Do Public Benefits Have an Impact on New Firms' survival? An Empirical Study on French Data

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Abstract

This paper deals with the impact of public benefits on new firms' probability to survive. We provide evidence on the determinants of firm survival using a rich database combining administrative data and an entrepreneurs survey providing individual characteristics. We implement a duration model controlling for endogeneity. We show that public benefits allow firms to survive. Small firms tend to survive more than larger ones. We find that firms innovating in new products are more likely to survive than others. Entrepreneurs' professional background and previous vocational training also allow firms to survive.

Keywords: survival, endogeneity, duration model.

JEL Classification: D21, H25, L38.

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1 Introduction

An important economic issue focuses on the phenomenon of entry of new competitors into markets. Entry, and in the same time exit, has an impact on the behavior of incumbents. Existing firms try to deter new firms from entry or change their strategies of production to remain competitive and survive. Entry[1] is often explained as the consequence of attractive markets, high profits in industries or innovation. The phenomenon of entry is in particular considered through the introduction of new products and new processes of production potentially involving the process of creative destruction. As a consequence of the pervasive growth of technology, older firms that are not able to adapt to new technologies are replaced by new innovative entrants.

Since the 1990s, a significant part of the empirical literature has concentrated on firm survival and has analyzed several aspects of the extent of entry across markets. Main stylized facts are: (i) high entry rates are noticed in most countries and accompanied by similar exit rates, (ii) entry and exit are essentially the fact of (very) small firms, (iii) among a set of a given year entrants, very few are able to survive and acquire market share.

These results come from studies that use firms' characteristics. They show that firm survival depends on firm size and firm age, innovative environment etc. They largely ignore entrepreneurs' characteristics. Generally, this kind of information is not available in firm databases. Nevertheless, entrepreneurs characteristics are supposed to play an important role in firm duration: Diploma, qualification or networks (entrepreneurial and/or family networks) etc. are conditions composing individual human capital (Becker, 1964). Introducing entrepreneurs' profiles helps us to control for a substancial part of unobserved heterogeneity. Another important factor which can increase the probability to survive is public benefits and subsidies when starting up.

This paper studies the duration of a large cohort (30,000) of new firms from French data on the the 1998-2006 period. Thanks to our rich database, we are able to assess the importance of many characteristics. The originality is that we can determine the impact of public benefits on firm survival and draw conclusions on economic and employment policies. Unsurprisingly, we find that around 85 percent of new born firms of the cohort survived during the first year after entry, 57 percent survived for the five years, and 46 percent for the nine years. We implement duration models with time-varying and time-invariant covariates gathering firm-specific and entrepreneur-

[1]Entry and exit are described in Geroski (1995) that we discuss in the following section.

specific variables. Controlling for endogeneity due to non random public benefits, we find that public benefits increase the probability to survive. entrepreneurs' professional background and previous vocational training to set-up also allow firms to survive. Businesses that innovate in new products have a highest probability to survive than those innovating in new processes of production.

The paper is organized as follows. Section 2 reviews the determinants of firm survival. Section 3 describes the administrative data and survey of firm entrepreneurs we use for empirical analyzes. Section 4 explains the econometric strategy applied in the empirical analysis. Section 5 deals with our results. Section 6 concludes.

2 Related Literature

In every developed country, firm demography is characterized by high entry and exit rates in a given market each year. Bartelsman, Scarpetta and Schivardi (2003) point to the fact that a large proportion of firms enter a given market and a similar one exits the same market, that is a proportion of firms entering a market replace a similar proportion of the same market. Among a cohort of firms a given year 80 percent survive the first year following entry, 50 percent survive five years after entry, and about 30 percent seven years after entry. This phenomenon of entry/exit is part of the process of creative destruction: On a given market, a substantial proportion of entrants replace a similar proportion of incumbents that exit. Considering the ability of firms to adapt to the environment: Those which are able to adapt and grow survive, while the others are obliged to exit the market (Jovanovic, 1982). The result of the process of creative destruction is analysed through the heterogeneity among firm behavior implying 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 process of production. So some incumbents lag behind new businesses, became less competitive and finally disappear. Gort and Klepper (1982) introduced the hypothesis that the technological and knowledge conditions determine the relative ease with which new firms are able to innovate and therefore survive. As an extent, learning models (Jovanovic, 1982; Ericson and Pakes, 1995) suggest that firms may enter an industry at sub-optimal scale in order to obtain the opportunity to learn and subsequently expand if successful. In fact, firms that survive in the early years of entry are the most able to understand the environment where they act (Jovanovic, 1982) or the most able to understand how the market

works before they enter it (Ericson and Pakes, 1995). In other words new entrants face a "liability of newness" (Stinchcombe, 1965) meaning that their risk of failure is greater than incumbents. In the early years of entry, firms have to learn and find the most efficient organizational structure and also the efficiency level in order to be competitive. Thus two potential factors have an impact on the probability to survive: a "learning by doing" effect is an ability to adapt to an environment and an anticipation effect.

2.1 Age and Size of Firms

The entry/exit process is mainly the fact of small firms (Baldwin, 1995). In 2006, the U.S. Small Business Administration established that 99.9 percent of the nearly 26 million firms in the United States were small businesses with less than 500 employees. 97.5 percent of all firms were very small businesses with fewer than 20 workers (Gu et *al.*, 2008. See the data description below for the French case). An important proportion of new firms enters the service sector which gathers many occupations that do not necessarily need employees (*e.g.* house cleaning). Those units enter the market more easily in the sense that they do not have to pay workers and have no social contributions linked to employment. A result of the entry/exit process is that some firms survive several years after entry, and others die within a more or less long period. In that respect some studies show that survival depends on firm characteristics such as its size and its age: Firm size and age are correlated to survival and entry growth (Geroski, 1995). Hazard functions tend to show that the older a firm is the more it is able to survive. This is explained by the "liability of adolescence" effect (Fichman and Levinthal, 1991) and the "liability of senescence" effect (Hannah, 1998). The first effect is related to the fact that initial endowments and strategic choice of entry operates as a protection for new entrants. This determines low failure rates for young firms. Yet, as firms get older, their endowments have less effects and their initial choice may become obsolete or less adapted to new environment. Thus the period of adolescence corresponds to an increase in firm exit risk. When firms survive after this period, they consolidate their position in the market and the failure rate decreases. The second effect is sometimes regarded as a source of exit in the sense that "*older firms face a relatively high likelihood of exiting the market due to the erosion of technology, products, business concepts and management strategies over time (liability of obsolescence) or difficulties of finding a successor for the business*".

Firm size is also correlated to survival and entry growth that is large firm is more likely to survive

than a smaller one. Firms enter a market at a relatively small scale, thus they face disadvantages in terms of costs with respect to incumbents operating at a minimum efficient scale. Large firms may have a better access to capital or labor markets (Pérez et *al.*, 2004). Hall (1987) and Evans (1987) found that small firms jointly present higher growth rates and a greater propensity to exit than do their larger counterparts.

In other words, the likelihood of survival is positively linked to firm size. However growth rates, at least for small and young firms, tend to be negatively linked to size (Audretsch, 1995). Small firms of one or two employees can more easily double the number of their workers than firms having more than twenty employees. Studies on other national data confirms these findings: Baldwin for Canada (1995), Mata and al. for Portugal (1994, 1995), Wagner for Germany (1994). A study on Portuguese data (Mata and Portugal, 1994) states that the largest firms and those having the largest number of plants that enter a market are the most likely to survive.

They also show that there are no scale economies effects or inefficient small firm effects on firm survival on a given market; an inefficient firm on any market tends to disappear rapidly for it cannot sustain competition and costs of production. However entry of new firms is not deterred from entering the market by intensive capital firms exhibiting scale economies (Audretsch and Mahmood, 1995). Audretsch found that survival rates vary considerably across industries (Audretsch, 1991). Conditions on technological regime and demand linked to industries shape those rates.

If scale economies do not deter new firms from entering affected markets, those firms do not necessarily reach the efficient size when entering and are disadvantaged in terms of production costs. On the one hand, if entrants choose a low volume of production, then the price they face after entry is close to the observed prices before entry, but unitary costs is high due to reduced scale. On the other, if new firms size is high, then unitary costs are low, but the additional production will reduce the market price and industry profits (Bain, 1956). Scale economies do not deter new firms from entering affected markets because entrants have access to the same cost conditions than incumbents. Therefore they can benefit from similar scale opportunities if they reach the minimum efficient scale (Stigler, 1957).

2.2 Innovation

Mata and Portugal (1994) also notice that the exposition to risk is stronger in the case of innovative environment. They conclude that the shape of probability to survive is substantially modified by

the ownership and the starting size. Their effects add to those of technological conditions and extent of scale economies. Furthermore, empirical research shows that the "*likelihood of survival tends to be systematically lower in industries where the innovative opportunities available to small firms tend to be the greatest*" where the "*process of entry continually throws up new aspirants for market places*" (Geroski, 1995). Some entrepreneurs are attracted by the innovative dimension because of the money-making aspect of innovation and the hope of weak competition, in particular whether a firm constitutes a monopole. Innovative entrepreneurs are attracted by the possibility of monopoly rents (Aghion and Howitt, 1992). But innovation has an ambiguous effect on post-entry performance (Audretsch 1995). It was found that within several years subsequent to entry a reversed relationship exists between the innovative environment and the likelihood of survival. Firms that survived several years subsequently after entry are those which were able to adjust and produce a viable product. Gort and Klepper (1982) find that the relative innovative advantage between newly established firms and incumbents depends on the source of information that generates innovative activity. Indeed "*if information based on non-transferable experience in the market is an important input in generating innovative activity, then incumbent firms will tend to have the innovative advantage over new firms*". The accumulation of knowledge and human capital is only possible in existing firms. New entrants have *a priori* no experience and have little knowledge on innovation on the market. According to learning models they have to learn in order to be competitive.

2.3 Public Benefits

Even if small business assistance programs are potentially a tool to promote entrepreneurship in the United Sates, little interest was given to the impact of public benefits on firm survival. Few data on public benefits are available. Gu et *al.* (2008) show the difficulty of measuring the impact of small business assistance programs. They present an evaluation of different programs in the United States. Under the assessment of significant force in the promotion of entrepreneurship in this country, they describe small business assistance programs. They distinguish four main categories: business assistance, grants, loans, specialty services (for instance assistance with procurement of federal contracts). Those numerous programs are characterized by heterogeneity. They "*serve a diverse clientele, they are designed to meet various needs and are dispersed across geographic locations*" (Gu et *al.*, 2008). They provide business training, technical assistance, financing services,

grants, and special services.

Using French data, Crépon and Duguet (2003) study the impact of bank financing and public benefits on firm survival. They use selective matching methods. From 1994 to 1999, public benefits essentially consist of the ACCRE (Aide aux Chômeurs pour la Création et la Reprise d'Entreprises). To deal with selection bias, they first estimate a model of determination of initial capital that each creator has, then they estimate a model of determination of the financing frame of his project. Then they use a matching process to compare firm survival that received public benefits with from those which did not. They find that a higher initial capital is associated with a lower failure rate and that this effect can only be exhibited after three years of activity. Their study also deals with the opportunity to extend public support to start-ups or not. The local authorities that allocate the subsidies play an important role in the selection of the projects. Crépon and Duguet estimate that in the case of "*formerly unemployed people, the bank loan alone has no significant effect on the survival of the start-up while the best performance is achieved by the projects that have both a loan and a subsidy.* Local authorities select projects of the best quality and bank loans are easily granted whether the entrepreneur has first received subsidies. To extend those works, we investigate the impact of public benefits ("assistance programs") on survival avoiding difficulties linked to data limits (in the case of Gu et *al.*, 2008) in terms of numerous assistance programs and so, the difficulty to mesure their impact and a lack of data on some programs.

2.4 Enrtepreneurs' Characteristics

Another type of literature deals with entrepreneurs themselves. This literature tries to answer the underlying question about the decision of people to become entrepreneurs or to become (or remain as) employees. The main assumption is that entrepreneurs have particular features and correspond to specific profiles in terms of skills and abilities.

Lazear (2003) establishes a model of occupational choice where an individual chooses to become an entrepreneur (multi-skills) or to specialize (one single skill). He defines an entrepreneur as someone who responds affirmatively to the question "*I am among those who initially established the business*". Investigating database of Stanford alumni, he emphasizes that entrepreneurs have more balanced talents that is span number of different skills whereas specialists have a comparative advantage in a single skill. "*Entrepreneurs are people who are multi-skilled either because of their endowment or because they acquire skills that they lack*". Poschke (2008) uses a similar methodology

to show that the relationship between entrepreneurship and education is U-shaped. He establishes that most of new firms are and remain small. In fact, some of them are created by individuals who consider their firm as a source of extra income adding to their current job. The quality of the project plays a role in firm survival. Due to the fact that a project's productivity is not known *ex ante*, an entrepreneur may start a low-productivity business and then abandon it hoping to start a better one next time. With the quality of the project, entrepreneurs' characteristics appear as conditions of the start-up success. Moreover, de Mel et *al.* (2009) found that "*owner ability, personality traits, and ethnicity have a significant and substantial impact on the likelihood of a firm innovating*". Thus there is a link between entrepreneurs' qualities and the innovation process.

In the context of emerging countries, Djankov et *al.* (2005) established a profile of entrepreneurs based on surveys from Russia, Brazil, China, India, and Nigeria. Three perspectives are investigated: The role played by economic, political and legal institutions in fostering or restricting entrepreneurship. Then they focus on the social variables shaping entrepreneurship, namely the role of cultural values (Cochran, 1971) and social networks (Young, 1971). They also concentrate on entrepreneurs' individual characteristics that are as follows: Need for independence (McClelland, 1961), their psychological traits could be summed up as a belief linked to an impact of personal efforts on outcomes (McGhee and Crandall, 1968; Lao, 1970) and then their attitudes towards the risk and individual self-confidence (Liles, 1971). Djankov et *al* (2005). eventually find that the Russian institutional environment has an impact on the determination of the scope for entrepreneurship. Social network also operates as a determinant in the decision to become an entrepreneur. They find that many people family and friends are entrepreneurs too: "*individuals whose relatives and school friends are entrepreneurs are themselves more likely to be entrepreneurs*". Finally, "*individual characteristics including educational background, performance on a test of cognitive ability, personal confidence, greed, and willingness to take risks are also important determinants of entrepreneurship, echoing the claims of Schumpeter and others*". Djankov et *al.* find similar results on their Chinese survey and draw very close conclusions.

Empirical studies on firm survival little broaches two determinants: public benefits on the one hand, because of little available information; individual characteristics on the other, because of similar reason. Thanks to our rich databases, we are first able to estimate the effect of individual and firm characteristics on the probability of getting public benefits. Diplomas plays an important role in getting public benefits and the fact of being unemployed before starting (Public benefits mostly

target the unemployed as described below); low amounts of starting capital and firms activity in terms of innovation are also determinants of getting subsidies. Second, we estimate the impact of those assistance programs on firm survival controlling for individuals' characteristics. Public benefits are found to be determinants of firm survival with positive impact. Thus in the aftermath of Lazear (2003), we show the importance of entrepreneurs' background and their mutli-skill aspect.

3 Data Description

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

3.1 The sources

The SINE ("*système d'information sur les nouvelles enterprises*") survey is a permanent observatory system of start-ups. Its objective is to follow a generation of newly created firms during five years. There are three generations of firms but we concentrate on the 1998 cohort. Firms can enter the market all year long and the year is divided in two semesters for interrogation. All firms are surveyed three times: The first interrogation occurs in the early entry, the second one three years after birth and the third one five years after birth. The firms of the 1998 first semester received their first questionnaire in September 1998. The second one was given in October 2001. The firms of the 1998 second semester were surveyed in March 1999 and again in March 2002. All firms were surveyed again in September 2003. Firms surveyed operate in the manufacturing sector, construction, commerce and services (except financial activities). Agriculture is also excluded. The SINE database consists of 30,067 observations and 584 variables. Unlike many foreign studies which use administrative data (Pfeiffer and Reize, 2000), SINE includes micro-firms, in particular those of the sector of services that represent the major part of start-ups, *i.e.* nearly 60 percent of new firms are created in the sector of commerce and repair, and in other services (services to households and to firms). The paper adopts the definition given by INSEE in order to identify the type of entry. We only keep "real creations" *i.e.* firms which use new means of production. For instance, it is the case of the opening of a new store or a new firm producing goods that do not exist until 1998.

Additional information about the financial situation of is obtained from a firm fiscal database

(Ficus, "Fichier unifié de Suse"). It covers the period from 1998 to 2006 and enables us to calculate indicators of economic health: the value-added variation rate, the profitability rate and the apparent labor productivity ratio. Every year, about 2.2 million to 2.6 million firms operate in all industry.

Table 1: Number of Firms in FICUS Each Year

Year	*Number of Firms*
1998	2,225,349
1999	2,273,650
2000	2,294,627
2001	2,229,467
2002	2,351,255
2003	2,408,557
2004	2,507,747
2005	2,429,293
2006	2,633,925

Source: FICUS 1998-2006

3.2 Matched Database

After matching, newly created firms in 1998 go through 30,067 in the SINE database to 10,570. More than one and a half of the created firms in 1998 disappeared between 1998 and 2006 which is consistent with the literature. This database contains an important amount of information which gathers entrepreneurs and firms characteristics and the opportunity to follow firms from birth to potential death between 1998 and 2006. Between the two first SINE survey (two semesters of 1998) and the FICUS survey, some firms where created but only appear in FICUS 1999. This case is the result of delays in administrative recordings. On the contrary, some firms still appear even when they have failed. We delete all these firms. We also drop firms which were taken over in this period. So we only concentrate on entry without considering takeovers or juridical transformations. The following results are only valuable in the case of entry and must not be generalized to all the cases. Other evaluations should be done to describe those other cases which can represent about 25 percent. Due to recording problems, some firms disappear one year within the period whereas they exist the year before and the year after. They are also dropped. With this matching we are able to follow firms from 1998 to 2006 with entrepreneurs' characteristics, firms' characteristics and

their potential public benefits. As a result the final database consists of a rich database with panel dimension and time-variant and time-invariant covariates.

3.3 Several Types of Available Public Benefits

SINE contains two variables related to public benefits. The first one describes all possibilities offered to entrepreneurs (8 possibilities). They can apply for different types of public benefits. The second variable of public benefits is an aggregate one, a dummy answering to "did you get public benefits?" 'yes' or 'no'. The correspondence between 'no public benefit' of the aggregate variable and the answer 'no' of the non aggregate variable is not absolute because of missing information in the second variable. Entrepreneurs can benefit from several subsidies. An important proportion of helped entrepreneurs in the data are unemployed people. People in activity before starting the business are hardly helped. The proportions of each type of public benefits between SINE and the matched database are very similar. In SINE, the major part of firms did not receive any public benefit. 19 percent of firms in the matched database are exempted of charges and 13 percent in SINE are.

Table 2 below presents a summary of the different types of benefits in SINE and in the matched database when we do not consider the firms that receive nothing to show the proportion of each benefit among all. The first column shows the types of public benefits, the second and third ones show respectively the number of firms and the corresponding percentage of firms that receive the current public benefit. The fourth and fifth columns do the same with the matched database. The major part of firms got exemptions linked to the ACCRE that is the major part of entrepreneurs in 1998 is unemployed people.

Table 2: Public Benefits in SINE and in the Matched Database Excluding 'No Public Benefits'

	In SINE		In Matched DB	
Types of Public Benefits	*Frequency*	*Percentage*	*Frequency*	*Percentage*
0. No answer	1,171	12.94	104	2.77
1. Local or regional subsidies	794	8.78	312	8.30
2. Other subsidies	239	2.64	94	2.50
3. Loans	494	5.46	174	4.63
4. Repayable advances loans at 0% rate	219	2.42	72	1.91
5. Paid-in benefits	127	1.40	56	1.49
6. Exemptions linked to ACCRE	3,972	43.90	2,049	54.49
7. Professional tax exemptions	877	9.69	422	11.22
8. Other fiscal exemptions	170	1.88	78	2.07
9. Reduction of social contributions	850	9.39	347	9.23
10. Other benefits	135	1.49	52	1.38
Total	9,048	100	3,760	100

Source: 1998 SINE survey and FICUS 1998

3.4 Descriptive statistics

Among the cohort of firms in 1998 80 percent survive the first year following entry, 50 percent survive five years after entry, and about 30 percent seven years after entry.

Estimations from SINE first establish that among the 1998 entries, half of them survive five years later. They show that individuals creating sustainable firms present common factors: unemployed people who create firms are rather short-term unemployed than long term, aged 30-40 years. Entrepreneurs older than 50 who were unemployed before starting up are the more able to run a firm to its fifth birthday. The youngest entrepreneurs are the less likely to sustain a firm. The lack of experience increases the probability of failure, more than low skill workers. Estimations exhibit the fact that construction and services to firms are the sectors where firms survive the more. Finally, one of their conclusions states that sustainable firms are those which create jobs: On average firms employ 3.5 individuals five years after creation. Survival also depends on investment, entrepreneurial network, preliminary training and the get of public benefits. This last statement is consistent with Crépon and Duguet (2003) who find that public benefits allow firms to survive.

The matched database presents similar statistics.

4 Methodology

The main model presented below is based on a binary representation of firm life. A discrete variable describing firm survival each year is created to implement discrete-time duration models. The study concentrates on entries in 1998 to avoid left-censored data. Due to the lack of available information about the future of sustainable firms after 2006, we face a problem of right-censored data.

The dummy variable describing public benefits is not random and needs controlling for endogeneity in the duration model. Public benefits are granted depending on the nature of the benefit in itself and on the entrepreneur's activity: in particular the highest proportion of allocated public benefits is the ACCRE. Thus the recipients are mainly unemployed people that had to apply for the benefits via application form. It is not irrelevant to think that people vouchsafing public benefits investigate each form in order to find the most "able prospective entrepreneur". Thus public benefits are not randomly distributed. Neglecting unobserved heterogeneity surely brings one to a bias in the duration dependence estimation; it seems to cause a rescaling of the covariate coefficients by a constant factor (Nicoletti et *al.*, 2006). Studies on survival traditionally concentrate on firm characteristics. We introduce a large number of covariates describing individual characteristics in order to control for proportion of unobserved heterogeneity and improve the results on survival. Nevertheless we expect some unobserved heterogeneity. The information about human capital are partially unobserved, for example we are not able to observe entrepreneur's management ability.

4.1 Endogenous Benefits

We assume that public benefits are endogenous for have an impact on firm survival. They help the entrepreneur in the early years of venture, in particular in the case of people beginning with few means. (See tables 6 and 7 in appendix)

In order to control for endogeneity, we implement a probit model to endogenize public benefits. The duration model is specified thanks to a variable which is related to the get of public benefit but is not related to survival. We use diploma to do so and use it as an instrumental variable because it has no real effect on survival, but has one on the get of public benefits. It actually operates as a signal (Becker, 1964): people who have the highest diploma are believed to be the

most able to manage and make successful projects than others (Poschke, 2008). In the probit model explaining public benefits, we include two sets of controls: firm characteristics (sector of activity, developed activity, location, etc.), individual characteristics (sex, age, qualification, etc.). Therefore, we use a similar approach to Heckman (1978; 1979). We use an aggregate binary variable given by the SINE database that described the fact of getting public benefits or not without paying attention to their nature. We lose the information on firms taking advantage of two and even three benefits (some receive 'Exemptions linked to ACCRE', 'Professional tax exemptions' and 'Other fiscal exemptions').

In that respect we operate a two-step model. We thus have the following equation of endogeneity:

$$pBenefits_{1998} = \alpha Y_i + \beta Z_i + \nu_i \tag{1}$$

where $pBenefits_{1998}$ is a dummy variable which equals one when the entrepreneur received public benefit in 1998 and zero otherwise, Y_i denotes a set of explanatory variables (sex, age, etc.), Z_i denotes the variable describing the highest entrepreneurs' diploma and ν_i denotes the error term. All the variables are time-invariant covariates because we assume that public benefits are not function of any firm productivity, value-added etc. We get estimated probabilities that we inject into the duration model.

4.2 Main Model

The duration model is as follows:

$$Life_i = \alpha A_i + \beta B_i + \hat{p}_{1998} + \mu_i \tag{2}$$

where $Life_i$ is the period a firm survives in years, $Life_i = 1 \dots 9$, A_i is a set of controls corresponding to firm characteristics and B_i is a set of controls corresponding to individual characteristics, $\hat{p}_{1998}$ denotes the estimated probabilities we got before and μ_i is the error term.

The richness of our database allows us to distinguish two sets of variables: those characterizing entrepreneurs and those describing the firms they created. The literature points to that small firms are less likely to survive. "They employ the less able managers and will be the first to leave the

market when, for example, wages grow and the opportunity cost of being an entrepreneur increases" (Lucas, 1978). Mistakes are linked to this manager's low ability. Large firms are more likely to last longer in the sense that even if they are not as efficient as they expect, they have the possibility to get smaller (Mata and Portugal, 1994). Without paying attention to scale economies, we include some variables of firm size to test this fact. Firm characteristics include lagged time-varying covariates in order to avoid problems of recording.

Lazear (2003) assumes that entrepreneurs are rather multi-skilled individuals than specialized in one field. Thus this aspect could be captured by the initial education level, but also by the current qualification, vocational training or any professional background. Another aspect of background may be seen through the potential number of previous creations. People who have never created are more likely to undergo the market laws than those who have already created one or two firms. In fact, the number of creations is an inverse U-shaped function of survival (Lazear, 2003).

INSEE estimations point to the fact that the quality of a project takes precedent on the entrepreneur's qualities. "Small project" are fragile, survival depends on the initial amount of capital (machines purchase, expenses for equipment and settlement, etc.). As they establish descriptive statistics on the 1994 SINE survey, we can evaluate this with a set of very similar variables. Poschke (2008) also points to individual's projects within a model of occupational choice. When people think they have a good business project, they would rather try this project than choose or stay in employment implying a self-selectivity in entrepreneurship. As in Audretsch et *al.* (1995), we capture the ownership structure[2] of the firm by including a dummy variable equaling to one if it belongs to a group and zero if independent.

5 Results

This section deals with our main findings. It presents the impact of different time-variant and time-invariant covariates denoting individual and firm characteristics on firm survival. We exhibit the effect of the control for endogeneity. If no control for endogeneity is done then public benefits have a non significant positive impact. Otherwise, the coefficient before public benefits appears to be significantly positive: if entrepreneurs are financed then they increase the probality to survive.

[2]The variable "ownership" describes: Independant Firm; Private French Group; Public French Group; Private Foreign Group; Group controlled by natural persons living outside of France

These findings are consistent with Crépon and Duguet (2003) in the sense that public benefits coupled with bank loans allow firms to survive more and the initial amount of capital is also a factor of survival. The two highest amounts of capital, as opposed to the two lowest, are positively correlated with firm survival in a significant way. Estimations on shorter periods (1998-2000 and 1998-2003) show the robustness of our results (See table 10 in Appendices). We found the same effects of public benefits on firm survival.

Even when controlling for individual characteristics, classical facts commonly found in the literature remain. Firm size matters in the sense that the more employees a firm has, the less it is sustainable. Our relation is not consistent with Audretsch (1995) who found that the likelihood of survival is positively linked to firm size. Most of the firms in the match database are very small units from the sectors of services and commerce. In that respect, our results are opposite to those found in the literature and they are significantly negative, but very low. Our findings are consistent with the following fact: most of small firms remain small and are not much more likely to exit than larger ones (Poschke, 2008). In fact, the most of our firms have no employee and the purpose of a single entrepreneur is not clearly established and could be more likely to fit with the profiles drew up by Poschke (2008) that is people who consider their firms as a source of extra outcomes.

As an extent, the firm size could be seen through the number of clients firms have. The more customers a firm has, the more it is likely to survive. This is especially true within the second questioning (proposed three years after entry), not within the first one. This would mean that in the early times of entry, having more than one or two customers is difficult to manage. But three years after, if surviving, the relationship between the number of customers and survival is positive thanks to routine effects, more than informatics (we found no significant effect on 'having a computer') to do accounting for example. This is consistent with learning by doing: The business learns how the markets works and if able to adapt, then it grows and increases the number of customers. Tirole (1993) shows that considering the clientele as a form of capital, an incumbent "investing" in a clientele increases the demand for its goods. Thus if the clientele linked to the incumbent is sufficiently large, the entrant's demand will be low. So the number of customers first lowers the probability to survive, and then, after having survive a couple of years, the number of customers increases the probability to survive for they are incumbents.

In the field of innovation, we consider the results against the fact that the firm introduces

an innovation process. The variable describing the type of developed activity is from the first questioning and gives no information on further activity. That is we do not know whether a firm that innovates at time t is still innovating at time $t+1$. We assume that there is no change in firms' activity. Entering a market with many incumbents seems to be more favorable to survival than product innovation. Three noticeable facts: First, if a firm enter a marcket in oligopoly then incumbents will try to deter the new one from entry (see Tirole, 1993 for more details on the strategies used by incumbents); it is difficult to last on the market, and the firm exits rapidly. Second, a less probable case, a firm entering a market where there does not exist any firm, that is the entrant creates a new market. In this case, the entry cost should be very high. Third, a firm entering a market where many incumbents exist that is the market is not the most innovative, and where monopoly is less possible due to the large number of incumbents. In that case there are less possibilities to deter new entrants from entry. Moreover new entrants on a market tend to discipline it (Mata and Portugal, 1994). Those facts give a clue to explain our findings: Firms entering a market where there are many incumbents tends to survive better than a firm using a making process innovation. Product innovation is positively and weakly significant. This should be explained by the fact that even if an innovating firm entering a market has to face large entry costs, it is profitable to innovate at a more or less long term. Intuitively, it is more competitive to develop product innovations than developing prossess innovations because of lower costs and smaller delays of launching the product on the corresponding market. Actually this result is consistent with de Mel et *al.*'s second hypothesis (2009): "*Process and organizational innovations will be more negatively associated with competition than product innovation. Marketing innovations will be at least as negatively associated with competition as product innovation, and possibly more strongly negatively associated*".

Note that firm location has an impact on survival. Indeed the region where firms were and are set up matters: There are heterogeneity in regional demands and needs, in unskilled and skilled workers in different labour pool ("*bassin d'emploi*"), etc. Our results show that, taking one region as reference, the others have an impact more or less significant. But location ('at home', 'close to your home', 'somewhere else') has a very low and non-significant impact: In relation to 'at home', the two other modalities have a negative impact. It appears to be more convenient to work at home than anywhere else; it presents the advantage of no transportation cost, or, although the type of

premises (owner, renter or freely roomed) has no significant impact, it present no location taxing.

Considering the impact of individual characteristics, gender has no significant effect that is male or female entrepreneurs have an equal ability to create a sustainable firm. There is *a priori* no gender discrimination in the sense that male and female obtain public benefits in the same proportions. In the mean time, even though entrepreneur's nationality lowers the probability to get public benefits (being a foreigner, and especially a non European Union citizen against being French), it has a negative but no significant impact on the probability to survive. Foreigners create firms with a similar probability of surviving than French entrepreneurs. This is a self-selectivity effect: Among people living abroad, knowing that starting a venture is difficult, those who create are the most able to do so. This is not surprising since foreign people who start a venture in France are potentially the most likely to be successful through an auto selection phenomenon.

Following Lazear (2003), entrepreneurs present a specific profile: they are "*individuals who are multi-faceted, are sufficiently skilled in a variety of areas to put together the many ingredients required to create successful business*". Thus, if public benefits do not target those more "*balanced individuals*", then they could be given to any person who are not necessarily mutli-skilled and as a consequence less able to be successful. Among individual characteristics, entrepreneur's age is an important matter: Taking the youngest as the reference, then all other age groups are significantly positive, except the older one. Youngest entrepreneurs have less experience to manage successfully their business along the period. In fact vocational experience is also important. It is rare that people under 25 have gained enough skills and experience within their previous jobs. People who acquired experience in an activity where they start up, or an activity close to the one they start up raise their probability of surviving.

Firms that survive the best are managed by a lonely business leader and people who have an entrepreneurial network raise their probability to survive, especially if this network consists of their relatives. Djankov et *al.* (2005) find that the decision to create a business is strongly linked to the social network: Entrepreneurs often have family or friends who are entrepreneurs themselves. The theoretical explanation should provide that there are positive externalities: These new entrepreneurs can take advantage from the experience of their family or friends. They benefit from their folks' advice without investing in business advisers. Concerning the management of the firm, another efficient option in relation to 'managing by their own' seems to be managing with the

spouse. There is enough confidence among the couple for they start up together and manage the business.

INSEE estimations show that, from the beginning, future business leaders of sustainable firms aim at developing their venture. They report that the majority of the entrepreneurs of 2002 declared that they would limit their ambition to assure their own job. This is not the case of one third of the business leaders who ruled sustainable firms. Our empirical results are consistent with those observations. If the reference of the point of view on the future is 'developing the business', then the other modalities 'turn up a difficult situation', 'close the firm', 'sell the firm', 'do not know' play a negative role on surviving. All these modalities are significant except 'sell the firm'. Yet 'sustain the current balance of the firm' is significantly positive. The matched database includes interesting variables about entrepreneur's knowledge on the risk of firm survival. One describes that the entrepreneur knows there is a risk or there is no risk or does not know about any risk. It captures whether the entrepreneur is risk adverse, risk lover or risk neutral. Considering that the entrepreneur is aware of a risky venture (assuming he is a risk lover), the results show that the absence of risk increases the probability to survive. In the same time, the ignorance of risk, that we could understand as risk neutrality, increases the probability to survive too. The other variable describes the nature of the risk. It appears that the absence of risk is favorable to surviving against the existence of risk; the existence of risk lowers the probability of surviving on the period.

Table 4: Estimation of the Impact of public benefits on duration models

Model	Exogenous PB	Endogenous PB
Intercept	0.7041***	
	(0.1176)	
Public benefits	0.0351	
	(0.0257)	
Estim. Prob. PB		0.2708***
		(0.0683)
Weibull Shape	1.4533	
	(0.0159)	
Weibull Shape		1.4494
		(0.0158)
Number of Observations	10183	10183
Noncensored Values	5458	5458
Right Censored Values	4725	4725

Source: 1998-2006 FICUS and 1998 SINE Survey

Notes: Stars indicate statistical significance at the 90% (*), 95% (**) and 99% (***) level, respectively. Standard error in brackets.

6 Concluding Remarks

We have provided a duration model of firm survival including two distinguished sets of covariates: firms characteristics on the one hand, entrepreneurs' characteristics on the other. When considering public benefits as exogenous, they have no impact on firm survival. However, the main prediction is that firm duration increases thanks to public benefits, which potentially permit entrepreneurs to bear entry costs, machine purchase etc. That confirms the primary hypothesis that public benefits are allocated according to entrepreneurs' characteristics and those of the businesses they start. That is the allocation of public benefits is determined by different socio-economic factors and are a determinant of firm survival. We also find usual results on determinants commonly found in the literature. Say, an large size when entering the market is negatively correlated with firm survival.

We find that innovation has not an important impact. Firms entering a market that many incumbents have already entered for several years are more likely to survive than firms entering an

innovative market. In that respect, competition appears to be negatively associated with innovation. But firms entering an innovative market of new products are slightly more likely to survive than those entering a market of making process innovation.

Entrepreneurs who were unemployed (more or less than one year) before starting-up are less likely to survive than those who were employed. The unemployed are the most numerous helped people but in the same time being unemployed before starting up is unfavorable to firm survival. That would mean two things: First, the unemployed who survive the most are the helped ones; second, people who are employed before creation and who are helped are the most likely to survive.

Moreover, the impact of individual human capital is not so relevant as it could be thought. One could think that diploma or previous qualification should play a role in managing the firm and allow it to survive. Yet, only entrepreneurs' previous background in other employment plays a significant part in surviving. The accumulation of knowledge increases the ability to understand the market functioning and potentially enables entrepreneurs to adapt. Managing the new firm with the spouse increases the probability to survive than when the individual does it on her own. Another interesting field that the paper raised is the impact of entrepreneurs' point of view about the future of firms : 'Developing the business' and most of all 'sustaining the balance of the firm' are points of view that have a positive impact on firm survival. This is not surprising since other modalities are riskier points of view.

Further researches would introduce information on the quality and the productivity of workers, and managers' choices in terms of recruitment. Those factors reflects workers' productivity on the one hand, and on the other, the form of organization the firm have to adopt to be the most efficient.

7 Appendix

7.1 Estimations of the Impact of Covariates on Survival

Table 3: Estimations on Duration Model, Individual Characteristics

Parameter	Estimation	Standard Error
Intercept	0.7041***	0.1176
Sex	0.0401*	0.0232
Background		
In the act. where you started	1.1490***	(0.3626)
In a near act.	1.0954***	(0.3632)
In a different act.	1.0125***	(0.3627)
Multi-skills	1.0113***	(0.3659)
Previous Activity		
In activity	Ref.	
Unem. less than one Year	-0.1371***	(0.0370)
Unem. more than one Year	-0.1905***	(0.0385)
Without activ	-0.1082***	(0.0311)
Estim. Prob. PB	0.2708***	(0.0683)
Weibull Shape	1.4494	(0.0158)
Number of Observations	10183	
Noncensored Values	5458	
Right Censored Values	4725	

Source: 1998-2006 FICUS and 1998 SINE Survey

Notes: Stars indicate statistical significance at the 90% (*), 95% (**) and 99% (***) level, respectively. Standard error in brackets.

Table 4: Estimations on Duration Model, Firm Characteristics

Parameter	Estimation	Standard Error
Firm Activity		
Making Process innovation Product innovation	0.0709*	(0.0428)
New commerc. mode	0.0497	(0.0489)
Many existing competitors	0.1209***	(0.0388)
Sector		
Industry IAA	REf.	
Industry out of IAA	0.0662	(0.0736)
Construction	0.1508**	(0.0704)
Commerce and Repair	-0.0415	(0.0675)
Transportation	0.2305***	(0.0777)
Real Estate Act.	0.0274	(0.0779)
Services to Firms	0.1673**	(0.0707)
Services to Individuals	0.0945	(0.0716)
Edu., Health	0.4462***	(0.0803)
Weibull Shape	1.4494	(0.0158)
Number of Observations	10,183	
Noncensored Values	5,458	
Right Censored Values	4,725	

Source: 1998-2006 FICUS and 1998 SINE Survey. Notes: Stars indicate statistical significance at the 90% (*), 95% (**) and 99% (***) level, respectively. Standard error in brackets.

Table 5: Estimations of Duration Model, Other Firm Characteristics

Parameter	Estimation	Standard Error
Ownership		
No participating corp.	ref	
Less than 50%	0.0108	(0.0647)
50% or more	1.2842***	(0.3622)
not concerned	-0.1251***	(0.0293)
Customers		
First questioning		
1 or 2 Cust	Ref	
3 to 10 Cust.	-0.1096***	(0.0342)
Many Cust.	-0.1360***	(0.0340)
Many with some big Cust.	-0.1441***	(0.0404)
Second questioning		
1 or 2 Cust	Ref	
3 to 10 Cust.	1.1245***	(0.0320)
Many Cust.	1.3152***	(0.0260)
Many with some big Cust.	1.4821***	(0.0384)
Manpower	-0.0098***	(0.0023)
Bank loan	0.0531*	(0.0258)
Network	-0.0514**	(0.0232)
Ent. Network	-0.0935***	(0.0246)
Amount of starting capital	(Euros)	
Les than 1,524	Ref	
1,524 to 3,811	-0.0630*	(0.0352)
3,811 to 7,622	-0.0601	(0.0370)
7,622 to 15,244	-0.0195	(0.0334)
15,244 to 38,112	0.0133	(0.0395)
38,112 to 76,244	0.1390***	(0.0529)
More than 76,244	0.1489**	(0.0580)
Existing Risk		
Yes	Ref	
No	0.1367***	(0.0288)
Do not know	0.0766***	(0.0296)
Estim. Prob. PB	0.2708***	(0.0683)
Scale	0.6900	0.0075
Weibull Shape	1.4494	(0.0158)
Number of Observations	10,183	
Noncensored Values	5,458	
Right Censored Values	4,725	

*Source: 1998-2006 FICUS and 1998 SINE Survey. Note: * = significant at the 10% level; ** = significant at the 5% level; *** = significant at the 1% level.*

7.2 Public Benefits

Several public benefits to create a firm exist. Those plans are put in place by the government or local communities and are differently shaped: Financial subsidies; Fiscal reductions; Payroll taxes exemptions; Help to advice; Availability of premises...

The SINE survey includes several types of public benefits that we describe above.

1. Local or regional subsidies. French regions can freely define direct benefits regime they grant. They have to respect common competition rules. Local communities can grant benefits through subsidies, interest bonuses, repayable loans, with null rate.

2. Other subsidies

3. Loans

4. Repayable advances loans at 0% rate

5. Paid-in benefit

6. Exemptions linked to ACCRE. The ACCRE (Aide aux Chômeurs à la Création et à la Reprise d'Entreprise), is a public program to help the unemployed to create or take over firms and was deeply transformed by a five-year employment law. From April 1994 the plan assign a 32,000 francs bonus (around 4880 euros), free social coverage for one year, and was enlarged to new recipients. Thus, the number of recipients came to 75,000 in 1994 from 50,000 in 1993.

   From 1995, eligibility conditions to this plan were progressively limited. The allocation bonus was suppressed on January 1997. As a consequence the number of firms that were created or taken over thanks to the ACCRE sharply diminished from 1996. This number went from 82,000 in 1995, 39,000 in 1996 to 33,000 in 1997.

7. Professional tax exemptions. They can be granted to firms that set up in definite areas.

8. Other fiscal exemptions
9. Reduction of social contributions
10. Other benefits

The ACCRE is defines as: Aide aux Chômeurs pour la Création et la Reprise d'Entreprise (Help to the unemployed to firm creation or takeover) and consists of an exemption of social assessments (except for CSG, RDS and mandatory complementary retirement) for one year, from the date of affiliation effect of insured individuals (for non-earned workers regime) or from the date of the beginning of firm activity (for earned regime). The exemption does not pertain to incomes or earnings that do not overtake 12% of current Smic from Jan. 1st (18,062.04 Euros for 2007). Concerning entrepreneur under the "Micro Fiscal" regime, the exemption can be extended two years under conditions.

Eligible Activities: The eligible Firm activities to take advantage of the ACCRE are the following: Commerce, Industry, Craftsmanship, professional activity and commercial agent.

Getting Conditions: To be a job applicant; Starting up or taking over a firm individually or under a company frame, rejecting associations, GIE and employers groups, and exercising the control of the firm; Not having got the ACCRE the past three years; To belong to the category of beneficiaries.

Application Form Handing In. The application form of the ACCRE should be handed in: As soon as the entry or takeover is started; By 45 days (calendar days) that follow the handing in of the start-up or takeover.

7.3 Probit Model Estimations

Table 6: Estimations of Probit Model, Individual Characteristics

Parameter	Estim. (Std)
Intercept	-2.5905*** (0.4627)
Male (Female Ref.)	-0.0336 (0.0386)
No Diploma	Ref.
CEP	0.2302*** (0.0857)
BEPC	0.0334 (0.0736)
CAP/BEP	0.2445*** (0.0540)
BAC Technique	0.1706** (0.0665)
BAC Général	0.0929 (0.0775)
BTS, DUT	0.2124*** (0.0690)
DEUG	0.2409*** (0.0925)
BAC + 3 and more	0.1708** (0.0700)
Previous Vocational training	
Yes, after asking	Ref.
Yes, because mandatory	-0.1049** (0.0511)
No	-0.2897*** (0.0458)
French	Ref.
European Foreigner	-0.1451* (0.0806)
Non European Foreigner	-0.2377*** (0.0867)
Employed	Ref.
Unemployed less than one year	1.0228*** (0.0446)
Unemployed more than one year	1.0820*** (0.0515)
Inactivity	0.1625*** (0.0617)
Observations	10,466

Source: 1998-2006 FICUS and 1998 SINE Survey

Notes: Stars indicate statistical significance at the 90% (*), 95% (**) and 99% (***) level, respectively.

Table 7: Estimations of Probit Model, Firm Characteristics

Parameter	Estim. (Std)
Firm Activity	
New Making Process	Ref.
New Product or New Service	0.2042*** (0.0660)
New Marketing Mode	0.2069*** (0.0782)
Activity with Many Competitors	0.1222** (0.0610)
Firm Sector	
Industry	Ref.
Construction	0.0272 (0.0593)
Business and Repair	0.0142 (0.0613)
Other services	-0.1222** (0.0586)
Hancrafted unit	0.2294*** (0.0460)
Initial amount of capital	
Less than 10,000 F	Ref.
10,000 to 25,000 F	0.1670*** (0.0584)
25,000 to 50,000 F	0.1935*** (0.0601)
50,000 to 100,000 F	0.1004* (0.0527)
100,000 to 250,000 F	0.0588 (0.0626)
250,000 to 500,000 F	0.1188 (0.0792)
More than 500,000 F	-0.0383 (0.0906)
Observations	10,466

Source: 1998-2006 FICUS and 1998 SINE Survey

Notes: Stars indicate statistical significance at the 90% (*), 95% (**) and 99% (***) level, respectively.

7.4 Results on Duration Models, 2001 and 2004

Table 10: Estimation of Duration Model on periods 1998-2001 and 1998-2004

	Year 2001		Year 2004	
Parameter	Estim.	Std.	Estim.	Std.
Intercept	0.5397***	(0.1639)	0.6438***	(0.1235)
Sex	0.0393	(0.0342)	0.0314s	(0.0248)
Background				
In the act. where you started	1.1415**	(0.4487)	1.1510***	(0.3770)
In a near act.	1.0399*	(0.4498)	1.0907***	(0.3776)
In a different act.	0.9412*	(0.4489)	1.0052***	(0.3771)
Multi-skills	1.0072*	(0.4549)	1.0164***	(0.3807)
Previous Activity				
Unem. less than one Year	-0.1677***	(0.0556)	-0.1400***	(0.0394)
Unem. more than one Year	-0.2280***	(0.0577)	-0.1998***	(0.0411)
Without activ	-0.1269***	(0.0462)	-0.1218***	(0.0330)
Firm Activity				
New making process	0.1422**	(0.0628)	0.0561	(0.0454)
New com. mode	0.1692**	(0.0720)	0.0622	(0.0521)
Many existing competitors	0.2531***	(0.0557)	0.1226***	(0.0412)
Sector				
Industry out of IAA	-0.0412	(0.1143)	0.0740	(0.0779)
Construction	0.1047	(0.1098)	0.1531**	(0.0744)
Commerce and Repair	-0.1153	(0.1050)	-0.0287	(0.0714)
Transportation	0.2753**	(0.1202)	0.2605***	(0.0825)
Real Estate Act.	0.0090	(0.1209)	0.0732	(0.0831)
Services to Firms	0.0976	(0.1094)	0.1917**	(0.0748)
Services to Individuals	0.0485	(0.1111)	0.1098	(0.0758)
Edu., Health	0.3966***	(0.1240)	0.4775***	(0.0854)

Manpower	-0.0113**	(0.0044)	-0.0093***	(0.0027)
Bank Loan	0.0913	(0.0403)	0.0570**	(0.0277)
Network	-0.0624*	(0.0348)	-0.0431*	(0.0248)
Ent. Network	-0.0960**	(0.0374)	-0.0973***	(0.0262)
Amount of starting capital	(Euros)			
1,524 to 3,811	-0.0708	(0.0521)	-0.0521	(0.0377)
3,811 to 7,622	-0.0717	(0.0545)	-0.0671*	(0.0394)
7,622 to 15,244	-0.0076	(0.0497)	-0.0284	(0.0355)
15,244 to 38,112	0.0410	(0.0596)	0.0213	(0.0422)
38,112 to 76,244	0.2114**	(0.0822)	0.1449**	(0.0567)
More than 76,244	0.2818***	(0.0932)	0.1638***	(0.0625)
Existing Risk				
No	0.2237 ***	(0.0445)	0.1654***	(0.0309)
Do not know	0.1016**	(0.0447)	0.0951***	(0.0316)
Estim. PB	0.3179***	(0.1031)	0.2776***	(0.0729)
Scale	0.8415	0.0114	0.7160	0.0081
Weibull Shape	1.1884	(0.0161)	1.3966	(0.0158)

Source: 1998-2006 FICUS and 1998 SINE Survey

Notes: Stars indicate statistical significance at the 90% (*), 95% (**) and 99% (***) level, respectively. Estim. PB denotes the estimations on public benefits from the probit model.

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