Short-Time Compensation and Establishment Exit: an Empirical Analysis with French Data *

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Abstract

According to the law, the short-time compensation (STC) program aims at avoiding redundancies in case of short-term downturns. Calavrezo, Duhautois and Walkowiak (2009a) show that STC seems to be a warning sign for redundancies. Even if it does not protect from redundancies, STC could preserve establishment's survival. In this paper, we study the efficiency of the STC device by analyzing the relationship between STC and establishment exit over the period 2000-2005. The STC recourse is not randomly distributed among French establishments; this implies a selection bias problem. To control for this bias, we merge six data sets and we test the relationship between STC and establishment exit with propensity score matching techniques. Our results show that, on average, establishments which use STC exit more intensely the market the year after than those which do not use the program.

Key words: Short-time compensation, establishment exit, selection bias, propensity score matching

JEL Codes: J20, J63, C14

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1. Introduction

According to the law, the short-time compensation (STC) program is a device of employment protection since it aims at avoiding redundancies in case of short-term economic downturns or exceptional circumstances (for instance, disasters). Employers applying STC can temporarily reduce their employees' activity below the legal working time (for the entire establishment or only a part of the establishment), eliminate a part of their activity or stop their entire activity. STC allows employees to maintain a contractual bond with their employer. They receive a compensation for their wage loss that is partly paid by the State. STC exists under different forms in most developed countries: for example, the "Cassa Integrazione Guadagni" in Italy, the "Kurzarbeitergeld" in Germany, the "Short-Time Compensation Program" in the United States, the "Worksharing program" in Canada and the "Short-time Working" device in the United Kingdom. In France, the exact name of the device is "Chômage partiel" (partial unemployment). Nevertheless, in this paper, we decide to use the US term. Before the recent economic crisis, even if the STC program is more used in Europe than in North America, it appears in all countries as a "rare phenomenon". In average, between 1995 and the 2005, STC authorizations affected nearly 1% of the French establishments and 2% of their employees in the private sector excluding agriculture (Calavrezo et al., 2009b). In the 80's, in the US, there is a similar low STC participation limited to less than 1% of employers. Since 2008, the economic crisis has been amplifying the use of STC programs especially all around Europe.

In a theoretical perspective, the international literature identifies two coexisting STC roles (a security role and a flexibility role) which differentiate North American and continental European systems (see the three main papers on this topic: Van Audenrode, 1994; Houseman and Abraham, 1993; Burdett and Wright, 1989).

Calavrezo et al. (2009b) investigate the flexibility role of STC between 1995 and 2005 in France. Working time reduction (WTR) is a flexibility device with the initial objective of reducing unemployment by work sharing. The last French WTR laws, between 1996 and 2002, consisted in the implementation of devices of organizing working time which stand for flexibility instruments because firms could use worked hours differently. The STC decree of June 28th, 2001 is directly related to the WTR implementation. Since 2001, establishments have had to use in priority flexible working hours associated to WTR. Calavrezo et al. (2009b) show a "substitution" effect between WTR and STC over the 1995-2005 period. They quantify the average decrease in STC authorized days. Indeed, the flexibility part of the STC program seems to have collapsed: until 2000, STC was inversely correlated to economic growth and after 2000 firms could not use STC as an internal flexibility instrument anymore. This suggests that WTR would have refocused the STC program on its initial role of keeping employees in employment.

In consequence, the main question about the STC recourse is: is STC really a protection device? The empirical analysis of the security role of STC is focused on its relationship regarding redundancies. We can distinguish three experiences on the relationship between STC and layoffs: the European experience (Vroman, 1992), the US experience (Needels et al., 1997) and the Canadian experience (the Ekos research, 1993). On the whole, even if researchers have found that firms in both American and European systems are likely to use some combinations of hour reductions and layoffs, the implications of STC on redundancies still remain unclear. In a recent study, Calavrezo et al. (2009a) analyze the effect of the French STC program on redundancies with panel data models with sample selection, endogenous explanatory variables and unobserved heterogeneity. Calavrezo et al. (2009a) work with an unbalanced panel of more than 36,000 French establishments with at least 50 employees. Their results highlight that STC seems to significatively increase the number of

redundancies or the laying off probability. The authors state that STC seems to the inefficient according to this employment protection criterion. Nevertheless, it is not possible for instance to conclude definitely that STC is totally inefficient in terms of employee protection. Even if STC can not stop redundancies maybe it can prevent from establishment exit.

For this reason, this paper questions the STC program efficiency within French establishments by investigating the relationship between the STC recourse and establishments' exit behaviour between 2000 and 2005. The contribution of this work is twofold. First, empirical analyses on the French STC program are very scarce in the literature; our topic is quite original especially in terms of the evaluation of a public policy device. Second, we use a rich dataset.

The use of STC among French establishments it is not randomly distributed. So, selection can be a potential problem because establishments which choose to have STC authorizations might do it as a consequence of their internal strategy. To analyse the effect of the French STC program on establishment exit and to control this selection bias, we implement a propensity score matching methodology. Different models are estimated on six annual samples obtained from the matching of six data sources which contain more than 550,000 observations. Our main result underlines that establishments which use STC exit more intensely the market the year after than those which do not use the program.

The remainder of the paper is organized as follows. The second Section describes the STC regulation in France. The third Section presents a short review of the literature on the relationship between STC and establishment exit. The fourth Section presents the data. The fifth Section outlines our econometric approach and the sixth Section presents our findings. Finally, the conclusion in the seventh Section discusses the efficiency of the STC program in France.

2. The STC regulation in France

The French STC program is a legal instrument that aims at protecting employment and preventing redundancies in case of exceptional circumstances by allowing firms to temporarily reduce working time or suspend their business activity. STC can be applied for the following reasons: downturns in economic cycles; difficulties in the provision of raw materials or energy; transformation, restructuring or modernisation of the firm; exceptional natural disasters and other types of difficulties. According to the law, the instrument should be used as a temporary tool.

STC can be considered as a preventive economic help device in the sense that its main objective is to avoid the permanent layoffs of its concerned employees in situations of temporary economic difficulties. Employees on STC continue to keep their contractual bound with their employer. A compensation system exists in order to indemnify employees' lost of salary due to STC.

STC regulation changed twice on the recent period: the first time in 2001 after the implementation of the working time reduction policy and the second time in 2008 and 2009 related to the economic crisis. As our period of analysis is 2000-2005, we exclusively concentrate on the description of the STC regulation before 2008.

The binding command of 28th June 2001 presents the STC regulation in connection with the working time reduction policy. In fact, the recourse to STC becomes conditioned by the types of application of the working time reduction policy. The role of this binding command is to refocus STC on its primer function of supporting employees in employment if the establishment meets some short-term economic downturns. By implementing the working time reduction policy, overtime and STC do not represent anymore the only two solutions for an establishment to adapt to the fluctuations of activity. After the implementation of the STC

binding command, establishments must use one of the devices related to the working time reduction policy.

The binding command of 2001 tries to clarify STC applicable procedures, by changing three dimensions of the STC regulation: compensation (Section 2.1), allocation (Section 2.2) and refund (Section 2.3).

2.1 The compensation

The binding command modifies three levels of the STC compensation: the number of compensated hours, the amount of the government support and the creation of a specific quota of compensated hours.

In firms with fixed working time duration, compensated hours are calculated as the difference between the number of hours supposed to be worked and the number of hours effectively worked during the month. With the decrease of the legal working time duration, the binding command of 2001 stipulates that STC is activated below 35 hours per week or below the collective working time duration if it is inferior to the legal working time duration. The binding command also defines the way of calculating compensated hours for the different devices of the working time reduction implementation. So, the compensation varies according to the rules of working time organization as for example, modulation of worked hours or "RTT days". Some "unworked" hours might not be compensated in relation to the forms of implementation of the working time reduction policy.

The minimum of the hourly STC compensation is established by the agreement of 21st February 1968. It is at least equal to 50% of the hourly gross pay. It corresponds to 4.42 euros per hour of STC compensation. The compensation for each hour on STC contains two elements. *The first one is the government support*. The binding command of 28th June 2001 establishes a shifting rate for this support according to the size of the firm. This support rate

was unique before the reform. So, in firms with more than 250 employees, the government support is 2.13 euros per hour. For other firms, the rate is 2.44 euros per hour. A less important STC compensation rate for big firms with at least 250 employees can be explained by the fact that big firms can more easily organize their working time. In case of strong threats on employment, the government can pay a more important compensation rate. In this case, a convention must be concluded between the State and the firm. In 2005, the costs for the State budget amount to 16.6 million euros for STC and generally, they fluctuate around 20 million euros during the years before 2005. *The second element is a support paid by the employer*. It is the difference between the total amount of each STC hour (4.42 euros) and the government support. In general, it equals to 1.98 euros per hour for firms with less than 250 employees and equals to 2.29 euros per hour otherwise. The STC compensation is exempted of employer security contribution but is subjected to the supplementary social security contribution and to the contribution to the repayment of social security debt.

Since the 10th of April 2001, the State has been refunding firms within the maximum quota of 600 STC hours per employee per year, for all professional branches. The binding command brings a new modification: in cases of modernization of facilities and firm's building, the quota is exceptionally settled to 100 hours. This number of hours is ascribed from the total quota of compensated hours. This change in the legislation is made since in the past, using STC in this way sometimes was contrary to the measure: this kind of situation could lead to quite long periods of interruption of the activity of the firm which could involve recourse to total STC[1] and stops the work contract.

[1] Total STC is a special situation of STC in which an employee is on STC more than 4 consecutive weeks. Its work contract ends at this moment.

2.2 The allocation

The 2001 binding command contains a major change in terms of the allocation of STC[2]. Firms that wish to take advantage of STC have to consult the plant's works council and then apply for an authorization with the French administration at the "department level"[3]. Asking for STC authorizations was not compulsory before the 2001 binding command. After using STC, employers must address a demand of compensation to the French administration. On the other hand, the binding command stipulates that in case of a sinister or bad weather, the demand can be registered 30 days after the phenomenon. When the administration accepts the demand, the firm must send each month the amounts of what should be refunded (because firms pay the wholeness of the allocation to their employees). The binding command provides a special procedure in case firms use modulating hours. In this special case, employers should inform the administration at the end of the year after having established the statement of account for modulating hours. If the firm does not respect all these procedures or in case the administration rejects the demand, the employer must pay "standard" wages.

2.3 The refund

After the change in the STC law, the refund procedures also contain new elements especially related to the different forms of working time reduction implementation in the establishment. The firm must indicate the main forms of organizing its working time and must inform if executives or migrant workers are in the firm with special conventions of working time. In case of using modulating hours, the firm has to provide for each employee his or her working time duration, once the statement of account for modulating hours having been made.

3 STC and establishment exit: a literature review

[2] Some categories of employees are not admissible to benefit from STC (as for example seasonal unemployed workers).
[3] In France, the equivalent of the American county is called "département".

In the economic literature, the relationship between STC and establishment exit is not addressed neither theoretically, nor empirically. The only "allusion" to this topic is found in Blyton (1985). The author makes the following hypothesis: using STC in case of a sustained economic recession could postpone some employers' decisions which could jeopardize the firms' chances to survive in the long run. The literature on STC is relatively scarce in France. On the recent period, Calavrezo (2009) gives a complete image of the functioning of STC between 1995 and 2005 in France. In the same vein, empirical studies concerning the effect of public policy devices on establishment exit or establishment survival are quite less developed especially as related data is missing.

We make a two-step description of the review of the literature: on the one hand, we describe briefly analyses on the efficiency of STC in terms of employment protection (Section 3.1) and on the other hand, we present some papers which underline the relationship between public policy devices and establishment survival (Section 3.2).

3.1 STC efficiency in terms of employment protection

An international literature, theoretical and empirical, is focused on STC's employment protection role (Wright, 1991; Abowd and Allain, 1997; Burdett and Wright, 1989; Needels et al., 1997; Gray, 1998). Indeed most of these papers study the effect of STC on redundancies. They show that STC's effect is not identical between countries and even inside the same country. For the French case, in function of the data, the period of analysis or the method used, the few theoretical and/or empirical papers emphasize contrasted results. Abraham and Houseman (1994) and Gray (1998) show a "positive" effect of STC on redundancies. On the other hand, Calavrezo et al. (2009a) analyze the relationship between STC authorizations and redundancies for establishments with at least 50 employees on the period 1996-2004. They show that establishments which use STC more intensively lay off more. Several

interpretations can be associated to this finding. The authors suppose that the resort to STC authorizations would be the ultimate (inefficient) solution before layoffs. From this point of view, STC authorizations and redundancies could complement each other to face economic difficulties. Another possible interpretation is that the STC program is a policy used to accompany establishments in structural decline (even if this aspect is normally forbidden by the law). These authors also consider that establishments would resort to STC to calm the social tensions before a planned redundancy scheme or to reassure the shareholders as using STC could represent a sort of a guarantee from the State. Whatever the true interpretation, the STC program does not fulfil its role of protection from redundancies in French establishments (with at least 50 employees) that face strong economic difficulties. Whatever, this result can not be interpreted as a signal of complete inefficiency of STC in terms of employment protection. Additional analyses need to be done. For this reason, our paper studies the relationship between the STC use and establishment exit. Even if STC does not protect all the employees from redundancies, it could nevertheless assure the survival of the establishment and in this way, protect the remaining employees: in this case, establishment exit could be seen as an extreme case of redundancies.

3.2 The effects of public policy devices on establishment exit

Since the 90's, the economic literature on firm survival has strongly developed (especially with the emergence of data permitting to better understand firm survival) and a particular attention was paid to new firms entering the market (especially small size firms). Firm survival is the opposite concept of firm exit. In a literature review, Caves (1998) describes the main determinants of the probability for a firm to survive. Firm features such as age, size, innovation (Dunne et al., 1989; Geroski, 1995; Agarwal and Gort, 1999) or entrepreneur characteristics as sex, age, professional trajectory before the creation of the firm

are the main determinants of firm survival. Papers analyzing the impact of public policy devices on firm survival deal generally newly created firms and focus inevitably on small firms. Moreover, a part of the literature studies the effects of government supports to create firms, especially designed for unemployed people (for Germany, Pféiffer and Reize, 2000; for young entrepreneurs in Italy, Battistin et al., 2001). Gu et al. (2008) make a survey of the main papers on public (and private) policy devices for small firms in the United-States. Their analysis emphasizes the difficulty of measuring the impact of the financial support on different firm performance indicators. This is due to the existence of very limited data and very simple techniques used in previous studies. Gu et al. (2008) encourage the use of experimental and quasi-experimental methods.

Our approach is slightly different: generally, the literature analyzes the effect of public policy device for helping firm creation on newly created firm survival. In our case, we use establishments of all ages (newly created or "ancient" establishments) in an a priori damaged economic situation. We control exclusively for establishment and firm characteristics. Our data sources allow for a good identification of firm exit. Nevertheless, in comparison to the literature, our analysis is close in terms of methodology used. We use propensity score matching techniques which are mostly recommended for this type of analysis.

4 Data

To assess the impact of the participation to the STC French program on establishment exit between 2000 and 2005, we use six different data sources. We construct for each year a different file. We finally work with six different files, as according to the year, some administrative data sets contain supplementary information on establishments or on firms to which establishments belong to.

First, we use monthly STC authorization databases. They are produced by the Departmental Directions of Work and Employment and by the Statistical Department of the French Labour Ministry. When facing a strong economic downturn an employer can administratively ask for a specified number of STC days. If the request is justifiable, the Departmental Directions of Work and Employment provides an authorization for a specified number of STC days. The files we use give information about the STC authorizations obtained by French establishments between 1995 and 2005. The authorized STC imperfectly measures the compensated STC that establishments really use and for which they get a financial compensation from the State. Indeed, some establishments can decide not to use STC authorized days. In the database, the number of compensated days is not available at establishment or firm level. Thus, we measure the number of authorized STC days. It is the superior limit of compensated days and it represents an indicator of the entrepreneurial anticipations. We analyse the STC behaviour at the establishment level with yearly indicators. From these databases, we constituted an exhaustive STC panel. It covers more than 93,000 French establishments of all industries, which had at least one STC authorization between 1995 and 2005. We finally retain for our analysis only one measure of STC : for each establishment *i* and for each year *t* we construct a dummy variable indicating the participation in the STC program (denoted STC_{it}).

[Insert Table 1]

Second, we use the SIREN file. It is an administrative database produced by the French National Institute of Statistics indicating the situation of French establishments in August 2007 (establishments are active or they disappeared); it also gives information on the date of creation of establishments. This file permits to calculate the age of the establishment

(a continuous variable denoted AGE_{it} [4]) and six exit dummy indicators (see table 1). We use these establishment exit variables to control for potential lagged effects of STC recourse. With this data source, an establishment exit represents all types of suspension of activity on the French territory: establishment shutdown (for economic reasons without appealing to the justice for judicial liquidation; situation when the establishment does find a taker and without appealing to the justice), establishment failure (with a compulsory recourse to the justice) or other situations in which the establishment is involved in a process of merger and acquisition – M&A). Nevertheless, the situation of M&A does not correspond exactly to a real establishment disappearance and we must take into account this aspect when merging data sets. For each year, we construct four classes of establishment age, each corresponding to a quartile of the establishment age distribution. Finally, in our regressions, we introduce only the dummy variable corresponding to the oldest establishments (the dummy variable for the forth quartile of the establishment age distribution).

Third, we use annual administrative datasources relating to the establishments affiliated to the unemployment insurance system and covering the 1995-2003 period: the UNEDIC files. They give information about the size of the establishment $SIZE_{it}$ (a continuous variable which indicates the number of employees in the establishment); the establishment industry $INDUSTRY_{it}$ (which is captured by 14 dummy variables corresponding to the main 14 aggregated French industries excepting agriculture and administration); and the number of women in the establishment ($WOMEN_{it}$). For the $WOMEN_{it}$ variable, we calculate the part of women in the establishment and we introduce the quartiles of this ratio in our estimations by taking as a reference the first quartile. Pour industry dummies, the industry "education, health and social action" is our reference.

[4] This variable is calculated as the difference between the year of interest and the year of creation of the firm. We do not take into account the month of creation of the establishment.

Forth, additional information is obtained from firm databases to which establishments belong to (the FICUS files). They cover the period 1994-2005. We retain the following two firm indicators: an indicator of the firm size ($FIRM\_SIZE_{it}$) and firm's value added (VA_{it}). We calculate two indicators of economic health of the firm to which the establishment belongs to: the value-added variation rate ($Var\_VA_{it} = \frac{VA_{it} - VA_{it-1}}{VA_{it-1}}$) and the apparent labor productivity ratio ($LP_{it} = \frac{VA_{it}}{FIRM\_SIZE_{it}}$). For the variable VAR_VA, we work with its values in *t* and its values lagged by one year (*t-1*). For the LP variable, we only work with its values in *t*. From 1998, the FICUS files contain more information : the legal status of the firm (we construct a legal status variable LS_{it} which equals to 1 if the firm to which the establishment belongs to is a for-profit firm and 0 otherwise), a variable indicating whether a firm was restructured (dummy variable - $RESTRUCT_{it}$) and a variable indicating whether the establishment belongs to a financial group (dummy variable - $GROUP_{it}$). Finally, the $GROUP$ variable will not be retained in our estimation as it does not have any impact on the propensity to recourse to STC. For the $RESTRUCT_{it}$ variable, we also work with its values lagged by one year and by two years in *t-1* and *t-2*).

Fifth, some additional information is obtained from the DADS files (2002-2005). They are administrative files containing data at the establishment level. We mainly retain information about employees' skill structure: $NOSKILL_{it}$ gives the number of employees having no skill and $HIGHSKILL_{it}$ gives the number of highly skilled employees. We then calculate the part of unskilled and high skilled employees and dummy variables corresponding to the quartiles of their distributions. We finally use only the first quartile of the part of unskilled employees and the forth quartile of the part of high skilled employees. As

UNEDIC files stop in 2003, the variables $SIZE_{it}$, $INDUSTRY_{it}$ and $WOMEN_{it}$ are taken from the 2004-2005 DADS files. In order to control for the geographical location of the establishment, we introduce dummies corresponding to the 8 main French regions according to a definition of the National French Institute of Statistics (INSEE): REG_{it}^{k} où $k=1,...,8$.

Finally, we use the CITRUS data base. It is produced by the National French Institute of Statistics and it contains firm data. CITRUS is a quasi-exhaustive dataset for listed companies and their subsidiary companies which have to release their notification of merger, scission and summons and also contains information which is registered to the graft of trade court. Since its creation in 1998, the CITRUS file has been improved by integrating new sources of information. Nonetheless, the increase in information on the most recent period must be handled with caution. In CITRUS, the period 2000-2005 seems relatively homogenous in terms of quality of data and of firm coverage. We use this data source in order to control for the fact that establishment exits (identified with the SIREN file) are not due to M&As for the period 2000-2005. In other words, for each year of the period 2000-2005, we check if firms to which establishments belong to, which disappear in *t*, *t+1* or *t+2* according to the SIREN file are not associated to M&As[5]. In the CITRUS file, for each M&A, we can identify the combining company and the "absorbed company". In the M&A process, we want to identify the "absorbed company". We eliminate from our data, firms for which for an anterior year or for the year of interest (*t*) appear as "absorbed firms" in a M&A and disappear in *t, t+1 or t+2*. For example, for 2002, we eliminate establishments which exit according to the SIREN file in 2002, 2003 or 2004 and which belong to firms which according to the CITRUS source are "absorbed" by other firms in 2002. We do not impose any control on the type of M&A. As we concentrate on exit phenomena, establishments belonging to combining companies on the period of analysis are not eliminated. The use of the CITRUS data source

[5] CITRUS gives information till 2006. For the year 2005, we can not control for potential M&As in 2007.

means that for each year we eliminate approximately 20 000 establishments. We have to recall that the main bias introduced by this type of check is the difference between firm and establishment data : our data are at the establishment level and we eliminate establishments related to the process of M&A in which are involved the firms to which the establishments belong to. Even if the quality of the information from the SIREN file is very good to identify establishments' exit, this type of check is nevertheless necessary. From now on, an establishment exit means all type of activity suspension on the French territory excepting situations of M&As (more precisely, excepting situations of "absorbed firms" in M&As).

[Insert Figure 1]

To obtain the yearly final samples, we impose three stages in the "cleaning" process. The first stage consists in erasing establishments which are supposed inactive, establishments which disappear before the year of interest or are created after the year of interest (for example, for the year 2002, we erase establishments which "die" before 2002 or are created after 2002). In the second stage, we eliminated establishments and firms with 0 employees in order not to have incoherent values in terms of STC use. Finally, we erase all observations with missing values for our control variables[6]. For the period 1995-1999, the number of establishments which exit in *t, t+1* or *t+2* is curiously small. This might be the consequence of the data collecting in the SIREN file which seems of a better quality since 2000. For this reason, we decide to restrain our period of analysis to 2000-2005.

Merging these six data sources allows us to use a very rich and original data set to study the relationship between STC and establishment exit. By merging the six data bases and by imposing these "cleaning" checks, we finally work each year with more than 550 000

[6] For continuous variables, we analyze their distributions and aberrant values. As the number of aberrant values was each time very small, we decide to work with deciles, respectively with quartiles and in this way to avoid the influence of these aberrant values without excluding the establishments from the analysis.

observations[7]. We want to analyze the effects of STC on establishment exit varying in time (in *t, t+1, t+2*). For example, for 2002, we study how the recourse to STC in 2002 affects establishment exit in 2002, 2003 and 2004 (as well as associated crossed effects). In order to analyze the effect of STC in 2002 on the establishment exit in 2003 or 2004, we must eliminate establishments that exit in 2002. If we do not eliminate them, we will introduce a bias as these establishments are already "dead". For this reason, we work each year with three different sample size files. The first file corresponds to the file obtained after merging the six data sets (*sample 1*). With this file, we analyze the effect of STC in *t* on the exit indicators *E0*, *E01* and *E012*. The second file is obtained by eliminating establishments which disappear in *t* (*sample 2*). In this situation, we analyze the effect of STC in *t* on the exit indicators *E1* and *E12*. Finally, we eliminate establishments which disappear in *t+1* and we obtain the last file (*sample 3*). It is used for analyzing the impact of STC in *t* on the *E2* indicator.

The recourse to STC stands for a "rare phenomenon". Between 1995 and 2005, we estimated that on average STC concerns less than 1% of the establishments from all industries excepting agriculture (Calavrezo et al, 2009b). Besides, between 1995 and 2005, the number of establishments that had STC authorizations decreased strongly in metropolitan France (see figure 1). Between 1996 and 2005, the number of establishments with STC authorizations diminished from 34,000 establishments to 5,000 (a fall of 85%). For example, in 2002, approximately 7,000 establishments have STC authorizations. In our final sample for the year 2002, among our 650,000 establishments, we identify after our several matching steps around 3,600 establishments with STC authorizations. For this reason, we must implement an econometric strategy that takes into account the under representation of the STC recourse.

5 The econometric strategy

[7] As we study the effect of STC on establishment exit, it is not possible to construct a panel of establishments. Each year, the final sample contains a different number of establishments.

In this study, we want to evaluate the effect of the STC recourse on establishment exit. The interest in such an analysis is very high as Calavrezo et al. (2009a) show that STC seems only "postponing" redundancies. Several factors are likely to explain establishment exit, and maybe to affect simultaneously establishment exit and STC recourse, producing a selection bias. At the heart of our statistical evaluation, we must deal with the problem of selection bias: in our case, having STC authorizations is a decision which is based on the entrepreneur's choice, being at least partly rational. This decision can not be independent on the way the entrepreneur evaluates himself the consequences of his choice. Establishments having STC authorizations are subjects to a non random selection process (according to their economic performance, short-term downturns and structural downturns, etc.), or even an auto-selection process, if we consider that the recourse to STC is an element of their internal strategy. Not taking into account this situation, could lead to biased results. On the other hand, having STC authorizations also "contains" a random component as being STC authorized depends on the department (the French county) where the entrepreneur asks for authorizations to the administration (this aspect will be explained more precisely in section 6.4.3).

In order to analyze the effect of STC on establishment exit by controlling for the selection bias related to the STC recourse, we use propensity score models. They were initially developed by Rosenbaum and Rubin (1983) to study the efficiency of medical treatments. Since then, these models have been improved (see for example Heckman and his various co-authors) and used in economics especially to test the efficiency of training programs (for a complete survey see Heckman, Smith and Lalonde, 1999). This method consists in comparing the "health" of each establishment which receives the treatment (uses STC) with the "health" of an identical counterfactual which does not receive the treatment (does not use STC). To identify statistically the counterfactual, an approach consists in building a counterfactual population for which the distribution of the propensity score

calculated according to a number of observable characteristics is the same as for the group receiving the treatment. By comparing the exit rate of establishments using STC and of counterfactuals, we can determine the impact of STC on establishment exit.

Our annual files permit us to identify two types of establishments: establishments which have recourse in *t* to STC ($STC = 1$) and those which do not use STC in *t* ($STC = 0$). The efficiency of the treatment is measured through the result y_i. Thus, each establishment has two potential results: y_0 (if *STC = 0*) and y_1 (if *STC = 1*). The effect of the recourse to STC on establishment exit ($C = y_1 - y_0$) is unobservable and individual (and consequently its distribution is not identifiable) as y_0 and y_1 are never observed simultaneously (since an individual either is treated, or untreated, but never both at the same time). Only the "true" result (translated by the establishment exit and denoted Y) is observed: $Y = y_1 STC + y_0(1 - STC)$.

Y_i is the vector of performance variables : $Y_i = (E_i^j)$. The variable *E* indicates if the establishments disappear (if it is "dead") after the STC use. The index *j = 0, 1, 2, 01, 12, 012* indicates the temporal window on which we calculate the effect (see table 1 for more details). Performance variables are calculated for the six years of analysis (*t = 2000,…, 2005*). Only the couple *(Y, STC)* is observed for each establishment. However, if performance variables are independent to the assignment to the treatment $(y_0, y_1) \perp STC$, in other words if the assignment to the treatment is random, then the average effect on the treated can be identified $C_{treated} = E(y_1 - y_0 | STC = 1)$. In the majority of cases, the property of independence is not valid. A solution would be to compare the health of each individual who received the treatment with the health of an identical counterfactual who did not receive the treatment. To identify statistically the counterfactual, an approach consists in building a counterfactual population for which the distribution of a number of observable characteristics (*X* – matching

variables) is the same as for the group receiving the treatment. In this way we can reduce the selection bias. Consequently, the property of independence must be respected conditionally to matching criteria and it is less restrictive:

$$(y_0, y_1) \perp STC \mid X \tag{1}$$

From the STC literature and establishment exit, we retain three categories of control variables. Firstly, we use "standard" establishment characteristics (size, industry, geographical location, age) and firm characteristics (legal status, restructuring). Secondly, we control with economic performance variables: the value added variation rate in *t* and lagged by one year[8] and labour apparent productivity lagged by one year. Finally, we will use variables which describe the structure of the labour force inside the establishment: the part of unskilled workers, the part of high-skilled workers as well as the part of women.

When many matching criteria are taken into account (as in our case), finding a counterfactual can be problematic. Rubin and Rosenbaum (1983) solved this problem by showing that conditional independence with the X variables was equivalent to the independence compared to the propensity score, $P(X)$:

$$(y_0, y_1) \perp STC \mid P(X) \tag{2}$$

The propensity score constitutes a one-dimension summary of the matching variables and it estimates the probability of being exposed to the treatment, conditionally to these variables.

Propensity score matching models are two-step methods. In a first step, we have to estimate the propensity score. In our case, we estimate it with a logit model and we use two different specifications (depending on the variables which are available for each year). The first model (**Model A**) is estimated for all the years of the period 2000-2005 and contains the following explanatory variables: size, age, industry, department, part of women, apparent

[8] For example, in 1998, we use the value-added variation rate calculated for 1997 (the evolution between 1996 and 1997).

labour productivity, value-added variation rate, legal status and restructuring. The second model (**Model B**) is estimated for the period 2002-2005 and it contains the following additional explanatory variables: part of unskilled workers and part of high-skilled workers.

In a second step, depending on the propensity scores of treated and untreated establishments, there are several matching techniques: kernel matching, nearest-neighbour matching, radius matching and stratification matching (see Caliendo and Kopeinig, 2008 for a complete presentation of these different estimators). In our data, the number of establishments which do not use STC is very high (the control group). For example, for the year 2002, the final sample contains 650,000 establishments and approximately 3,600 establishments participate in the STC program. So, it seems appropriate to we perform matching using the nearest neighbour method. This estimation is the most simple among propensity score matching methods as it consists in choosing for each treated establishment the counterfactual which is the nearest in terms of the propensity score value. There are several types of performing this method. First, nearest-neighbour matching can be performed with replacement or without replacement. In the first case, an untreated establishment can be use several times as a counterfactual. On the other hand, in the second case, an establishment can only be used once for the construction of the counterfactual[9]. There is a trade-off between bias and variance: if replacement of establishments is permitted, the average quality of the matching will increase and the bias will decrease. Then, we can use more than one establishment to construct the counterfactual (the case of "oversampling"). In this case, there is also a trade-off between bias and variance: the variance decreases (as we use more information to construct counterfactuals) and the bias increases being the result of average matching of inferior quality (Smith, 1997). In the case of "oversampling", one should establish first the number of partners to perform the matching and the weight affected to

[9] In the case of nearest-neighbour matching without replacement, the estimation depends on the order in which establishments are matched. Establishments should be first randomly sorted.

theses partners. The method of nearest-neighbour can lead to bad quality matching if the nearest neighbour is far in terms of its propensity score value. As only 0.5% of the establishments of our sample receive the treatment, this indicates that the chances to find a unique establishment without the treatment and with a propensity score almost identical are very high. Finally, we decide to implement a nearest-neighbour matching without "oversampling" (called one-to-one matching) with replacement by restricting a maximum distance between propensity scores for treated and their nearest neighbours (called in general in the economic literature calliper) to 0.0001[10]. We also impose the common support condition. Standard-errors are calculated with the analytical expression of the variance of the nearest-neighbour estimator. Abadie and Imbens (2006) show that calculating standard-errors with bootstrap techniques can not be done for the nearest-neighbour estimator. A common problem in evaluation papers is that the sample used is particular (Smith and Todd, 2005). For example, participants in programme are over-represented in comparison to the number of admissible people. This problem is called the "choice-based sampling". It is our case. In our files, the number of STC beneficiary is very weak (less than 1%). Heckman and Smith (1995) showed that in order to solve this problem, matching must be done on the odd-ratios. They also show that for matching with a unique nearest neighbour, matching on the propensity score or on the odd-ratios gives the same results. We also implement some tests which verify the quality of the matching.

To sum up, for each establishment exit variable, and for each of the two possible model specifications, we implement the nearest-neighbour matching. For the years 2000 and 2001, for each sample, we make one matching technique and for the period 2002-2005 we make two matching techniques for each sample.

[10] We tested several values for the caliper, but we finally choose the value 0.0001 because the values for the propensity score are very small in our case. Because of a very important number of zeros associated to the recourse to STC and in the same time related to the fact that we control with categorical variables, the values of the propensity score are concentrated around 0.

6 The results

We first present some descriptive statistics based on our final samples (section 6.1). We then outline the determinants of the probability to beneficiate from STC authorizations (section 6.2). Section 6.3 gives the results of the econometric strategy. Section 6.4 gives the results for establishments with at least 50 employees. Finally, we test the robustness of the relationship between STC and establishment exit variables by using alternative samples and methods (section 6.5).

6.1 Descriptive statistics

In table 2, we present the different files we use, for each year and for the three samples. We provide a "global picture" of STC recourse and establishment exit (remember that establishment exit variables are presented in more detail in the table 1). Each year, the files include around 650,000 establishments. Among them, approximately 3,500 use STC authorizations (0.6%) and 10-12% exit in *t, t+1* or *t+2* (*E012* dummy variable). For example, in 2002, approximately 6% of establishments exit by 2003 (*E01* dummy variable). This statistic is consistent with figures given generally in the literature: firms' average annual exit rate is between 5 and 10% (see Agarwal and Gort, 1999; Dunne et al., 1988, Baldwin and Gorecki, 1991).

[Insert Table 2]

6.2 The determinants of the STC recourse

In the first stage of the econometric strategy, we estimate the probability to use STC authorizations a given year with a logit model. For 2000 and 2001, we only use Model A. For the period 2002-2005, we use the two specifications: Model A and Model B (see section 5 for

more details). Table 3 presents the results of the logit model only for the year 2002 (we retain only sample 1 and we have the results for Model A and Model B) [11]. We find the same results for all the years of the study.

[Insert Table 3]

We analyze the correlation between the probability to use STC and establishments' and firms' characteristics. We use four "standard" variables: size, industry, age and geographic location.

We find quite "traditional" results in terms of STC use: the probability to beneficiate from STC authorizations increases with the establishment's size (Gray, 1998). Industry dummies are strongly significant due to the sectoral dimension of the STC use. Establishments from the following industries: manufacture of consumer goods, manufacture of motor vehicles, manufacture of capital equipment, manufacture of intermediate goods or transportation industry have a higher probability to beneficiate from STC authorizations in comparison to the industry "education, health and social action" (which is the reference). Regional dummies are always significant. This shows the importance of the geographical location for the STC recourse. Being outside the Paris region (the "Ile-de-France" region) increases the probability to use STC in 2002. Finally, older establishments (belonging to the fourth quartile of establishment age distribution) have a higher probability to use STC, probably because of a better knowledge of the device.

We also introduce "standard" firm level variables: firms' legal status and a variable indicating whether a firm was restructured. The fact that an establishment belongs to a for-profit firm is positively and significantly associated to the probability to beneficiate from STC authorizations. The restructuring plans that we measure here do not involve the exit of the

[11] In appendix 1, we present the distribution of establishments' and firms' characteristics according to their use of STC for the year 2002 (sample 1 and Model B).

firm, in other words do not concern “absorbed companies” from M&As (see section 4). Being restructured in 2002 decreases the probability to use STC during the year. However, being a restructured in 2001 increases the probability to beneficiate from STC authorizations. This could be due to the fact that a restructuring in *t-1* would involve a “negative” shock on the economic performance of the firm involving additional demands of STC authorizations.

The economic performance of the firm to which the establishment belongs to plays a substantial role in the STC use. To take into account the economic situation of the firm, we introduce the value added growth rate (in 2002 and 2001) and apparent labor productivity (in 2001). The introduction of these variables is absolutely necessary since the STC use and establishments’ exit depend strongly on the economic situation. Globally, the use of STC in *t* decreases with the level of apparent labor productivity in *t-1*. Similarly, the probability of the STC use in *t* decreases with the value-added growth rate in *t* and *t-1*. This negative link between good economic performances and the use of STC authorizations was evidenced by Gray (1998) and by the papers of Calavrezo et al. (2009a and b) on STC in France. Moreover, according to the law, an establishment has to prove that it is in a bad economic situation in order to benefit from STC authorizations.

The last category of variables takes into account the structure of the labour force: share of women, share of high-skilled and unskilled workers. We find the expected results: establishments that use the least STC authorizations are those with more high-skilled workers. Moreover, the probability to use STC increases with the share of women.

To estimate correctly the effect of the use of STC on establishments’ exit, we must have a sufficiently large common support for propensity scores: the probability of establishments that use STC and the probability of establishments that do not use STC have to overlap at maximum. In our case, the distributions of propensity scores of treated and non treated groups almost completely overlap. We check if the two models that explain the STC

use are well specified by implementing a test that analyzes standardized differences. This test was elaborated by Rosenbaum and Rubin (1985). It computes for each matching variable a measure of the diminution of the selection bias. It is easy to implement. It is equivalent to a test of equality of means of treated and non treated groups, before and after matching. We compute the reduction of the bias associated with the difference of average differences before and after matching. We present the test for 2002 (sample 1, Model B) in the appendix 2. Thus, we observe strong bias reductions. We conclude that variables that we introduced in the logit model determine well the probability of using STC.

6.3 The effect of STC on establishment exit

In the second stage of the econometric strategy, we use propensity scores reviously estimated with the logit model. For each treated establishment, by comparing its propensity score, we determine a counterfactual establishment which is not treated. Then, we estimate the average effect of the treatment on the difference of means of the "performance" variable for the treated establishments and their counterfactuals. We have six "performance" variables (establishment exit variables). We only present the average effects of the treatment (STC use) on the treated establishments (the *ATT* effect).

For each year and each model (Models A and B), we implement a nearest neighbor propensity score matching with replacement by imposing that the nearest neighbour has a propensity score in a radius inferior to 0.0001.

Whatever the Model considered, the significance is the same, with slightly different effects (table 4). The principal result suggests that the STC does not prevent an establishment to exit the next year (measured with the dummy variable *E1*): there is a significant and positive effect. For Model A, this effect takes values comprised between 0.4 and 3.6 points according to the year of interest. For Model B, the effect varies between 1.4 and 3.3 points.

For example, using Model B for 2002, the use of STC increases by 3.3 points the probability for an establishment to exit in 2003.

[Insert Table 4]

With regards to the *E0* dummy (the exit of the establishment during the year of interest), the STC use has no effect. This can be explained by the fact that for the current year exit variables are less well observed probably because of registration deadlines for the exit. In other words, it is difficult to observe establishments' exit the current year.

Regarding the exit of the establishment two years later (*E2*), the effects are more "mixed": most of the times they are positive and sometimes they are equal to zero. When significant, these effects are less strong (than for *E1*) and at maximum they equal to 2.2 points. How can we explain this result? A priori, we expect that STC has no effect two years later as STC is a short term device. Thus, firstly, the effects found on *E2* can perhaps be explained by registration deadlines. Moreover, these positive effects include establishments of different sizes that do not disappear at the same pace. Large establishments take longer to disappear because of constraints on collective redundancies (see section 6.4).

As the temporality of the relationship between STC and establishment exit is not easily grasped, crossed variable of exit (*E01*, *E12* and *E012*) can provide a temporal margin to interpret the results. Our results show that the use of STC increases significantly the probability of an establishment to exit. Excepting *E2*, the effects are more important when the "temporal dimension" is wider.

6.4 Test on a subsample of establishments with at least 50 employees

In this section, we want to check if the demography of large establishments is the same as the demography of establishments of all sizes with regards to the STC recourse. In

addition, Calavrezo et al. (2009a) analyze the relationship between STC and redundancies in establishments with at least 50 employees. They find that establishments that use STC more intensively have also a more important number of redundancies. We focus on this population of establishments in order to compare our results to the study of Calavrezo et al. (2009a) more easily. We present the results in table 6 only for the year 2002. Several changes are necessary to implement this test.

[Insert Table 5]

When we focus on establishments with at least 50 employees, some industries do not use STC authorizations in 2002: energy, financial intermediation, real estate activities and the industry of education, health and social action[12]. We exclude these industries from the analysis. For this new population, we recalculate the quartiles for the following variables: the value added variation rate (in 2001 and 2002), the labor productivity (in 2001 and 2002), the age of the establishment (its quartiles), the share of women and share of unskilled workers and highly skilled (their quartiles). We work with quartiles rather than deciles as the sample of establishments with at least 50 employees is much smaller (about 20 000 establishments where only 500 are concerned by STC authorizations).

The main result of this robustness test shows no effect of STC on the *E1* dummy variable but, in contrast, shows the existance of a significant positive effect on *E2* (the exit of the establishment in *t+2*). If we use the second model specification (Model B) and the estimator with replacement where the nearest neighbor is within a radius less than 0.0001, the effect of STC is much higher for the subsample of establishments with at least 50 employees (see tables 5 and 6): on average, the exit of establishments with at least 50 employees using STC is higher by 4.8 points (it is 1.7 points for the initial sample).

[12] In this industry, only one establishment with at least 50 employees has STC authorizations in 2002.

For establishments with at least 50 employees, the relationship between the SCT use and the exit of establishments seems to be delayed. Behind this result two related aspects lie: an economic aspect (demography of large establishments is not the same) and a statistical aspect (on this subsample, there are fewer exits of establishments). Large firms have more important legal constraints. For example, a firm with at least 50 employees is obliged to implement a safeguard plan for employment if the employer wishes to dismiss at least 10 employees over a period of 30 days. Such procedures are probably more costly in terms of time when the size of the establishment is important. In addition, large firms are also involved in the development of training plans with employees, which can lengthen the time between the STC use and their exit.

6.5 Robustness tests

To validate the robustness of our results, we do some checks by mobilizing additional samples and alternative methods.

6.5.1. Tests with other nearest-neighbor estimators

We implement three additional nearest-neighbor estimations in order to check if the results change or not: with replacement, without replacement, and without remplacement by imposing that the nearest neighbor has the propensity score in a radius inferior to 0.0001. Table 6 gives the results for this test only for 2002 (randomnly chosen year).

[Insert Table 6]

For all the variants of the match, we always find the same significance with quite similar effects (see table 6). For example, for the *E012* dummy variable, the effect varies from 4.7 points for the fourth variant to 5.3 points for the first variant of the match. For the variable

E1, which concerns us particularly, the effects are almost identical and equal to 3.6 points for all the four variants.

6.5.2. Tests on subsamples constructed from French departments

To take into account the heterogeneity of departmental behavior in terms of STC authorizations, we implement our econometric strategy on subsamples of establishments.

The methodology of propensity score matching allows us to measure the effect STC use on the establishment exit. If these effects are not biased, the STC use conditional on the retained observable characteristics must be independent of the exit of establishments. However, it is likely that unobservable characteristics influence the STC use, as well as the exit of establishments. For this reason, even conditionally on observable characteristics, there is always a "suspicion" that the STC use is not independent of establishment exit. In section 5, we explain that considering the nature of the observed phenomena (STC use and establishment exit), it is not possible to develop models that control unobservable characteristics such as the DID models with propensity score matching or regression models with endogenous regimes[13]. In this section, and in the next one, we set up tests to remove this uncertainty. Our test consists in implementing the initial econometric strategy on a subsample of establishments belonging to departments where the STC use is more strongly allowed and on a subsample of establishments belonging to departments where STC is less strongly allowed. A priori, given the econometric strategy and given the chosen observable characteristics, if we did not make the STC use independent of establishment exit, we would get different effects for the two subsamples. However, outcomes are significantly different from zero and positive for both subsamples, it will be a sign of a good control of the selection

[13] This kind of models are called differently : switching regression model with endogeneous switching, mover/stayer model, Roy model or Tobit V. A first treatment of heterogenous subsamples is due to Roy (1951).

bias associated with the STC use. Therefore, we will confirm that the estimated effects of our main econometric strategy are not be biased.

An employer who wishes to use STC must necessarily make a preliminary request to the French administration at the departmental level before the implementation of STC. The authorization has so a geographical dimension (French departements correspond to US counties). In this paper, we use information on what is authorized by the French administration. Calavrezo (2009) shows that within French departments, beyond a "standard" application processing system to authorize STC (analysis of order books, visit in the firm, discussion with staff representatives, verification of prior STC demand, etc.), there is a subjective approach, specific to each departmental unit to authorize STC. We can imagine that the way STC is authorized may be different at the departmental level, beyond of course, the industrial structure of the department. For this reason, we want to checky if our results change if we focus on different categories of establishments built in terms of departmental STC authorizations. We perform this test only for the year 2002 using the second model specification (Model B). To simplify the presentation of the results, we decide to present only the average effects calculated on the sample 2 for the *E1* dummy variable and for the *E12* dummy variable (establishment exit one or two years later). Since in 2002, STC is not authorized in two French departement, we dismiss them from the analysis. We conduct a two-stage approach.

(i) We are interested in how STC is authorized at the level of the departement. Initially, we classify departments into two categories relatively to the median of the proportion of establishments receiving STC authorizations in the department[14]: departments where STC is allowed more intensely, i.e. at levels exceeding the median (*category STC plus*)

[14] This indicator is constructed according to establishments that are in our final annual samples and not according to what happens in a exhaustive way in the French economy.

and departments where STC is allowed less intensively, that is to say, in proportions equal to or below the median (*category STC minus*).

For each category of departments (*categories STC plus* and *minus*), we set up our econometric strategy with the same control variables as described in section 5. The results for establishments belonging to the *category STC plus* and to the *category STC minus* are presented in table 7.

[Insert Table 7]

For the *E1* variable, we find in both cases a significant positive effect of STC on the establishment exit in 2003. In the subsample of establishments with a more intensive STC use (*STC plus*), the average effect is 3.5 points. On the subsample *STC minus*, this average effect is slightly stronger: it takes values between 3.6 and 3.9 points. What conclusions can we draw from this test? Even while working on subsamples of establishments located in departments with different STC authorization behaviors, our results remain stable. Somehow, this test is a check of the fact that we control correctely the selection bias associated to STC authorizations.

(ii) In a second step, we construct two other categories of establishments according to the intensity at which STC authorizations are given within the French departments between 2000 and 2005. We construct a new variable *STC_plus* which equals to 1 if for each year of the period 2000-2005, the department authorizes STC in larger proportions than the median share of authorizations (*category STC plus 2000-2005*) and the opposite variable *STC_minus* which equals to 1 if for each year 2000-2005, the department authorizes STC at levels lower than the median share of authorizations[15]. We introduce the same control variables as

[15] The construction of these two variables is made according to establishments that are in our final annual samples and not according to what happens in a exhaustive way in the French economy.

compared to the previous case[16]. The results for establishments in the categories *STC plus 2000-2005* and *STC minus 2000-2005* are presented in table 8.

We find the same results as in the previous robustness test: there is always a positive and significant effect. The effects are somewhat larger for the subsample of establishments *STC minus 2000-2005* (between 3.8 and 4.7 points) than for establishments from the subsample *STC plus 2000-2005* (between 3.1 and 3.4 points). This new test confirms once again a good control of the selection bias associated to the STC use.

[Insert Table 8]

7 Conclusion

In this paper, we analyze the relationship between STC and establishment exit over the period 2000-2005 in France. The STC use is not randomly distributed among establishments. Moreover, a particularly bad economic situation plays a crucial role in the decision to use STC and also in the exit of establishments. We propose a method of matching on the propensity score that takes into account several important economic health indicators (value-added variation rate and apparent labor productivity). We consider that, conditionally on establishment and firm characteristics (chosen according to the economic literature), the STC use is independent of establishment exit. Thus, the average effects of STC on establishment exit indicators are not *a priori* biased.

Our main result points out that, considering the initial samples, having STC authorizations in the current year impacts positively and significantly the probability for an establishment to exit the market the following year. We also show the absence of a

[16] However, as we work with fewer departments than in the previous test, some regions (among the eight aggregated regions) are excluded from the analysis.

simultaneous relationship between the STC use and the exit of establishments (because of registration deadlines). Our results also outline a less net effect of the STC use on the exit of the establishment two years later. As the temporality of the relationship between STC and establishment exit is not obvious, we introduce "crossed" exit dummies (on temporal windows of different lengths) to give us more information.

By focusing on large establishments (with at least 50 employees), we find again a time lag in the link between the STC use and the exit of establishments: larger establishments have a different demography.

As unobservable characteristics may affect the STC use and the exit of establishments, even controlling for a rich set of observables, there can be a suspicion that the STC use is not independent of establishment exit. There can always a doubt that establishments that use STC are also those who inherently are less likely to survive. Tests of robustness are achieved on additionnal subsamples of establishments and with an alternative methodology to demonstrate a good control of the selection bias. On the one hand, we implement supplementary nearest-neighbor estimators and we obtain the same resunts. On the other hand, we focus on subsamples of establishments with opposite behaviors in terms of STC at the departmental level. As we find the same effects for establishments belonging to departements with an intense STC authorization and for establishments belonging to departements with a weak STC authorization, this confirms a good control of the selection bias.

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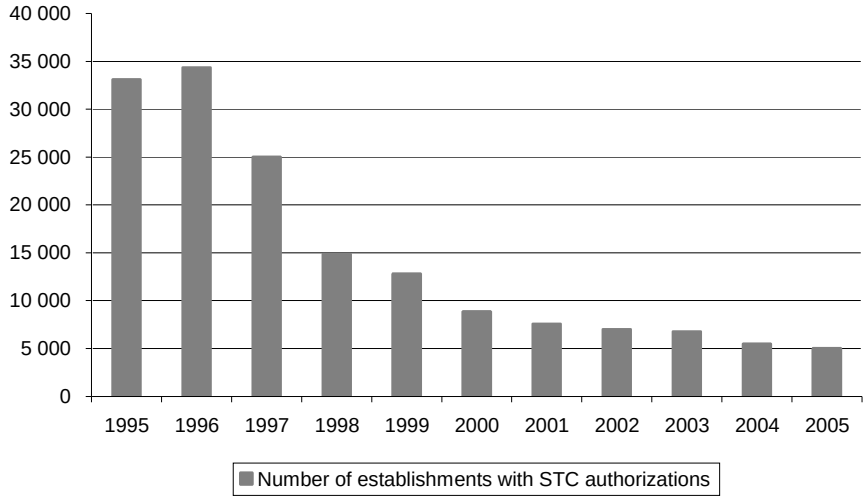
Table 1 : Establishment exit dummy variables

Dummy	Description
E_{it}^{0}	Dummy variable which equals to 1 if the establishment exits in *t* and 0 otherwise
E_{it}^{1}	Dummy variable which equals to 1 if the establishment exits in *t+1* and 0 otherwise
E_{it}^{2}	Dummy variable which equals to 1 if the establishment exits in *t+2* and 0 otherwise
E_{it}^{01}	Dummy variable which equals to 1 if the establishment exits in *t or t+1* and 0 otherwise
E_{it}^{12}	Dummy variable which equals to 1 if the establishment exits in *t+1 or t+2* and 0 otherwise
E_{it}^{012}	Dummy variable which equals to 1 if the establishment exits in *t or t+1* or *t+2* and 0 otherwise

Figure 1 : Number of establishments with STC authorizations



Source : Exhaustif panel of annual STC authorizations covering the period 1995 - 2005 (DARES, DDTEFP)
Field :French establishments with STC authorizations (all industries, all classes of establishment size).

Table 2 : Global statistics

Variable	***2000***						***2001***					
	Sample1		***Sample2***		***Sample3***		***Sample1***		***Sample2***		***Sample3***	
% column	***STC=0***	***STC=1***	***STC=0***	***STC=1***	***STC=0***	***STC=1***	***STC=0***	***STC=1***	***STC=0***	***STC=1***	***STC=0***	***STC=1***
E0=1	*0,06*	*0,08*					*0,20*	*0,3*				
E01=1	*0,47*	*0,79*					*4,51*	*7,17*				
E012=1	*5,20*	*6,91*					*9,73*	*14,63*				
E1=1			*0,41*	*0,71*					*4,32*	*6,96*		
E12=1			*5,14*	*6,83*					*9,55*	*14,44*		
E2=1					*4,75*	*6,16*					*5,47*	*8,04*
Nb. est. E0=1	*359*						*1 265*					
Nb. est. E01=1	*2 676*						*28 872*					
Nb. est. E012=1	*39 311*						*62 306*					
Nb. est. E1=1			*2 317*						*27 607*			
Nb. est. E12=1			*28 952*						*61 041*			
Nb. est. E2=1					*26 635*						*33 434*	
Nb. Étab. STC=1	*3 649*		*3 646*		*3 620*		*3 499*		*3 491*		*3 248*	
Nb. observations	***562 785***		***562 426***		***560 109***		***638 452***		***637 187***		***609 580***	

Variable	***2000***						***2001***					
	Sample1		***Sample2***		***Sample3***		***Sample1***		***Sample2***		***Sample3***	
% column	***STC=0***	***STC=1***	***STC=0***	***STC=1***	***STC=0***	***STC=1***	***STC=0***	***STC=1***	***STC=0***	***STC=1***	***STC=0***	***STC=1***
E0=1	*0,98*	*1,15*					*1,10*	*1,44*				
E01=1	*5,98*	*9,88*					*6,66*	*9,93*				
E012=1	*11,75*	*17,54*					*12,53*	*17,26*				
E1=1			*5,05*	*8,83*					*5,62*	*8,62*		
E12=1			*10,87*	*16,58*					*11,56*	*16,05*		
E2=1					*6,13*	*8,50*					*6,29*	*8,13*
Nb. est. E0=1	*6 476*						*7 710*					
Nb. est. E01=1	*39 523*						*46 800*					
Nb. est. E012=1	*77 591*						*88 003*					
Nb. est. E1=1			*33 047*						*39 090*			
Nb. est. E12=1			*71 115*						*80 293*			
Nb. est. E2=1					*38 068*						*41 203*	
Nb. Étab. STC=1	*3 643*		*3 601*		*3 283*		*3 755*		*3 701*		*3 382*	
Nb. observations	***658 793***		***652 317***		***619 270***		***701 032***		***693 322***		***654 232***	

Variable	*2000*						*2001*					
	Sample1		*Sample2*		*Sample3*		*Sample1*		*Sample2*		*Sample3*	
% column	*STC=0*	*STC=1*	*STC=0*	*STC=1*	*STC=0*	*STC=1*	*STC=0*	*STC=1*	*STC=0*	*STC=1*	*STC=0*	*STC=1*
E0=1	*1,18*	*1,98*					*1,18*	*2,07*				
E01=1	*6,84*	*11,10*					*6,33*	*9,97*				
E012=1	*12,36*	*18,14*					*9,22*	*13,34*				
E1=1			*5,73*	*9,31*					*5,21*	*8,07*		
E12=1			*11,31*	*16,49*					*8,14*	*11,51*		
E2=1					*5,92*	*7,92*					*3,09*	*3,74*
Nb. est. E0=1	*8 430*						*7 887*					
Nb. est. E01=1	*48 902*						*42 437*					
Nb. est. E012=1	*88 245*						*61 806*					
Nb. est. E1=1			*40 472*						*34 550*			
Nb. est. E12=1			*79 815*						*53 919*			
Nb. est. E2=1					*39 343*						*19 369*	
Nb. Étab. STC=1	*3 026*		*2 966*		*2 690*		*2 759*		*2 702*		*2 484*	
Nb. observations	***712 603***		***704 173***		***663 701***		***669 107***		***661 220***		***626 670***	

Source : Samples obtained by matching six data sets
Field : Establishments from metropolitan France (all industries excepting agriculture and administration).

Table 3 : The determinants of the STC recourse (2002, sample 1)

Variable	Model A		Model B	
	Estimate	Standard error	Estimate	Standard error
Size				
Less than 20 employees	Ref.		Ref.	
20-49 employees	0,5634 ***	0,0489	0,5146 ***	0,0501
50-499 employees	1,0128 ***	0,0538	0,9552 ***	0,0553
500 employees and more	1,2084 ***	0,2259	1,1516 ***	0,2265
For-profit firm	0,1495 ***	0,0506	0,1513 ***	0,0510
Restructuring in 2002	-0,7566 ***	0,2303	-0,7460 ***	0,2303
Restructuring in 2001	0,4049 ***	0,1354	0,4146 ***	0,1355
Establishment age				
4th quartile	0,2133 ***	0,0369	0,2057 ***	0,0369
Geographic location				
Ile-de-France	Ref.		Ref.	
Centre North	0,9896 ***	0,0728	0,9627 ***	0,0732
Nord-Pas-de-Calais	1,0476 ***	0,0898	1,0178 ***	0,0902
East	0,7620 ***	0,0836	0,7372 ***	0,0839
North West Atlantic	0,6969 ***	0,0808	0,6744 ***	0,0812
South West	0,6147 ***	0,0845	0,5925 ***	0,0848
Centre South	1,1340 ***	0,0729	1,1139 ***	0,0732
Midi Mediterranean	1,1785 ***	0,0774	1,1585 ***	0,0776
Value added variation rate in 2002				
1st decile	Ref.		Ref.	
2nd decile	-0,5429 ***	0,0520	-0,5472 ***	0,0521
3rd decile	-0,9692 ***	0,0612	-0,9743 ***	0,0612
4th decile	-1,0273 ***	0,0609	-1,0319 ***	0,0609
5th decile	-1,1795 ***	0,0738	-1,1845 ***	0,0738
6th decile	-1,5971 ***	0,0802	-1,6016 ***	0,0802
7th decile	-1,6668 ***	0,0824	-1,6711 ***	0,0824
8th decile	-1,6942 ***	0,0831	-1,6980 ***	0,0831
9th decile	-1,7498 ***	0,0851	-1,7545 ***	0,0850
10th decile	-1,5411 ***	0,0777	-1,5390 ***	0,0777
Value added variation rate in 2001				
1st decile	Ref.		Ref.	
2nd decile	-0,1224 **	0,0651	-0,1306 **	0,0651
3rd decile	-0,2016 ***	0,0688	-0,2112 ***	0,0688
4th decile	-0,2372 ***	0,0712	-0,2477 ***	0,0712
5th decile	-0,3449 ***	0,0741	-0,3563 ***	0,0742
6th decile	-0,3027 ***	0,0737	-0,3140 ***	0,0738
7th decile	-0,3408 ***	0,0740	-0,3554 ***	0,0741
8th decile	-0,4660 ***	0,0757	-0,4812 ***	0,0758
9th decile	-0,3523 ***	0,0724	-0,3648 ***	0,0725
10th decile	-0,5161 ***	0,0764	-0,5273 ***	0,0765
Apparent labor productivity in 2001				
1st decile	Ref.		Ref.	
2nd decile	-0,1910 ***	0,0721	-0,1900 ***	0,0721
3rd decile	-0,0972	0,0700	-0,0939	0,0700
4th decile	-0,1906 ***	0,0705	-0,1835 ***	0,0706
5th decile	-0,3208 ***	0,0726	-0,3105 ***	0,0726
6th decile	-0,5000 ***	0,0751	-0,4819 ***	0,0753
7th decile	-0,5753 ***	0,0771	-0,5518 ***	0,0773
8th decile	-0,7505 ***	0,0811	-0,7212 ***	0,0814

9th decile	-0,9623 ***	0,0873	-0,9206 ***	0,0879
10th decile	-1,3672 ***	0,1033	-1,3156 ***	0,1040
Part of women in 2002				
1st quartile	Ref.		Ref.	
2nd decile	0,2505 ***	0,0465	0,2393 ***	0,0468
3rd decile	0,3696 ***	0,0531	0,3625 ***	0,0535
4th quartile	0,3872 ***	0,0626	0,3690 ***	0,0629
Industry				
Manufacture of food products	-0,2274 *	0,1336	-0,3027 **	0,1346
Manufacture of consumer goods	1,2365 ***	0,1109	1,2157 ***	0,1112
Manufacture of motor vehicles	1,3698 ***	0,2062	1,3265 ***	0,2066
Manufacture of capital equipment	1,2909 ***	0,1158	1,2749 ***	0,1161
Manufacture of intermediate goods	1,8575 ***	0,1054	1,8131 ***	0,1061
Energy	-0,0727	0,5886	-0,0503	0,5886
Construction	0,0704	0,1145	0,0480	0,1152
Wholesale and retail trade; repairing	-0,9376 ***	0,1104	-0,9800 ***	0,1108
Transportation	0,3665 ***	0,1267	0,3798 ***	0,1278
Financial intermediation	-2,4868 ***	0,5103	-2,3642 ***	0,5110
Real estate activities	-1,7358 ***	0,3311	-1,6984 ***	0,3313
Services to firms	-0,2324 **	0,1193	-0,1937	0,1197
Services to individuals	-0,3932 ***	0,1106	-0,4712 ***	0,1118
Education, health and social action	Ref.		Ref.	
Part of unskilled workers in 2002				
1st quartile			-0,1547 ***	0,0433
Part of high-skilled workers in 2002				
4th quartile			-0,1141 **	0,0508
Intercept	-5,0545 ***	0,1433	-4,9118 ***	0,1465
Pseudo R^2	**0,1637**		**0,1642**	
Number of observations	**658 793**			

Source : Samples obtained by matching six data sets
Field : Establishments from metropolitan France (all industries excepting agriculture and administration).

Table 4: The effect of STC on establishment exit

	2000	2001	2002	2003	2004	2005
			Model A			
Performance variable						
Sample 1						
E0	0.0008 *	0.0002	-0.0013	0.0005	0.0010	0.0058
	(0.0004)	(0.0011)	(0.0027)	(0.0028)	(0.0034)	(0.0036)
E01	0.0060 ***	0.0214 ***	0.0362 ***	0.0189 ***	0.0315 ***	0.0220 ***
	(0.0016)	(0.0057)	(0.0066)	(0.0068)	(0.0076)	(0.0077)
E012	0.0097 *	0.0393 ***	0.0479 ***	0.0317 ***	0.0442 ***	0.0276 ***
	(0.0058)	(0.0080)	(0.0086)	(0.0086)	(0.0095)	(0.0088)
Sample 2						
E1	0.0038 **	0.0211 ***	0.0361 ***	0.0242 ***	0.0301 ***	0.0147 *
	(0.0017)	(0.0057)	(0.0062)	(0.0062)	(0.0070)	(0.0071)
E12	0.0066	0.0348 ***	0.0406 ***	0.0360***	0.0455 ***	0.0139
	(0.0058)	(0.0081)	(0.0085)	(0.0084)	(0.0092)	(0.0085)
Sample 3						
E2	-0.0002	0.0211 ***	0.0124 *	0.0181 ***	0.0226 ***	0.0053
	(0.0057)	(0.0064)	(0.0067)	(0.0064)	(0.0069)	(0.0053)
			Model B			
Sample 1						
E0			-0.0013	-0.0032	0.0020	0.0055
			(0.0026)	(0.0030)	(0.0035)	(0.0036)
E01			0.0315 ***	0.0149 **	0.0325 ***	0.0306 ***
			(0.0066)	(0.0068)	(0.0075)	(0.0076)
E012			0.0435 ***	0.0274 ***	0.0450 ***	0.0328 ***
			(0.0086)	(0.0087)	(0.0094)	(0.0088)
Sample 2						
E1			0.0327 ***	0.0145 **	0.0304 ***	0.0207 ***
			(0.0062)	(0.0064)	(0.0070)	(0.0070)
E12			0.0378 ***	0.0269 ***	0.0386 ***	0.0260 ***
			(0.0085)	(0.0084)	(0.0092)	(0.0083)
Sample 3						
E2			0.0170 **	0.0183 ***	0.0147 ***	0.0028
			(0.0066)	(0.0064)	(0.0070)	(0.0054)

Source : Samples obtained by matching six data sets
Field : Establishments from metropolitan France (all industries excepting agriculture and administration).

Table 5 : Test for establishments with at least 50 employees (2002)

Performance variable	Without replacement	With replacement	Without replacement and the nearest neighbour in a radius <0,0001	With replacement and the nearest neighbour in a radius <0,0001
		Model A		
Sample 1				
E0	-0,0054	-0,0072	-0,0079	-0,0078
	(0,0047)	(0,0054)	(0,0048)	(0,0057)
E01	0,01073	0,0107	0,0020	0,0039
	(0,0128)	(0,0136)	(0,0130)	(0,0136)
E012	0,0483 ***	0,0465 **	0,0376 **	0,0427 **
	(0,0174)	(0,0183)	(0,0174)	(0,0184)
Sample 2				
E1	0,0233 **	0,0215 *	0,0179	0,0156
	(0,0115)	(0,0119)	(0,0119)	(0,0121)
E12	0,0664 ***	0,0718 ***	0,0636 ***	0,0643 ***
	(0,0163)	(0,0164)	(0,0166)	(0,0167)
Sample 3				
E2	0,0454 ***	0,0472 ***	0,0412 ***	0,0469 ***
	(0,0127)	(0,0128)	(0,0127)	(0,0128)
		Model B		
Sample 1				
E0	-0,0089	-0,0072	-0,0101	-0,0079
	(0,0053)	(0,0058)	(0,0060)	(0,0061)
E01	0,0089	0,0179	0,0081	0,0138
	(0,0129)	(0,0129)	(0,0134)	(0,0130)
E012	0,0447 ***	0,0572	0,0423 **	0,0511 ***
	(0,0176)	(0,0179)	(0,0181)	(0,0180)
Sample 2				
E1	0,0162	0,0180	0,0121	0,0157
	(0,0120)	(0,0125)	(0,0122)	(0,0124)
E12	0,0575 ***	0,0628 ***	0,0544 ***	0,0626 ***
	(0,0167)	(0,0172)	(0,0173)	(0,0175)
Sample 3				
E2	0,03781 ***	0,0416 ***	0,0397 ***	0,0488 ***
	(0,0133)	(0,0136)	(0,0133)	(0,0138)

Source : Samples obtained by matching six data sets
Field : Establishments from metropolitan France (all industries excepting agriculture and administration).

Table 6: The four types of nearest-neighbour matching for 2002

Performance variable	Without replacement	With replacement	Without replacement and the nearest neighbour in a radius <0,0001	With replacement and the nearest neighbour in a radius <0,0001
		Model A		
Sample 1				
E0	-0,0011	-0,0008	-0,0017	-0,0014
	(0,0026)	(0,0027)	(0,0026)	(0,0027)
E01	0,0354 ***	0,0368 ***	0,0355 ***	0,0362 ***
	(0,0063)	(0,0066)	(0,0064)	(0,0066)
E012	0,0530 ***	0,0499 ***	0,0512 ***	0,0480 ***
	(0,0083)	(0,0087)	(0,0083)	(0,0087)
Sample 2				
E1	0,0369 ***	0,0364 ***	0,0368 ***	0,0362 ***
	(0,0060)	(0,0062)	(0,0060)	(0,0063)
E12	0,0478 ***	0,0414 ***	0,0464 ***	0,0407 ***
	(0,0082)	(0,0085)	(0,0083)	(0,0086)
Sample 3				
E2	0,0207 ***	0,0155 ***	0,0180 ***	0,0124 *
	(0,0065)	(0,0068)	(0,0065)	(0,0068)
		Model B		
Sample 1				
E0	-0,0016	-0,0016	-0,0017	-0,0014
	(0,0026)	(0,0027)	(0,0026)	(0,0027)
E01	0,0296 ***	0,0307 ***	0,0297 ***	0,0315 ***
	(0,0065)	(0,0066)	(0,0065)	(0,0067)
E012	0,0434 ***	0,0431 ***	0,0428 ***	0,0435 ***
	(0,0084)	(0,0087)	(0,0085)	(0,0087)
Sample 2				
E1	0,0308 ***	0,03134 ***	0,0312 ***	0,0328 ***
	(0,0061)	(0,0063)	(0,0062)	(0,0063)
E12	0,0414 ***	0,0383 ***	0,0396 ***	0,0379 ***
	(0,0083)	(0,0085)	(0,0083)	(0,0086)
Sample 3				
E2	0,0204 ***	0,0186 ***	0,0193 ***	0,0171 **
	(0,0065)	(0,0066)	(0,0065)	(0,0066)

Source : Samples obtained by matching six data sets
Field : Establishments from metropolitan France (all industries excepting agriculture and administration).

Table 7: Test for *STC plus* and *STC minus* establishments (2002)

Performance variable	Without replacement	With replacement	Without replacement and the nearest neighbour in a radius <0,0001	With replacement and the nearest neighbour in a radius <0,0001
STC plus subsample / Model B				
Sample 2				
E1	0,0359 ***	0,0359 ***	0,0355 ***	0,0353 ***
	(0,0069)	(0,0070)	(0,0070)	(0,0071)
E12	0,0452 ***	0,0472 ***	0,0434 ***	0,0432 ***
	(0,0098)	(0,0100)	(0,0099)	(0,0101)
STC minus subsample / Model B				
Sample 2				
E1	0,0375 ***	0,0393 ***	0,0369 ***	0,0378 ***
	(0,0117)	(0,0121)	(0,012)	(0,012)
E12	0,0473 ***	0,0446 ***	0,0452 ***	0,0414 ***
	(0,0151)	(0,0155)	(0,0152)	(0,0156)

Source : Samples obtained by matching six data sets
Field : Establishments from metropolitan France (all industries excepting agriculture and administration).

Table 8: Test for *STC plus 2000-2005* and *STC minus 2000-2005* establishments *(2002)*

Performance variable	**Without replacement**	**With replacement**	**Without replacement and the nearest neighbour in a radius <0,0001**	**With replacement and the nearest neighbour in a radius <0,0001**
STC plus 2000-2005 subsample / Model B				
Sample 2				
E1	0,0312 ***	0,0344 ***	0,0325 ***	0,0322 ***
	(0,0010)	(0,0098)	(0,0097)	(0,0098)
E12	0,0430 ***	0,0445 ***	0,0475 ***	0,0488 ***
	(0,0134)	(0,0137)	(0,0137)	(0,0139)
STC minus 2000-2005 subsample / Model B				
Sample 2				
E1	0,0454 ***	0,0472 ***	0,0383 **	0,0383 **
	(0,0164)	(0,0171)	(0,0166)	(0,0166)
E12	0,0544 **	0,0454 **	0,0479 **	0,0479 **
	(0,0216)	(0,0226)	(0,0222)	(0,0222)

Source : Samples obtained by matching six data sets
Field : Establishments from metropolitan France (all industries excepting agriculture and administration).

Appendix 1: Distribution of establishment and firm characteristics according to the STC use (year 2002 – sample 1)

Variable	STC=0 (%)	STC=1 (%)
Size		
Less than 20 employees	**88,99**	**67,64**
20-49 employees	**7,34**	**16,99**
50-499 employees	**3,56**	**14,77**
500 employees and more	**0,11**	**0,60**
Establishment age		
1st quartile	**27,88**	**21,05**
2nd quartile	**22,15**	**19,74**
3rd quartile	**23,67**	**24,43**
4th quartile	**26,30**	**34,78**
For-profit firm	**68,42**	**82,51**
Geographic location		
Ile-de-France	**18,32**	**7,25**
Centre North	**16,77**	**21,69**
Nord-Pas-de-Calais	**5,25**	**7,05**
East	**8,57**	**9,36**
North West Atlantic	**13,16**	**11,03**
South West	**11,97**	**8,81**
Centre South	**13,27**	**21,11**
Midi Mediterranean	**12,69**	**13,70**
Value added variation rate in 2002		
1st decile	**9,90**	**28,14**
2nd decile	**9,95**	**17,81**
3rd decile	**10,00**	**10,90**
4th decile	**12,34**	**10,90**
5th decile	**7,69**	**6,64**
6th decile	**10,01**	**5,33**
7th decile	**10,03**	**4,97**
8th decile	**10,03**	**4,83**
9th decile	**10,03**	**4,53**
10th decile	**10,02**	**5,96**
Value added variation rate in 2001		
1st decile	**9,97**	**15,23**
2nd decile	**9,98**	**13,26**
3rd decile	**9,99**	**11,12**
4th decile	**10,00**	**9,61**
5th decile	**10,00**	**8,65**
6th decile	**10,01**	**8,84**
7th decile	**9,98**	**8,67**
8th decile	**10,04**	**7,93**
9th decile	**10,01**	**9,11**
10th decile	**10,01**	**7,58**
Apparent labor productivity in 2001		
1st decile	**9,99**	**11,58**
2nd decile	**9,99**	**10,90**
3rd decile	**9,99**	**13,23**
4th decile	**10,16**	**13,45**
5th decile	**9,81**	**12,38**
6th decile	**9,89**	**10,79**
7th decile	**10,11**	**9,77**
8th decile	**10,01**	**8,02**
9th decile	**10,01**	**6,18**
10th decile	**10,04**	**3,71**
Part of women in 2002		
1st quartile	**25,01**	**23,55**

2nd decile	**25,02**	**35,68**
3rd decile	**25,01**	**24,95**
4th quartile	**24,96**	**15,81**
Part of unskilled workers in 2002		
1st quartile	**37,77**	**27,64**
2nd decile	**12,24**	**21,19**
3rd decile	**24,95**	**34,56**
4th quartile	**25,05**	**16,61**
Part of high-skilled workers in 2002		
1st quartile	**42,27**	**26,19**
2nd decile	**7,78**	**15,23**
3rd decile	**24,90**	**42,63**
4th quartile	**25,05**	**15,95**
Industry		
Manufacture of food products	**4,74**	**3,24**
Manufacture of consumer goods	**3,00**	**10,49**
Manufacture of motor vehicles	**0,20**	**0,91**
Manufacture of capital equipment	**2,83**	**9,28**
Manufacture of intermediate goods	**4,81**	**33,43**
Energy	**0,15**	**0,08**
Construction	**14,08**	**10,38**
Wholesale and retail trade; repairing	**31,45**	**9,58**
Transportation	**3,73**	**4,58**
Financial intermediation	**1,64**	**0,11**
Real estate activities	**2,07**	**0,27**
Services to firms	**10,28**	**5,60**
Services to individuals	**15,48**	**8,81**
Education, health and social action	**5,53**	**3,24**
Restructuring in 2002	**1,05**	**0,55**
Restructuring in 2001	**1,45**	**1,70**
Nb. of observations	**655 150**	**3 643**

Source : Samples obtained by matching six data sets
Field : Establishments from metropolitan France (all industries excepting agriculture and administration).

Appendix 2: Test of standardized differences (year 2002, sample 1 et Model B)

Variable	Situation	Mean		% bias	t-test	
		Treated	Untreated	reduction	t	p>|t|
Size						
20-49	Without matching	0,16991	0,07338		22,22	0,000
	With matching	0,16769	0,15737	89,3	1,18	0,236
50-499	Without matching	0,14768	0,03559		36,15	0,000
	With matching	0,13923	0,13393	95,3	0,65	0,513
500 ET +	Without matching	0,00604	0,00114		8,62	0,000
	With matching	0,00586	0,00335	48,7	1,57	0,116
FORPROFIT	Without matching	0,82514	0,68416		18,27	0,000
	With matching	0,82227	0,82227	100,0	0,00	1,000
RESTRUCTt	Without matching	0,00549	0,01052		-2,97	0,003
	With matching	0,00558	0,00586	94,4	-0,16	0,876
RESTRUCTt-1	Without matching	0,01702	0,01451		1,26	0,207
	With matching	0,01674	0,02121	-77,9	-1,39	0,166
QUARTILE_AGE4	Without matching	0,34779	0,26296		11,59	0,000
	With matching	0,34431	0,33147	84,9	1,15	0,251
Region						
REG2	Without matching	0,21685	0,16770		7,91	0,000
	With matching	0,21456	0,21289	96,6	0,17	0,863
REG3	Without matching	0,07055	0,05254		4,85	0,000
	With matching	0,07031	0,06473	69,0	0,94	0,347
REG4	Without matching	0,09360	0,08566		1,71	0,088
	With matching	0,09431	0,09096	57,9	0,49	0,625
REG5	Without matching	0,11035	0,13155		-3,78	0,000
	With matching	0,11105	0,10798	85,5	0,42	0,677
REG6	Without matching	0,08811	0,11972		-5,86	0,000
	With matching	0,08929	0,08789	95,6	0,21	0,835
REG7	Without matching	0,21109	0,13274		13,88	0,000
	With matching	0,20787	0,21038	96,8	-0,26	0,794
REG8	Without matching	0,13698	0,12689		1,82	0,068
	With matching	0,13895	0,15067	-16,3	-1,41	0,159
Var_VA t						
DECILE2	Without matching	0,17815	0,09952		15,78	0,000
	With matching	0,17969	0,17941	99,6	0,03	0,975
DECILE3	Without matching	0,10898	0,1		1,80	0,072
	With matching	0,11077	0,1144	59,6	-0,49	0,627
DECILE4	Without matching	0,10898	0,12336		-2,63	0,008
	With matching	0,11049	0,10938	92,2	0,15	0,880
DECILE5	Without matching	0,06643	0,07688		-2,36	0,018
	With matching	0,06752	0,06334	60,0	0,72	0,474
DECILE6	Without matching	0,05325	0,10014		-9,41	0,000
	With matching	0,05413	0,05078	92,9	0,64	0,525
DECILE7	Without matching	0,04968	0,10029		-10,15	0,000
	With matching	0,05050	0,05246	96,1	-0,37	0,708
DECILE8	Without matching	0,04831	0,10031		-10,43	0,000
	With matching	0,04911	0,05329	92,0	-0,80	0,422
DECILE9	Without matching	0,04529	0,10028		-11,03	0,000
	With matching	0,04604	0,04799	96,4	-0,39	0,696
DECILE10	Without matching	0,05957	0,10022		-8,16	0,000
	With matching	0,06055	0,05776	93,1	0,50	0,617

Var_Va t-1						
DECILE2	Without matching	0,13258	0,09982		6,57	0,000
	With matching	0,13253	0,14593	59,1	-1,64	0,102
DECILE3	Without matching	0,11117	0,09995		2,25	0,024
	With matching	0,11077	0,11161	92,5	-0,11	0,910
DECILE4	Without matching	0,09607	0,10005		-0,80	0,425
	With matching	0,09682	0,09319	8,7	0,52	0,601
DECILE5	Without matching	0,08647	0,10004		-2,72	0,006
	With matching	0,08705	0,0784	36,3	1,33	0,184
DECILE6	Without matching	0,08839	0,10006		-2,34	0,019
	With matching	0,08956	0,09319	68,9	-0,53	0,594
DECILE7	Without matching	0,08674	0,09981		-2,63	0,009
	With matching	0,08622	0,08231	70,1	0,60	0,552
DECILE8	Without matching	0,07933	0,10038		-4,22	0,000
	With matching	0,08064	0,08092	98,7	-0,04	0,965
DECILE9	Without matching	0,09113	0,10012		-1,80	0,071
	With matching	0,09208	0,09905	22,4	-1,00	0,315
DECILE10	Without matching	0,07576	0,10006		-4,88	0,000
	With matching	0,07645	0,07478	93,1	0,27	0,789
LP t-1						
DECILE2	Without matching	0,10898	0,09994		1,81	0,070
	With matching	0,10854	0,11328	47,5	-0,64	0,523
DECILE3	Without matching	0,13231	0,09989		6,50	0,000
	With matching	0,13030	0,13309	91,4	-0,35	0,727
DECILE4	Without matching	0,13450	0,10158		6,55	0,000
	With matching	0,13421	0,12444	70,3	1,23	0,218
DECILE5	Without matching	0,12380	0,09808		5,20	0,000
	With matching	0,12388	0,12137	90,2	0,32	0,746
DECILE6	Without matching	0,10788	0,09891		1,81	0,071
	With matching	0,10854	0,11691	6,7	-1,12	0,263
DECILE7	Without matching	0,09772	0,10106		-0,67	0,505
	With matching	0,09794	0,10435	-92,4	-0,90	0,368
DECILE8	Without matching	0,08015	0,10011		-4,00	0,000
	With matching	0,08119	0,08147	98,6	-0,04	0,966
DECILE9	Without matching	0,06176	0,10015		-7,70	0,000
	With matching	0,06250	0,0639	96,4	-0,24	0,808
DECILE10	Without matching	0,03706	0,10041		-12,71	0,000
	With matching	0,03767	0,03627	97,8	0,31	0,754
Women t						
QUARTILE2	Without matching	0,35685	0,25019		14,81	0,000
	With matching	0,35770	0,36551	92,7	-0,69	0,491
QUARTILE3	Without matching	0,24952	0,25009		-0,08	0,937
	With matching	0,24498	0,23884	-977,5	0,61	0,544
QUARTILE4	Without matching	0,15811	0,24958		-12,73	0,000
	With matching	0,15960	0,15765	97,9	0,23	0,821
Industry						
SECT1	Without matching	0,03239	0,04743		-4,26	0,000
	With matching	0,03292	0,03209	94,4	0,20	0,842
SECT2	Without matching	0,10486	0,03004		26,22	0,000
	With matching	0,10603	0,09403	84,0	1,69	0,091
SECT3	Without matching	0,00906	0,00197		9,54	0,000
	With matching	0,00921	0,00837	88,2	0,38	0,704
SECT4	Without matching	0,09278	0,02835		23,24	0,000

	With matching	0,09375	0,08817	91,3	0,82	0,411
SECT5	Without matching	0,33434	0,04806		79,71	0,000
	With matching	0,32450	0,34542	92,7	-1,88	0,061
SECT6	Without matching	0,00082	0,00149		-1,04	0,300
	With matching	0,00084	0,00056	57,8	0,45	0,655
SECT7	Without matching	0,10376	0,14083		-6,42	0,000
	With matching	0,10547	0,10575	99,2	-0,04	0,969
SECT8	Without matching	0,09580	0,31446		-28,39	0,000
	With matching	0,09738	0,101	98,3	-0,51	0,608
SECT9	Without matching	0,04584	0,0373		2,71	0,007
	With matching	0,0466	0,05636	-14,4	-1,87	0,061
SECT10	Without matching	0,0011	0,01642		-7,28	0,000
	With matching	0,00112	0,00056	96,4	0,82	0,414
SECT11	Without matching	0,00274	0,02074		-7,62	0,000
	With matching	0,00279	0,00195	95,3	0,73	0,466
SECT12	Without matching	0,05600	0,10279		-9,28	0,000
	With matching	0,05692	0,04576	76,1	2,14	0,032
SECT13	Without matching	0,08811	0,15483		-11,11	0,000
	With matching	0,08956	0,0971	88,7	-1,10	0,273
Unskilled workers						
QUARTILE 1	Without matching	0,27642	0,37768		-12,58	0,000
	With matching	0,28041	0,27902	98,6	0,13	0,895
High-skilled workers						
QUARTILE 4	Without matching	0,15948	0,2505		-12,65	0,000
	With matching	0,162110	0,15151	88,4	1,23	0,217

Source : Samples obtained by matching six data sets
Field : Establishments from metropolitan France (all industries excepting agriculture and administration).