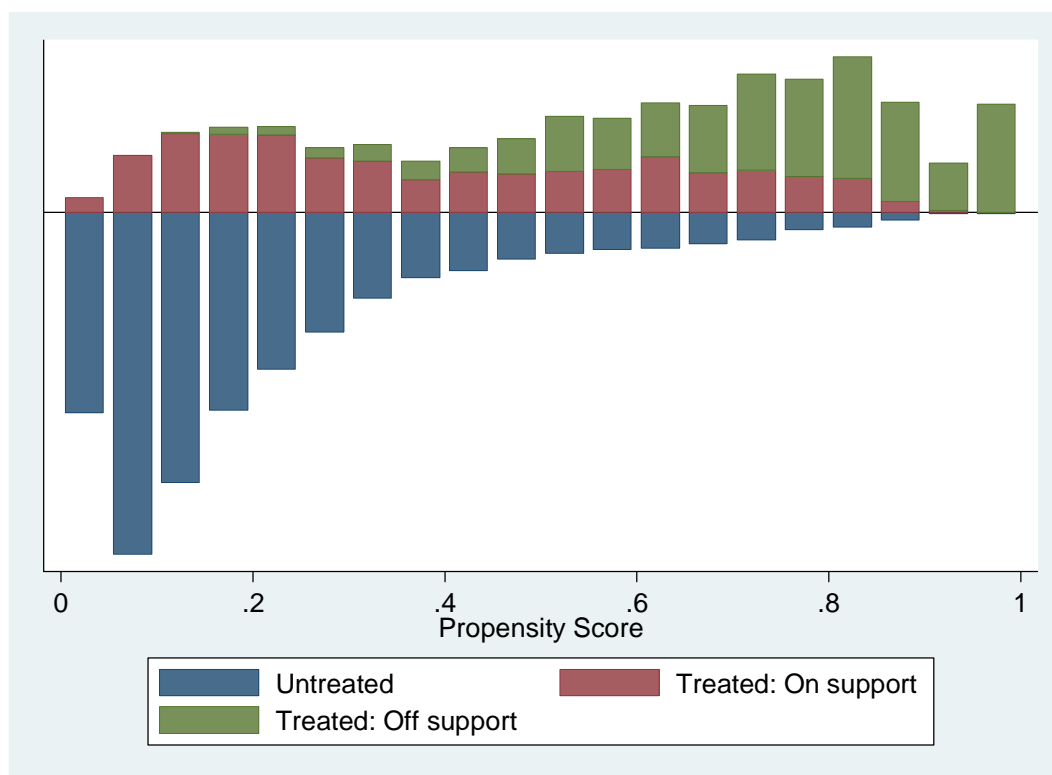


Table A1 - Estimations of the Logit Model

Variable	Estimation	Variable	Estimation
<i>Nationality</i>		<i>Initial Amount of Capital (Euros)</i>	
Not French	Ref.	Less than 2,000	Ref.
French	.281***	2,000 to 4,000	.434***
<i>Age</i>		4,000 to 8,000	.451***
Less than 25	Ref.	8,000 to 16,000	.433***
25 to 50	NS	16,000 to 40,000	.451***
More than 50	-.476***	40,000 to 80,000	.497***
<i>Education</i>		More than 80,000	.364**
No Diploma	Ref.	<i>Financing Sources</i>	
Professional Certificate	.372***	Other Types of Sources	Ref.
A-Levels	.266***	Bank Loans	.887***
Higher National Diploma	.432***	Personal Resources	.816***
Master Degree or More	.334***	<i>Sector</i>	
<i>Professional Skilled</i>		Construction	Ref.
Craftsman	Ref.	Commerce	-.367***
Student	-.249*	Transport	-.530***
Unskilled Workers	-.293**	Real-Estate Activity	-.870***
Other Skilled Workers	NS	Counseling	-.433***
<i>Previous Activity Status</i>		Functional Services	-.436***
Employed	Ref.	Hostels and Restaurants	-.298**
Unemployed Less Than One Year	1.911***	Education	-.623***
Unemployed More Than One Year	2.028***	Health and Social Activity	-.958***
Inactive	.333***	Other Sectors	NS
<i>Have you Received Preliminary Training</i>		<i>Region</i>	
Yes, after request	Ref.	Outside Paris	Ref.
Has Not Received Any	-.504***	Paris and its Suburbs	-.743***
<i>How many firms have you ever created?</i>		<i>Franchise</i>	
Has Never Created	Ref.	Yes	Ref.
Has Created One Firm	-.171**	No	-.177*
Has created More than One Firm	NS	<i>Subsidiary (Yes No)</i>	
How many hours of start-up counsel have you		Intercept	-.2.251***
Less than One Hour	Ref.		
One Hour to 5 Hours	NS		
5 Hour to 3 Days	.508***		
More than 3 Days	NS		
<i>Who Set Up The Project?</i>			
Entrepreneur With Someone	Ref.		
Entrepreneur Alone	-.473***		
<i>Prospecting for Customers</i>			
Yes	Ref.		
No	.291***		
<i>Number of observations</i>		10.452	
<i>Pseudo R2</i>		.269	
<i>Log Likelihood</i>		-4940.309	

Sources: FICUS 1998-2006 and SINE 1998

Notes: Stars indicate statistical significance at the 10% (*), 5% (**) and 1% (***) levels, respectively.

Table A2 - Balancing Test

Variable	Treated	Potential Controls	Selected Controls	Reduction bias (%)
<i>over 50 years-old</i>	.073	.123	.072	96.8
French	.894	.864	.892	98.2
Student	.046	.054	.034	75.1
Inactive	.054	.067	.047	40.8
<i>Previous Activity</i>				
Unemployed Less than a Year	.282	.125	.269	92.7
Unemployed More than a Year	.200	.099	.210	84.2
Inactive	.091	.150	.082	93.9
<i>Education</i>				
Professional Certificate	.464	.351	.474	92.3
A-Levels	.149	.168	.137	-349.4
Higher National Diploma	0.126	0.145	0.148	-403.7
Master Degree or More	0.118	0.165	0.098	68.1
<i>Have Receive no Preliminary</i>	0.506	0.664	0.511	92.1
<i>Training</i>				
<i>Initial Amount of Capital (Euros)</i>				
1,524 to 3,811	0.136	0.113	0.141	43.4
3,811 to 7,622	0.129	0.099	0.117	77.5
7,622 to 15,244	0.318	0.336	0.319	93.2
15,244 to 38,112	0.163	0.136	0.166	52.0
38,112 to 76,244	0.068	0.066	0.067	-142.5
More than 76,244	0.05	0.062	0.048	96.9
<i>Have Created One firm before</i>	0.122	0.152	0.116	94.5
<i>Counsel between 5h and 3h</i>	0.112	0.081	0.11	83.7
<i>Sector Of Activity</i>				
Commerce	0.082	0.099	0.082	100.0
Transport	0.053	0.059	0.058	96.7
Real-Estate Activity	0.029	0.061	0.029	92.6
Counseling	0.106	0.138	0.112	74.0
Functional Services	0.049	0.053	0.043	57.3
Hostels and Restaurants	0.043	0.045	0.037	-474.6
Education	0.013	0.017	0.012	16.3
Health and Social Activity	0.027	0.068	0.024	99.0
<i>Financing Personal Resources</i>	0.723	0.646	0.715	93.8
<i>Financing Bank Loans</i>	0.371	0.266	0.38	94.6
<i>Paris and its Suburbs</i>	0.068	0.127	0.066	94.3
<i>Project Set up Alone</i>	0.433	0.516	0.409	93.1
<i>Customer Prospecting</i>	0.524	0.421	0.516	92.4
<i>Franchise</i>	0.078	0.083	0.088	84.6
<i>Subsidiary</i>	0.249	0.31	0.254	98.0

Sources: FICUS 1998-2006 and SINE 1998

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