Do long-term unemployed workers benefit from active labor market programs? Evidence from France, 198-1998

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Do long-term unemployed workers benefit from active labor market programs?

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Abstract. This paper examines the relationship between the time spent in unemployment before entry into an active labor market program and the effect of this program on the individual reemployment probability. More precisely, we test for possible different program effects on short-term and long-term unemployed workers. For this purpose, we develop a general framework for the evaluation problem with multiple treatments and varying dates of entry into the treatment. We estimate a competing-risks duration model to derive the propensity scores that are used to construct the matching estimates of the program effects. Our application is concerned with the youth employment programs which were set up in France during the last twenty years. The empirical analysis makes use of two nonexperimental longitudinal micro data sets collected over two different periods, 1986-1988 and 1995-1998. Results show that youth employment programs were generally less effective in the late nineties than ten years before, although the two subperiods were similar from a macroeconomic point of view. On the whole, long-term unemployed young workers benefited from at least some active labor market policies. However they benefited from different types of programs over the two subperiods.

JEL Codes: C13, C14, C41, J64.

Keywords: program evaluation, matching estimators, multiple treatments, competing-risks duration models, long-term unemployment.

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1. Introduction

In this paper, we reconsider the evaluation of the effect of active labor market programs on the probability of reemployment when the probability of entry into the programs varies through the previous unemployment spell. In other terms, we examine the relationship between the time spent in unemployment before entry into a program and the effect of this program on the individual reemployment probability. In particular, we want to test for possible different program effects on short-term versus long-term unemployed workers. Our application is concerned with the youth employment programs which were set up in France during the last twenty years to improve the labor market prospects of the most disadvantaged and unskilled young workers. The empirical analysis makes use of two non-experimental longitudinal micro data sets. The first data set was collected by INSEE (Institut National de la Statistique et des Etudes Economiques, Paris) from 1986 to 1988; the second set was collected by the statistical department of the French Ministry of Employment and Social Policy (Ministère de l’Emploi et des Affaires Sociales) between 1995 and 1998. These data are based on administrative records supplemented by a series of four interviews over one and a half years for the first survey, and by a series of three interviews over two years and a half for the second survey: both surveys provide information on the dates of entry into training programs and on durations of subsequent spells of employment and unemployment. The first data set was previously used by Bonnal, Fougeré and Sérandon (1997) to estimate the impact of youth employment schemes on subsequent unemployment and employment durations of recipients using a reduced-form multi-state multi-spell transition model that includes participation in these programs as an additional state.¹

We propose to re-examine the impact of these programs on subsequent employability of trainees by implementing matching estimators which were introduced by Heckman, Ichimura, Smith and Todd (1998) and Heckman, Ichimura and Todd (1998). Such estimators are derived from a causal model and their identification do not rely on the assumption of constant treatment effects and on distributional assumptions. This model is an extension of the statistical framework developed by Imbens (2000) and Lechner (2001) to identify and to estimate the causal effects of multiple treatments under the conditional independence assumption. Let us recall briefly the content and consequences of this assumption. Evaluation methods usually try to compare two potential outcomes which are associated with two regimes called treatment and non-treatment. The conditional independence assumption, which states that the assignment to treatment \(D\) and the response variable \(Y\) are conditionally independent.

¹There are just a few empirical studies using French data that adopt the spirit of the literature on program evaluations (Heckman, Lalonde and Smith, 2000). Almost all of them use observational data, as opposed to experimental data. In addition, just a few among the few control for selection on unobserved heterogeneity (Bonnal, Fougeré and Sérandon, 1997, Magnac, 2000). Their main results can be summarized as follows. Training programs directed at unemployed young persons have no effect on post-training wages or employment probabilities unless they have a large training content. On the other hand, payroll tax subsidies have significant effects on employment probabilities of low-wage workers, but their largest effects concern workers between 25 and 30 (see, Fougeré, Kramarz and Magnac, 2000).
given relevant observable covariates $X$, has received a lot of attention. It leads to various estimation methods in which the propensity score of being treated plays a key role. However, treatments are usually not homogenous, at least in the field of the evaluation of active labor market policies. The treatment state is the aggregation of various treatments whose effectiveness may strongly differ. In particular, economists interested with the evaluation of alternative labor market policies should adapt the general statistical methodology to the situation where mutually exclusive treatments are possible, in order to examine how their relative effectiveness can be estimated.

More formally, let us consider $(K + 1)$ treatments. The assignment to one specific treatment $k$ ($k = 0, ..., K$) is represented by $D = k$, and the potential output associated with treatment $k$ is denoted $Y_k$. Our parameter of interest is the average relative effect of, say, treatment $k$ with respect to treatment $k' \neq k$, which is denoted $E(Y_k - Y_{k'} | D = k)$. For identifying this effect, we assume that the treatment indicator $D$ is conditionally independent of the potential outputs given the values of the observable covariates; this assumption is denoted by $(Y_0, ..., Y_K) \perp D | X$. Then we apply matching methods developed by Heckman, Ichimura and Todd (1998) to the individuals who receive treatments $k$ or $k'$. Thus our evaluation of treatment $k$ against treatment $k'$ is not the same as our evaluation of treatment $k'$ against treatment $k$.

The literature on estimation by matching has often emphasized the importance of the propensity score specification. Due to the fact that our first sample is extracted from the stock of unemployed people at a given date (August 1986) and is subject to right-censoring, a natural specification of the treatment probabilities may be derived from a competing-risks duration model. A propensity score derived from a competing-risks model presents a second and probably more important advantage: it permits directly to estimate the probability to move from unemployment to a given treatment over a given subperiod of the unemployment spell, and thus to compare program participants either with those unemployed who did not enter any program over the same time period, or with program participants who entered the program within a different period.

The complete design of the process evaluated can be summarized as follows: in the first data set, all individuals are initially unemployed (i.e. in August 1986), while, in the second survey, they enter unemployment between April and June 1995. Thus the first data set is sampled from the stock of individuals who were unemployed in August 1986, while the second one is sampled from the flow of entrants into unemployment over the second quarter of 1995. When exiting unemployment, individuals may enter regular employment or one among three types of programs, the first type including “community jobs” in the public sector, the second one including short training programs in public training centers, and the last one corresponding to workplace training programs in the private sector. The observation period ends in May 1988 in the first survey, and in 1998 in the second one; all durations are measured in months; the outcome variables are alternatively the probability to be employed in a regular job (namely, either in a temporary job or in a job with a long-term labor contract) and the probability to be nonemployed.

Usually the literature on evaluation distinguishes between a selection bias that may
result either from selection on observables or from selection on unobservables.\footnote{See, for instance, Heckman and Robb (1985), or Heckman and Hotz (1989).} Due to the form of the above conditional independence assumption, it should be mentioned that our paper obviously considers the situation where selection only results from characteristics which are observable to the analyst.\footnote{This is an important difference to the study by Bonnal, Fougère and Sémandon (1997) which is based on the assumption that both observable and unobservable characteristics affect the process of assignment to programs. The fact that in our study, the intensity of transition from the initial unemployment spell to other states is allowed to be affected by more observable covariates than in Bonnal, Fougère and Sémandon (1997), is an argument for using the conditional independence assumption. If this assumption would not hold, alternative evaluation strategies could be for instance to choose the methods implemented by Bonnal, Fougère and Sémandon (1997) and by Magnac (2001) who consider selection on unobservables.} Our results highlight the variability of program effects, both between programs and among recipients of the same program, according to their previous unemployment duration. The next section gives a description of youth employment programs in France and Section 3 presents the data we use. In Section 4, we develop the general framework for the evaluation problem with multiple treatments and varying dates of entry into the treatments. We show that, under the conditional independence assumption, matching with respect to the ratio of the scores \( \Pr(D_t = k \mid X_t, D_t \in \{k, k'\}) \) and \( \Pr(D_t = k' \mid X_t, D_t \in \{k, k'\}) \), where \( X_t \) is the vector of relevant covariates at date \( t \) of entry into the program, allows to estimate nonparametrically the average conditional treatment effect \( E(Y_{k}^{t+h} - Y_{k'}^{t+h} \mid D_t = k) \) for a pair of treatments \( k \) and \( k' \), where \( Y_{k}^{t+h} \) denotes the outcome variable associated with program \( k \) when this program is entered at date \( t \) and when the outcome is observed \( h \) time units after the entry date. In Section 4, we also introduce the specification of our propensity scores, which are derived from a competing-risks duration model, and we discuss their estimates. In Section 5, we report and comment the results obtained for different response variables through kernel matching estimation. Section 6 concludes.

2. Youth Employment Programs in France

Over the last twenty years, youth unemployment is the most striking feature of the French labor market. For workers between 15 and 24 years old, the unemployment rate increased from 13% in 1979 to 26.6% in 1999, after reaching a maximum, 29%, in 1987. This explains why active labor market policies were increasingly introduced in France since the mid-seventies, when unemployment started its increase (see DARES, 1996, for a historical description). These policies were targeted to the unemployed and to workers with the highest unemployment risks, among which young adults or older workers. These policies are similar to those implemented in other European countries (Scarpetta, 1993), France being a median user. Direct employment subsidies and incentives for human capital investments are the two main instruments of these policies. Almost any mixture of these two components can be found within French employment policies. For instance, public employment schemes such as community jobs (“Travaux d’Utilité Collective”) or the more recent program called “Contrats Emploi Solidarité” have almost no component of training or learning by doing. At
the other extreme, apprenticeship contracts have a very intensive training content.

Approximately fifty measures were implemented since 1974, even though only ten programs are still in use. These programs may be classified according to the characteristics of eligible participants, the level of implementation (local or national), the employment sector (public or private), or the legal status (training course or labor contract). Each year, 800,000 individuals between 15 and 25 years old are financially assisted through public programs which give them a training course or a subsidized job.

Behind this profusion of measures, two main types of public interventions can be distinguished:

1. job creation in the public sector, thanks to massive wage subsidies, directed to low-skilled unemployed young adults,
2. promotion of training programs in the private sector, these programs include classroom education and on-the-job training in order to increase labor market experience and human capital.

Let us recall the main features of youth training programs which were in effect in France during the last fifteen years. Most of these programs were introduced before, but the numbers of participants increased greatly after the 1986 Emergency Plan for Youth Employment (“Plan d’Urgence pour l’Emploi des Jeunes”). This Plan introduced strong incentives for private firms offering training places and facilitated the development of programs with alternating spells of work and training (“formations en alternance”, for which we propose the term “workplace training programs”). For instance, the lower age limit for entry into such programs has been lowered from 18 to 16 years old, while the upper age limit for entry into the apprenticeship system has been raised from 20 to 25 years old. To simplify, we can distinguish between two types of programs: the “workplace” training programs provided by private firms, and the “workfare” programs provided by the State and the public sector. For this second type of programs, the amount of vocational and specific training is generally lower.

2.1. Workplace training programs

The apprenticeship contract is a training scheme which offers participants part-time work in the firm, complemented by part-time education in a public training center. Every participant prepares himself/herself for a national diploma; to obtain this diploma, a test has to be taken after completion of the contract. The applicant has to be between 15 and 25 years of age, the applicant must find a firm which is authorized to hire apprentices, and he/she has to be registered in a training center for apprentices. The apprenticeship contract, signed both by the employer and the employee, is registered by a local office of the Ministry of Employment and Social Policy. The usual length of an apprenticeship contract is two years, but it can vary between one and three years. The training is partly general, but it also comprises occupation-specific components. The apprentice is a wage-earner, and his/her wage is calculated as a fraction of the minimum wage level. At the end of the apprenticeship contract, the employee may be hired by the firm either under a fixed-term labor contract (FTC), or under a long-term labor contract (LTC).
The “Contrat de Qualification” is very similar to the apprenticeship contract. It is a fixed-term contract with length that may vary from 6 to 24 months. Every participant prepares himself/herself for a diploma as in apprenticeship contracts. This program is addressed to unskilled or long-term unemployed young adults. At least one-fourth of the contract period must be devoted to training. This training takes place during working hours and is approved by collective agreements. The participant is paid by the employer; the wage is equal to a fixed fraction of the monthly legal minimum wage, and this fraction varies according to the age of the participant and the seniority in the contract.

The “Contrat d’Adaptation” may be either a fixed-term labor contract with length that may vary from 6 to 12 months or a long-term labor contract. It is aimed to provide some specific training (adapted to the job). This program is addressed to skilled young people who have difficulties to find a job. Potential employers are all firms in craft, trade and industrial sectors. If the “adaptation contract” is a fixed-term labor contract, at least 200 hours must be devoted to training. If it is signed as a long-term labor contract, the amount of training depends both on the job and on the skill level of the applicant. The wage is paid by the firm; it is at least equal to the legal minimum wage. Firms signing “adaptation contracts” are exempted from paying the employer training tax but have to pay Social Security contributions. Apprenticeship contracts, “Contrats de Qualification” and “Contrats d’Adaptation”, which are still in use, are rarely observed in our data sets, because they are generally addressed to skilled young workers with a low labor market experience. Thus applicants are mainly young people who leave school or college.

“Courses for Preparation to the Working Life” (“Stages d’Initiation à la Vie Professionnelle”) are non renewable fixed-term labor contracts in the private sector, which are aimed to offer some general training to young people with no work experience or who are unemployed for more than one year. The training is provided either by the firm or by a government training center. Trainees receive a lump-sum from the State and a complementary allowance from the firm. Firms offering such courses are exempted to pay Social Security contributions. This program was suppressed in 1991. It was replaced by “Contrats de Retour à l’Emploi” (acronym: CRE; literal translation: “Return-to-Employment Contracts”) up to 1995, and by “Contrats Initiative Emploi” (acronym: CIE; literal translation: “Initiative-for-Employment Contracts”) from 1995. These two programs have similar features. They are addressed to long-term unemployed workers (either young or adults), adult recipients of the “Minimum Integration Income”, and older workers. The contract could be either a long-term labor contract or a fixed-term labor contract (with length that may vary from 6 to 18 months in the case of “Contrats de Retour à l’Emploi”, and from 12 to 24 months in the case of “Contrats Initiative Emploi”). Firms signing such contracts are exempted from paying Social Security contributions. Transitions to “Courses for Preparation to the Working Life” are only observed in our first data set, while transitions to “Return-to-Employment Contracts” and “Initiative-for-Employment Contracts” appear only in the second one. In our results, these three types of programs are called “workplace

4The “Minimum Integration Income” (Revenu Minimum d’Insertion) is the main welfare means-tested program in France.
2.2. Workfare programs

The program called “Travaux d’Utilité Collective” was set up in 1984 and suppressed in 1990. In this program, hiring of low-educated jobless young adults and long-term unemployed in community service jobs is heavily subsidized; the objective being not only to give a job but also to increase employability. Employers are public institutions, local administrations and non-profit associations. Labor contracts associated with “Travaux d’Utilité Collective” is a part-time (20 hours a week) fixed-term (from 3 to 12 months) employment contract. From 1987, contract length has been extended to 24 months for people with poor employment prospects. The hourly wage is the legal hourly minimum wage. It is entirely paid by the State. The employer is exempted from Social Security contributions but not from Unemployment Insurance contributions. This program was suppressed in 1990 and replaced by “Contrats Emploi Solidarité” (acronym ;CES, literal translation: “Employment-Solidarity Contracts”). These contracts, which are still in use, have the same features than “Travaux d’Utilité Collective”, but eligible participants include also long-term unemployed adult workers, adult recipients of the “Minimum Integration Income”, and unskilled older workers. These contracts can be renewed three times, their maximum length is 36 months. In our estimation, “Travaux d’Utilité Collective” and “Contrats Emploi Solidarité” are called “Community jobs”.

The remaining group of workfare programs is called “Other Programs” in our empirical part. This group includes two types of programs. “Courses for 16 to 25 years old” (“Stages pour les 16-25 ans”) are training courses offered by State training centers. Their length varies from 6 to 9 months and the time devoted to training is between 550 and 700 hours. These courses are aimed to facilitate social and professional integration of young people leaving the educational system without any diploma or qualification. Trainees received a lump-sum from the State. The program called “Actions d’Insertion et de Formation” (acronym: AIF; translation: “programs for insertion and training”) was introduced in 1990. It is now the main program addressed to long-term unemployed. This program proposes different types of training courses; some of them may include a short training period within a firm. Participants receive a lump-sum from the State. The time devoted to training is between 40 and 200 hours.

3. Data

The first data set used in our study comes from the “Suivi des Chômeurs” (or “Histories of Unemployed”) survey collected by INSEE (Paris) between 1986 and 1988. The sample has been drawn randomly in August 1986 from the files of the public employment service (“Agence Nationale Pour l’Emploi” or ANPE ). About 8,000 unemployed people were sampled but only 7,450 could be reached at the first interview. Individuals were interviewed four times, in November 1986, May 1987, November 1987, and finally May 1988. At the first interview, respondents were asked to give information
on their labor market status between August and November 1986, and in particular on the time already spent in the unemployment spell sampled in August 1986 and on their status before entry into that spell. The data record retrospectively month by month, between November 1986 and May 1988, the events corresponding to individual transitions in the labor market. For this study, we consider young unemployed who were less than 27 years old in August 1986 and for whom it is possible to observe an accurate and relevant date of registration in the ANPE files. The subsample includes 3,160 individuals.5

The second data set comes from the survey “Trajectoires des Demandeurs d’Emploi” collected by the Statistical Department of the French Ministry of Employment and Social Policy between 1995 and 1998. The sample has been drawn randomly among the entrants into unemployment over the second quarter of 1995, in eight local labor markets. The survey sites include two cities in the north region (Roubaix and Lens), three around Paris (Cergy, Mantes and Poissy), and three in the south-east region (Marseille, Aix-en-Provence and Berre). The objective of this survey was to collect longitudinal information on a cohort of entrants into unemployment over three years, from 1995 to (early) 1998. About 9,000 unemployed people were sampled but only 8,125 could be reached at the first interview. Individuals were interviewed three times, in the first quarters of 1996, 1997, and 1998. At the first interview, respondents were asked to give information on their labor market status between their entry into unemployment during the second quarter of 1995 and the first interview, but also on their labor market history before entry into the sampled unemployment spell. Once again, the data record retrospectively month by month, between the second quarter of 1995 and the first quarter of 1998, the events corresponding to individual transitions in the labor market, and we keep for our study young people who were less than 27 years old when they entered the sampled unemployment spell. This subsample includes 3,383 individuals.

The sizes of both samples and the information contained in both data sets are very similar. For each individual whose initial unemployment spell is not right censored, we observe either a transition to a regular job with a long-term duration labor contract (LTC) or with a fixed-term labor contract (FTC), either a transition to the out-of-labor-force (OLF) state, or a transition to one among the following employment and training programs:

- a workplace training program ((WT hereafter),
- a community job (CJ hereafter),
- or a program of the last category called “other programs”.

Table 1 gives the number and the destination states of transitions from the initial unemployment spell, given gender, age, educational level (below or above the “Bac-

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5 The selection rule for the chosen sample in our study differs to the one used in Bonnal, Fougère and Sérandon (1997) from two aspects; first we include men and women in our sample, while Bonnal, Fougère and Sérandon (1997) examined young males only; then, instead of younger than 26, the age limit is increased to younger than 27.
"lauréat", which is the terminal high school diploma in France, and the previous state (i.e. the state occupied before the initial unemployment state).

### Table 1
Number of transitions from the initial unemployment spell

<table>
<thead>
<tr>
<th># of transitions to:</th>
<th>Total</th>
<th>Women</th>
<th>Age ≤ 23</th>
<th>High-school and above</th>
<th>Previously in: a job</th>
<th>a program</th>
</tr>
</thead>
<tbody>
<tr>
<td>LTC jobs</td>
<td>726</td>
<td>371</td>
<td>516</td>
<td>108</td>
<td>476</td>
<td>45</td>
</tr>
<tr>
<td>FTC jobs</td>
<td>703</td>
<td>358</td>
<td>542</td>
<td>108</td>
<td>446</td>
<td>52</td>
</tr>
<tr>
<td>OLF state</td>
<td>298</td>
<td>183</td>
<td>245</td>
<td>38</td>
<td>129</td>
<td>25</td>
</tr>
<tr>
<td>Workplace training</td>
<td>246</td>
<td>123</td>
<td>221</td>
<td>27</td>
<td>98</td>
<td>37</td>
</tr>
<tr>
<td>Community jobs</td>
<td>244</td>
<td>133</td>
<td>232</td>
<td>25</td>
<td>62</td>
<td>30</td>
</tr>
<tr>
<td>Other programs</td>
<td>286</td>
<td>162</td>
<td>201</td>
<td>38</td>
<td>147</td>
<td>36</td>
</tr>
<tr>
<td>Right-censored⁶</td>
<td>657</td>
<td>436</td>
<td>472</td>
<td>63</td>
<td>389</td>
<td>56</td>
</tr>
<tr>
<td>Total</td>
<td>3160</td>
<td>1786</td>
<td>2429</td>
<td>407</td>
<td>1747</td>
<td>281</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th># of transitions to:</th>
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<th>Women</th>
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<th>High-school and above</th>
<th>Previously in: a job</th>
<th>a program</th>
</tr>
</thead>
<tbody>
<tr>
<td>LTC jobs</td>
<td>481</td>
<td>189</td>
<td>223</td>
<td>189</td>
<td>223</td>
<td>45</td>
</tr>
<tr>
<td>FTC jobs</td>
<td>1496</td>
<td>632</td>
<td>844</td>
<td>550</td>
<td>644</td>
<td>173</td>
</tr>
<tr>
<td>OLF state</td>
<td>363</td>
<td>230</td>
<td>219</td>
<td>119</td>
<td>110</td>
<td>43</td>
</tr>
<tr>
<td>Workplace training</td>
<td>303</td>
<td>123</td>
<td>209</td>
<td>67</td>
<td>79</td>
<td>49</td>
</tr>
<tr>
<td>Community jobs</td>
<td>211</td>
<td>132</td>
<td>136</td>
<td>56</td>
<td>38</td>
<td>54</td>
</tr>
<tr>
<td>Other programs</td>
<td>110</td>
<td>62</td>
<td>68</td>
<td>18</td>
<td>19</td>
<td>23</td>
</tr>
<tr>
<td>Right-censored⁷</td>
<td>419</td>
<td>218</td>
<td>208</td>
<td>67</td>
<td>151</td>
<td>65</td>
</tr>
<tr>
<td>Total</td>
<td>3383</td>
<td>1586</td>
<td>1907</td>
<td>1066</td>
<td>1264</td>
<td>452</td>
</tr>
</tbody>
</table>


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⁶The subset of right-censored observations includes the individuals who exited from the panel because of attrition in November 1986, May 1987, or November 1987, and the individuals who were still in their sampled unemployment spell at the end of the observation period (May 1988).

⁷The subset of right-censored observations includes the individuals who exited from the panel because of attrition between the first and the second interviews (thus between the first quarter of 1990 and the first quarter of 1997), between the second and the third interviews (thus between the first quarter of 1997 and the first quarter of 1998), and the individuals who were still in their sampled unemployment spell at the end of the observation period (first quarter of 1998).
4. The statistical framework

4.1. Assumptions

The time scale is supposed to be discrete and indexed by \( t \in \mathbb{N} \). Workers are assumed to enter unemployment at time \( t = 0 \). Individuals leave this unemployment spell either to enter one among \( K \) types of programs, either to enter regular employment (including fixed-term labor contracts -FTC- and long-term labor contracts -LTC-), or to enter the out-of-labor-force (OLF) state. We are interested here in the short term effect of the program participation on the subsequent employment probability. Our statistical model will focus exclusively on the first transition (if any) out of unemployment. A transition to a program of type \( k \) is indicated by a polychotomous variable \( D_t \) taking its values in the set \( \{0, 1, \ldots, K\} \) at any date \( t > 0 \), namely

\[
D_t = k, \ k \in \{0, 1, \ldots, K\}, \ t = 1, 2, \ldots
\]

Nonparticipation in a program at date \( t \) corresponds to \( D_t = 0 \). If no program is entered at date \( t \), then the unemployed either stay unemployed or move to one among the other possible destination states (FTC, LTC or OLF). For a given date \( t \) of entry, there exists \( K + 1 \) potential outcomes

\[
\{Y^{t+h}_0, Y^{t+h}_1, \ldots, Y^{t+h}_k, \ldots, Y^{t+h}_K\}
\]

which are associated with the \( K + 1 \) possible treatments. In our application, the outcome variable \( Y^{t+h}_k \) equals 1 if the individual is employed at date \( t + h \) (namely, \( h \) time units after entering program \( k \) at date \( t \)), 0 otherwise. The observed outcome at time \( (t + h) \) is then defined as

\[
Y^{t+h} = Y^{t+h}_k \quad \text{if} \quad D_t = k
\]

We concentrate entirely on the average effect (evaluated \( h \) units of time after the date of entry) of treatment \( k \) relative to treatment \( k' \) when both are entered at date \( t \), for an individual randomly drawn from the population of individuals entering treatment \( k \) at date \( t \). Formally, we are interested in the identification and the estimation of the parameter

\[
\Delta^{t+h}_{k|k'} = E \left( Y^{t+h}_k - Y^{t+h}_{k'} \mid D_t = k \right), \quad \text{for} \ k \neq k'
\]  \hspace{1cm}(4.1)

These parameters are specific to the entry date. If one of these treatments is the nonparticipation state at date \( t \) (\( k' \) for instance), then we compare the unemployed who enter program \( k \) at date \( t \) with the unemployed who either stay unemployed or move to one among the three other possible states (employment in a FTC job, employment in a LTC job, or OLF state) at that date. If we define \( X_t \) as the set of exogenous relevant covariates, then the expression of the conditional independence assumption (CIA) in this case of multiple treatments (see Imbens, 2000, and Lechner, 2001) is

\[
\{Y^{t+h}_0, Y^{t+h}_1, \ldots, Y^{t+h}_k, \ldots, Y^{t+h}_K\} \mathcal{H} D_t \mid X_t
\]  \hspace{1cm}(4.2)
This assumption means that, conditionally on the set $X_t$ of relevant covariates, the participation in any program $k$ at date $t$ does not affect potential outcomes. This CIA assumption is an extension of the so-called “selection on observables” assumption in the evaluation literature. As noticed by Imbens (2000), Lechner (2001), and Brodaty, Crépon and Fougère (2001), assumption (4.2) implies the propensity score property:

$$\{Y_{t+h}^i, Y_{t+h}^{i'}\} \perp D_t \mid D_t \in \{k, k'\}, P_{k|k'}^t$$  \hspace{1cm} (4.3)

where the propensity (balancing) score $P_{k|k'}^t$ is defined as

$$P_{k|k'}^t = \Pr (D_t = k \mid X_t, D_t \in \{k, k'\})$$

This property shows that the pair of outcomes $\{Y_{t+h}^i, Y_{t+h}^{i'}\}$ and the treatment variable $D_t$ are conditionally independent, given the conditional probability $P_{k|k'}^t$, of entering treatment $k$ at date $t$. Under this last assumption, our parameter of interest may be written as

$$\Delta_{k|k'}^{t+h} = E \left( Y_{t+h}^i - Y_{t+h}^{i'} \mid D_t = k \right)$$

$$= E \left( Y_{t+h}^i - E \left( Y_{t+h}^{i'} \mid D_t = k, D_t \in \{k, k'\}, P_{k|k'}^t \right) \mid D_t = k \right)$$

$$= E \left( Y_{t+h}^i - E \left( Y_{t+h}^{i'} \mid D_t = k', D_t \in \{k, k'\}, P_{k|k'}^t \right) \mid D_t = k \right)$$

$$= E \left( Y_{t+h}^i - E \left( Y_{t+h}^{i'} \mid D_t = k', P_{k|k'}^t \right) \mid D_t = k \right)$$

$$= E \left( Y_{t+h}^i - E \left( Y_{t+h}^{i'} \mid D_t = k', P_{k|k'}^t \right) \mid D_t = k \right)$$

Finally, using the methodology of matching estimators proposed by Heckman, Ichimura and Todd (1998, 1999), the parameter $\Delta_{k|k'}^{t+h}$ may be estimated as

$$\widehat{\Delta}_{k|k'}^{t+h} = \frac{1}{N_{i,k}} \sum_{i \in \{D_t = k\}} \left\{ Y_{t+h}^i - \sum_{j \in \{D_t = k'\}} W \left( P_{i,k|k'}, P_{j,k|k'}^t \right) Y_{t+h}^{j} \right\}$$  \hspace{1cm} (4.4)

where $N_{i,k}$ is the observed number of entrants in treatment $k$ at date $t$, and the weight

$$W \left( P_{i,k|k'}, P_{j,k|k'}^t \right)$$

is defined as

$$W \left( P_{i,k|k'}, P_{j,k|k'}^t \right) = \frac{K \left( \frac{P_{i,k|k'}, P_{j,k|k'}^t}{h_{N_{i,k}}}, \frac{P_{m,k|k'}}{h_{N_{m,k}}} \right)}{\sum_{m \in \{D_t = k'\}} K \left( \frac{P_{i,k|k'}, P_{m,k|k'}}{h_{N_{i,k}}}, \frac{P_{m,k|k'}}{h_{N_{m,k}}} \right)}$$

11
where \( N_{t,k} \) is the observed number of entrants in treatment \( k' \) at date \( t \), \( K(\cdot) \) is a
kernel function,\(^8\) and \( h_{N_{t,k'}} \) is a “rule-of-thumb” bandwidth parameter calculated on
the support of the propensity score \( P_{k'|k}^t \), for individuals entering treatment \( k' \) at date
\( t \).

### 4.2. The duration model

In order to estimate the propensity scores

\[
P_{k'|k}^t = \Pr \left( D_k = k \mid X_t, D_k \in \{k, k'\} \right)
\]

we need a sufficiently flexible framework that allows for some possible non monotone
variations of the transition rates through the unemployment spell, but also for time-varying
effects of some regressors on the exit rates. For these reasons we have chosen to use a flexible
semi-parametric competing risks duration model, closed to the competing risks duration model
used by MacCall (1996) and more recently by Deng, Quigley and Van Order (2000). Because
information concerning individual histories is collected on a monthly basis, and because our
statistical framework is set in discrete time, we follow a grouped data approach.\(^9\)

The underlying time scale is supposed to be continuous and indexed by \( t \in R \),
where \( t = 0 \) corresponds to the entry date into the sampled unemployment spell. Let
\( T^*_k \) be the latent duration associated with a transition to state \( k \) \( (k = 1, 2, \ldots, K) \). In
our application we distinguish between seven destination states: regular employment
(either LTC or FTC jobs), out-of-the labor force (OLF), and three types of programs
(community jobs, subsidized jobs in private firms, or other programs). Moreover, we
assume that the latent durations are independently distributed conditionally on the
observable covariates \( X = \{X_s\}_{s=0}^t \):

\[
(T^*_j \cap T^*_k) \mid X, \forall j \neq k, j, k = 1, 2, \ldots, K \tag{4.5}
\]

The time scale is partitioned into equal time intervals (or periods) denoted \([I_{j-1}, I_j] \),
with \( j \in N \). The lower bound of the first interval, \( I_0 = 0 \), corresponds to the entry
date into the sampled unemployment spell. In the sequel, \([I_{j-1}, I_j] \) is called the \( j \)-th
interval. The rate of transition to destination state \( k \) is supposed to have the following
piecewise constant baseline hazard form:

\[
\theta_k (t \mid X_t; \beta_k) = \exp \left( \delta_{jk} + X_j \beta_{jk} \right), \forall t \in [I_{j-1}, I_j] \tag{4.6}
\]

where \( \beta_{jk} \) are unknown coefficients indexed by interval \( j \), which implies that the
effects of regressors on the transition rate may vary along the unemployment spell.
Definition (4.6) implies the transition rate in the \( j \)-th interval depends only on the
values of the regressors along this interval, which are supposed to fixed and equal to
\( X_j \). This specification is more flexible than the usual proportional hazard specification.
From assumption (4.6), it is easily shown that:

\[
\Pr \left( T^*_k \geq I_j \mid T^*_k \geq I_{j-1}, X_j; \beta_{jk} \right) = \exp \left[ -\exp \left( \delta_{jk} + X_j \beta_{jk} \right) \right] \tag{4.7}
\]

\(^8\)In our application, \( K \) is chosen to be the quartic kernel function.
Thus, the survivor function of the \( k \)-th latent duration variable \( T^*_k \) is:

\[
S_k(I_j) \equiv \Pr(T^*_k \geq I_j \mid X; \beta_k) = \prod_{l=1}^{j} \exp \left( - \exp \left( \delta^k_l + X_l \beta_{l,k} \right) \right) \tag{4.8}
\]

with \( \beta_k = \{\beta_{1,k}, ..., \beta_{j,k}\} \). The probability that a transition to destination state \( k \) occurs during the \( j \)-th interval is

\[
P_{k,j} \equiv \Pr(T^*_k \in [I_{j-1}, I_j], \{T^*_m \geq I_j\}_{m \neq k} \mid X, \beta) = \{S_k(I_{j-1}) - S_k(I_j)\} \times \prod_{m \neq k} S_m(I_j) \tag{4.9}
\]

with \( \beta = \{\beta_1, ..., \beta_K\} \). The probability that the unemployment spell is observed to be right-censored during the \( j \)-th interval is

\[
P^*_j \equiv \Pr(\{T^*_m \geq I_{j-1}\}_{m=1,..K} \mid X, \beta) = \prod_{m=1}^{K} S_m(I_{j-1}) \tag{4.10}
\]

Because our first data set is extracted from the stock of unemployed people in August 1986 (see above for the description of the data), we have to correct for a potential stock sampling bias. To do so, we use the conditional maximum likelihood procedure described in Bonnal, Fougère and Sérandon (1997, p.698-699), or in Brodaty, Crépon and Fougère (2001, p.97-98). This procedure consists in weighting probabilities (4.9) and (4.10) by the inverse of the probability to be still unemployed at the sample date (August 1986), which is equal to the survivor function of the unemployment duration calculated as the difference between the sampling date and the date of entrance into the sampled unemployment spell. This difference is the duration already spent in unemployment at the sampling date; it is denoted \( t^* \) and it is supposed to belong to the interval \([I_{j^*-1}, I_{j^*}]\). The resulting conditional probabilities are:

\[
P^*_{k,j} \equiv \Pr(T^*_k \in [I_{j-1}, I_j], \{T^*_m \geq I_j\}_{m \neq k} \mid X, \beta, \{T^*_m \geq I_{j^*}\}_{m=1,..K}) = \frac{P_{k,j}}{P^*_{j^*}} \tag{4.11}
\]

and

\[
P^*_j \equiv \Pr(\{T^*_m \geq I_{j-1}\}_{m=1,..K} \mid X, \beta, \{T^*_m \geq I_{j^*}\}_{m=1,..K}) = \frac{P_j}{P^*_{j^*}} \tag{4.12}
\]

The stock sampling corrected log-likelihood may then be written

\[
\ln(L) = \sum_{i=1}^{N} \left\{ \sum_{k=1}^{K} \delta_{ik} \ln \left( P^*_{i,k,j} \right) + \delta_{i'} \ln \left( P^*_{i',j} \right) \right\} \tag{4.13}
\]

13
where the subscript $i$ refers to individual $i \ (i = 1, \ldots, N)$ and $(\delta_{ik}, \delta_{ic})$ are dummy variables defined as

$$
\delta_{ik} = \begin{cases} 
1 & \text{if destination state for individual } i \text{ is } k, \\
0 & \text{otherwise}
\end{cases}
$$

and

$$
\delta_{ic} = \begin{cases} 
1 & \text{if the unemployment spell of individual } i \text{ is right censored,} \\
0 & \text{otherwise.}
\end{cases}
$$

Propensity scores are derived from this competing risks duration model. For instance, when both $k$ and $k'$ ($k \neq k'$) correspond to one among the three types of programs, the propensity score $P^x_{k\setminus k'}$ is

$$
P^x_{k\setminus k'} = \frac{P_{k,j}}{(P_{k,j} + P_{k',j})} \quad \text{for } t \in [I_{j-1}, I_j] \quad (4.14)
$$

Otherwise, when we compare the treatment $k$ when entered at date $t$ with the “no treatment” state $k' = 0$ (non participation at all in any program), and if we denote $S$ the set of transitions that correspond to our three types of programs, then the propensity score $P^x_{k\setminus 0}$ is

$$
P^x_{k\setminus 0} = \frac{P_{k,j}}{1 - \sum_{m \in S, m \neq k} P_{m,j}} \quad \text{for } t \in [I_{j-1}, I_j] \quad (4.15)
$$

4.3. Application to the data

The sample size at our disposal does not allow to estimate accurately the parameters

$$
\Delta_{k\setminus k}^{t+h} = E \left( Y_{k}^{t+h} - Y_{k'}^{t+h} \mid D_k = k \right)
$$

because it does not contain enough transitions from unemployment to programs at each possible date $t$. As a consequence, we choose to estimate a grouped version of these parameters. Specifically, we focus on the two following subperiods that are described in section 3:

$$
p[\tau] = [\tau, \tau + 8] \quad \text{with} \quad \tau = 1 \text{ or } 10 \quad (4.16)
$$

and we estimate the following parameters

$$
\Delta_{k\setminus k}^{\tau+h} = E \left( Y_{k}^{\tau+h} - Y_{k'}^{\tau+h} \mid D_{p[\tau]} = k \right) \quad (4.17)
$$

where $\tau = 1, 10$ and $h \in \mathbb{N}^*$. $D_{p[\tau]}$ is the treatment indicator which is equal to $k \neq 0$ if treatment $k$ is entered during subperiod $p[\tau]$, and equal to $k = 0$ if the no treatment
state is entered. This last event corresponds either to survival in unemployment until the end of period \( p[\tau] \), or to a transition from unemployment to one of the other destination states (LTC, FTC or OLF) during subperiod \( p[\tau] \). \( Y_k^{\tau+h} \) is the latent outcome variable which is associated with treatment \( k = \{0, 1, \ldots, K\} \) in period \( p[\tau] \); it equals 1 if the individual is employed \( h \) time units after date \( \tau \), 0 otherwise. The corresponding propensity score property is then

\[
\{Y_k^{\tau+h}, Y_k^{\tau+h}\} \perp D_{p[\tau]} \mid D_{p[\tau]} \in \{k, k'\}, P_{k\mid \tau}^{p[\tau]}
\]  

(4.18)

where \( P_{k\mid \tau}^{p[\tau]} \) is defined as

\[
P_{k\mid \tau}^{p[\tau]} = Pr\left(D_{p[\tau]} = k \mid X_{\tau}, D_{p[\tau]} \in \{k, k'\}\right)
\]  

(4.19)

Thus, we match the unemployed according to their respective conditional probability of moving from unemployment to program \( k \) in period \( p[\tau] \). These probabilities are simply

\[
P_{k\mid \tau}^{p[\tau]} = \frac{\sum_{j \in p[\tau]} P_{k,j}}{\left(\sum_{j \in p[\tau]} P_{k,j} + \sum_{j \in p[\tau]} P_{k',j}\right)}
\]

when both \( k \) and \( k' \) correspond to one among the three types of programs and

\[
P_{k\mid \tau}^{p[\tau]} = \frac{\sum_{j \in p[\tau]} P_{k,j}}{\left(1 - \sum_{j \in p[\tau]} \sum_{m \in S \setminus k} P_{m,j}\right)}
\]  

(4.20)

when we compare entry into treatment \( k \) in period \( p[\tau] \) with the “no treatment” situation in the same period.

5. Results

5.1. Estimation of the propensity scores

Tables 2 and 3 give parameter estimates for the piecewise-constant competing-risks duration model (4.6)-(4.10) for the first and the second data sets respectively. In these models, we have constrained proportionality parameters \( \beta_{j,k} \) to be constant through the unemployment spell, namely \( \beta_{j,k} \equiv \beta_k \). Estimates of the piecewise-constant baseline hazard function \( \delta_j^k \) are not reported in these tables. For the first data set, we have used a conditional likelihood function for the correction of the stock sampling bias. Many covariates, such as age, diploma, gender, marital status, health, type of
housing, car ownership, regional dummies and previous labor market experience, appear to have statistically significant but sometimes opposite effects on the intensities of transition from unemployment. For example, previous employment in a regular job (either a LTC or a FTC job) increases the intensity of transition from unemployment to regular jobs, but reduces very significantly the intensity of transition to community jobs. Intensities of transition from unemployment to regular jobs or to workplace programs are lower for women (especially when they are married); at they opposite, they move more intensively from unemployment to community jobs after 1995; low-educated individuals move less frequently to regular jobs; transitions from unemployment to programs decrease with age, with the exception of the category called “other programs”.

Figures 1 and 2 present nonparametric kernel estimates of the distributions of the balancing scores $p_{p[\tau]}^k$ defined by equation (4.20), where the index $k$ denotes entry into treatment $k$ in period $p[\tau]$ and index 0 indicates the “no treatment” situation in the same period. For example, the graph in the first window plots the distribution of the ratio of the conditional probability to move from unemployment to a community job during the first nine months of the unemployment spell over the sum of this probability and the conditional probability of not moving from unemployment to any program over the same subspell, for individuals who transited from unemployment to a community job in the subspell (solid line), and for unemployed who did not enter a program over the period (dashed line). These graphs exhibit significant differences between the balancing score density functions for program participants (treatment group) and nonparticipants (control group). It is particularly obvious for the programs offering a low training content, such as community jobs. For each pair (treatment vs. no treatment) to be compared, it appears that the common supports of the balancing scores are wide enough, and that these common supports differ between pairs. Moreover, for some pairs, the shapes of the balancing score distributions significantly differ. For example, when comparing the relative probabilities of entering a community job over the nine first months of unemployment for individuals who have effectively accepted a community job and those who did not enter any program over the same period (see the first graph in Figure 1), we observe that the distribution of the balancing score is more concentrated in the higher part of the support for individuals who have entered a community job. These differences are less contrasted after 1995 (in the second data set).
Table 2.
Estimates of the parameters of the unemployment duration model (first data set)

<table>
<thead>
<tr>
<th>Destination state:</th>
<th>LTC</th>
<th>FTC</th>
<th>OLF</th>
<th>CJ</th>
<th>WT</th>
<th>Other Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regional dummies (reference: Paris)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Centre</td>
<td>-0.317* (2.09)</td>
<td>0.107* (0.74)</td>
<td>0.594* (1.80)</td>
<td>0.743* (1.96)</td>
<td>0.617* (1.79)</td>
<td>0.288 (1.04)</td>
</tr>
<tr>
<td>Nord</td>
<td>-0.522* (2.68)</td>
<td>-0.738* (3.41)</td>
<td>0.178 (0.46)</td>
<td>0.954* (2.38)</td>
<td>0.977* (2.76)</td>
<td>-0.309 (0.89)</td>
</tr>
<tr>
<td>Est</td>
<td>-0.343* (1.92)</td>
<td>-0.608* (3.07)</td>
<td>0.288 (0.77)</td>
<td>-1.206* (3.07)</td>
<td>0.564 (1.48)</td>
<td>0.131 (0.42)</td>
</tr>
<tr>
<td>Ouest</td>
<td>-0.055 (0.37)</td>
<td>-0.119 (0.76)</td>
<td>0.706* (2.11)</td>
<td>0.534 (1.34)</td>
<td>0.403 (1.11)</td>
<td>-0.267 (0.94)</td>
</tr>
<tr>
<td>Sud-Ouest</td>
<td>-0.222 (1.46)</td>
<td>-0.332* (2.14)</td>
<td>0.196 (0.53)</td>
<td>0.889* (2.33)</td>
<td>0.819* (2.38)</td>
<td>0.370 (1.32)</td>
</tr>
<tr>
<td>Centre-East</td>
<td>-0.230 (1.35)</td>
<td>-0.189 (1.14)</td>
<td>0.287 (0.78)</td>
<td>0.412 (0.97)</td>
<td>0.800* (2.18)</td>
<td>0.497* (1.69)</td>
</tr>
<tr>
<td>Sud-East</td>
<td>-0.141 (0.85)</td>
<td>-0.361* (2.08)</td>
<td>0.664* (1.88)</td>
<td>-0.094 (0.19)</td>
<td>-0.013 (0.03)</td>
<td>0.336 (1.11)</td>
</tr>
</tbody>
</table>

Individual characteristics

<table>
<thead>
<tr>
<th></th>
<th>Estimate</th>
<th>Std. Error</th>
<th>t-statistic</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Woman</td>
<td>-0.302* (3.11)</td>
<td>-0.237* (2.24)</td>
<td>-0.572* (3.60)</td>
<td>0.048 (0.56)</td>
</tr>
<tr>
<td>Married</td>
<td>0.171 (0.98)</td>
<td>0.467* (2.30)</td>
<td>-1.138* (1.73)</td>
<td>-0.214 (0.32)</td>
</tr>
<tr>
<td>Woman, married</td>
<td>-0.562* (4.42)</td>
<td>-0.604* (5.05)</td>
<td>-0.901* (5.33)</td>
<td>-1.435* (3.79)</td>
</tr>
<tr>
<td>19 ≤ age ≤ 23</td>
<td>0.418* (3.28)</td>
<td>0.139 (1.14)</td>
<td>-0.142 (0.91)</td>
<td>-0.105 (0.65)</td>
</tr>
<tr>
<td>24 ≤ age</td>
<td>0.304* (2.66)</td>
<td>-0.103 (0.69)</td>
<td>-0.642* (2.84)</td>
<td>-1.301* (3.88)</td>
</tr>
<tr>
<td>Diploma</td>
<td>0.044 (0.51)</td>
<td>0.335* (3.89)</td>
<td>-0.186 (1.34)</td>
<td>-0.312* (2.10)</td>
</tr>
<tr>
<td>Dipl2</td>
<td>0.302* (2.88)</td>
<td>0.649* (5.17)</td>
<td>0.285 (1.39)</td>
<td>0.402* (1.80)</td>
</tr>
<tr>
<td>Poor health</td>
<td>-0.206* (2.97)</td>
<td>-0.224* (2.29)</td>
<td>-0.043 (0.29)</td>
<td>-0.027 (0.16)</td>
</tr>
<tr>
<td>Having a car</td>
<td>0.300* (4.03)</td>
<td>0.308* (3.18)</td>
<td>0.343* (2.15)</td>
<td>0.250 (1.61)</td>
</tr>
<tr>
<td>Foreigner</td>
<td>-0.131 (0.75)</td>
<td>-0.182 (1.06)</td>
<td>-0.621* (1.80)</td>
<td>0.292 (0.81)</td>
</tr>
</tbody>
</table>

Housing (reference: independent housing)

<table>
<thead>
<tr>
<th></th>
<th>Estimate</th>
<th>Std. Error</th>
<th>t-statistic</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parental</td>
<td>0.040 (0.37)</td>
<td>-0.143 (1.24)</td>
<td>-0.333* (1.78)</td>
<td>0.074 (0.38)</td>
</tr>
<tr>
<td>Collective</td>
<td>0.210 (0.98)</td>
<td>0.363* (1.75)</td>
<td>0.030 (0.10)</td>
<td>-0.148 (0.26)</td>
</tr>
</tbody>
</table>

Previous labor market state (reference: OLF)

<table>
<thead>
<tr>
<th></th>
<th>Estimate</th>
<th>Std. Error</th>
<th>t-statistic</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>In a program</td>
<td>-0.117 (0.68)</td>
<td>-0.072 (0.44)</td>
<td>-0.320 (1.34)</td>
<td>-0.294 (1.38)</td>
</tr>
<tr>
<td>Apprentice</td>
<td>0.406* (2.04)</td>
<td>0.414* (2.19)</td>
<td>0.002 (0.00)</td>
<td>-0.233 (0.72)</td>
</tr>
<tr>
<td>Internim</td>
<td>0.141 (0.66)</td>
<td>0.594* (3.69)</td>
<td>-0.474 (1.25)</td>
<td>-0.906* (1.91)</td>
</tr>
<tr>
<td>FTC</td>
<td>0.219* (2.15)</td>
<td>0.356* (3.45)</td>
<td>-0.421* (2.57)</td>
<td>-0.446* (2.31)</td>
</tr>
<tr>
<td>LTC</td>
<td>0.336* (3.18)</td>
<td>-0.013 (0.10)</td>
<td>-0.571* (3.08)</td>
<td>-1.149* (4.06)</td>
</tr>
</tbody>
</table>

Unemployment Insurance (reference: no UI benefit)

<table>
<thead>
<tr>
<th></th>
<th>Estimate</th>
<th>Std. Error</th>
<th>t-statistic</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>UI benefit</td>
<td>0.019 (0.22)</td>
<td>-0.048 (0.56)</td>
<td>-0.086 (0.60)</td>
<td>-0.508* (3.15)</td>
</tr>
</tbody>
</table>

Mean Loglikelihood: -3.67668

Source: Survey “Suivi des chomeurs” (INSEE, 1986-1988)

Remarks. Estimates of the parameters $\delta_j$ are not reported in this table. Between parenthesis we give t-statistics. The symbol * means that the parameter is significantly different from 0 at the 10% level.

Abbreviations for educational level: dip0 = no diploma (reference), dip1 = elementary school or short technical studies, dip2 = above high school.
### Table 3
Estimates of the parameters of the unemployment duration model (second data set)

<table>
<thead>
<tr>
<th>Destination state</th>
<th>LTC</th>
<th>FTC</th>
<th>OLF</th>
<th>CJ</th>
<th>WP</th>
<th>Other Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regional dummies</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(reference: Cergy)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mantes</td>
<td>-0.237 (1.28)</td>
<td>0.041 (0.37)</td>
<td>-0.180 (0.68)</td>
<td>0.321 (0.79)</td>
<td>-0.342 (1.23)</td>
<td>-0.789* (1.67)</td>
</tr>
<tr>
<td>Poissy</td>
<td>0.059 (0.37)</td>
<td>-0.002 (0.01)</td>
<td>0.180 (0.76)</td>
<td>0.338 (0.81)</td>
<td>-0.444* (1.69)</td>
<td>-0.023 (1.40)</td>
</tr>
<tr>
<td>Roubaix</td>
<td>-0.067* (3.46)</td>
<td>0.261* (2.58)</td>
<td>0.213 (0.97)</td>
<td>0.324 (0.84)</td>
<td>-0.638* (2.51)</td>
<td>-0.915* (2.09)</td>
</tr>
<tr>
<td>Lens</td>
<td>-1.106* (5.95)</td>
<td>-0.209* (2.06)</td>
<td>0.107 (0.50)</td>
<td>0.530 (1.48)</td>
<td>-0.064 (0.30)</td>
<td>0.119 (0.33)</td>
</tr>
<tr>
<td>Aix-en-Prov.</td>
<td>-0.300* (2.58)</td>
<td>-0.289* (2.23)</td>
<td>0.032 (0.12)</td>
<td>0.220 (0.51)</td>
<td>-0.232 (0.83)</td>
<td>-0.502 (0.82)</td>
</tr>
<tr>
<td>Berre</td>
<td>-0.716* (2.95)</td>
<td>-0.017 (0.12)</td>
<td>0.002 (0.33)</td>
<td>0.447 (1.26)</td>
<td>-0.376 (1.25)</td>
<td>-0.238 (0.48)</td>
</tr>
<tr>
<td>Marseille</td>
<td>-0.023* (3.82)</td>
<td>-0.431* (3.86)</td>
<td>-0.435* (1.81)</td>
<td>0.389 (0.94)</td>
<td>-0.042 (0.19)</td>
<td>-0.854* (2.06)</td>
</tr>
</tbody>
</table>

### Individual characteristics

| Woman             | -0.290* (3.01) | -0.236* (3.74) | 0.177 (1.28) | 0.320* (2.82) | -0.375* (2.59) | 0.126 (0.50)  |
| Man, married      | 0.332* (2.44)  | 0.132 (1.54)  | -0.474* (1.82) | 0.431 (1.61) | -0.382 (1.55) | -0.778 (1.30) |
| Woman, married    | 0.001 (0.00)   | -0.207* (2.37) | 0.201* (2.75) | -0.440* (2.02) | -0.252 (1.20) | -0.423 (1.41) |
| 19 ≤ age ≤ 23     | 0.710* (2.56)  | 0.232* (2.10) | -0.518* (3.15) | 0.427 (1.53) | -0.751* (4.46) | -0.728* (2.61) |
| 24 ≤ age          | 0.865* (2.96)  | 0.017 (0.14)  | -0.364* (1.83) | 0.121 (0.36) | -0.092* (4.13) | -0.810* (2.04) |
| Dipl1             | 0.285* (2.34)  | 0.383* (3.08) | -0.048 (0.34) | 0.119 (0.67) | -0.087 (0.38) | -0.819* (2.62) |
| Dipl2             | 0.370* (4.48)  | 0.576* (7.85) | 0.354* (2.57) | 0.311 (1.30) | -0.113 (0.02) | -0.383 (1.11) |
| Having a car      | 0.812* (7.55)  | 0.506* (6.48) | 0.088 (0.70)  | -0.137 (0.82) | 0.429* (3.03) | -0.275 (0.90) |
| Foreigner         | -0.022* (2.97) | -0.208* (2.25) | -0.372* (1.79) | -0.221 (0.79) | -0.260 (1.03) | -0.761* (2.81) |

### Housing (reference: renting)

| Parental          | -0.015 (0.09)  | 0.003 (0.03)  | -0.043 (0.21) | 0.230 (0.94) | 0.118 (0.59)  | -0.928* (1.73) |
| Owner             | -0.127 (1.12)  | 0.135* (2.16) | 0.006 (0.77)  | -0.141 (0.74) | 0.132 (1.07)  | 0.186 (0.73) |

### Previous labor market state (reference: first participation)

| OLF               | 0.120* (5.56)  | 0.299* (3.39) | 0.171 (0.98)  | 0.040 (0.16) | -0.218 (1.07) | -0.102 (0.29) |
| WP program        | 0.361 (1.45)   | 0.279* (2.16) | -0.103 (0.34) | 0.467 (1.32) | 0.002 (0.33)  | 0.016 (0.03)  |
| Other Programs    | 0.404 (1.03)   | 0.288 (1.99)  | 0.158 (0.41)  | 0.404 (0.86) | 0.251 (0.68)  | 0.180 (0.27)  |
| CJ program        | -0.246 (0.86)  | -0.023 (0.17) | -0.317 (1.16) | 0.726* (2.48) | -0.320 (1.15) | 0.222 (0.47)  |
| Interim           | 0.197 (0.65)   | 0.706* (5.12) | 0.172 (0.48)  | -1.418 (1.28) | -0.467 (1.14) | -0.504 (0.56) |
| FTC               | 0.341* (3.79)  | 0.508* (6.16) | 0.046 (0.24)  | -0.068 (0.24) | -0.312 (1.51) | -0.654 (1.38) |
| LTC               | 0.434* (2.57)  | -0.086 (0.77) | -0.014 (0.00) | -0.810* (2.03) | -0.826* (2.97) | -0.414 (0.89) |

### Unemployment Insurance (Reference: no benefit)

| UI benefit        | -0.777* (7.04) | -0.390* (5.04) | -0.206* (2.55) | -0.536* (2.49) | 0.077 (0.46)  | 0.210 (0.00)  |
| RMI               | -0.046* (4.31) | -0.701* (5.21) | -0.583* (2.53) | -0.071 (0.27) | -0.364* (1.96) | 0.449 (1.17)  |

### Mean Loglikelihood: -3.73837


Remarks: Estimates of the parameters $\delta^k_j$ are not reported in this table. Between parenthesis we give t-statistics.

The symbol * means that the parameter is significantly different from 0 at the 10% level.

Abbreviations: dip0 = no diploma (reference), dip1 = elementary school or short technical studies, dip2 = above high school, RMI = Revenu Minimum d’Insertion (welfare benefits)
5.2. Matching estimates

Figures 3 to 5 (respectively, 6 to 8) give the matching estimates of the interest parameters

$$\Delta^{\tau + h}_{k \mid 0} = E \left( Y^{\tau + h}_{k} - Y^{\tau + h}_{k'} \mid D_{p[\tau]} = k \right)$$

for the 1986-1988 (respectively, the 1995-1998) data set. In our application, we divide the initial unemployment spell into two sub-intervals (months 1 to 9, months 10 to 18), and we consider three different outcomes: employment under a long-term labor contract, regular employment (employment under either a long-term contract or a short-term contract), non employment (either unemployed or out-of-the labor force). For each type of program (workplace training in the private sector, community jobs in the public sector and local administrations, other training and integration programs), the counterfactual state is the “no treatment” state, i.e. no entry into a program.

First, let us comment the estimates obtained for the period between 1986 and 1988. Figures 3 to 5 show that all the programs had positive average effects on the two employment variables that we consider. However, the average effects of workplace training programs are statistically more significant and higher than the average effects of community jobs and other types of programs. Moreover they become positive more rapidly, probably because of the lower average duration of workplace programs. The difference between nonemployment probabilities of participants and nonparticipants is decreasing over the ten (in fact, from eight to twelve) first months following the entry into the program, which means that nonparticipants become more and more nonemployed over this interval. Beyond the tenth month after entry into the program, the difference goes up to zero, but it stays negative two years after entry, which implies that the programs durably reduced the probability of subsequent nonemployment of unemployed young workers in the late eighties. Workplace programs are more profitable for short-term unemployed young workers (i.e. unemployed for less than ten months) than for long-term unemployed young workers (i.e. unemployed between ten and eighteen months). This result is more pronounced when the outcome variable is employment under a long-term labor contract or nonemployment. At the opposite, average effects of “other programs” on the probability of regular employment are higher for long-term than for short-term unemployed workers. Finally, community jobs are not found to have differentiated effects for short-term and long-term young unemployed. How can we interpret these results? If we assume that the quality of a program does not vary with the duration of the previous unemployment spell, these results may be explained by two types of arguments: other observable things being equal, the effect of workplace programs (respectively “other programs”, which often involve a short training period in a public training center) could be more profitable for short-term (respectively, long-term) unemployed workers, because of observable and unobservable individual characteristics of these workers. Alternatively, we can argue that long-term unemployment induces human capital obsolescence and / or discouragement; in this case, programs which are grouped in the category called “other programs”, which are often intended to help unemployed workers to retrieve self-confidence or motivation, could be well adapted for long-term unemployed workers, while private firms should prefer to offer workplace training to short-term unemployed.
Figures 6 to 8 show that, between 1995 and 1998, youth employment programs had generally average negative effects on the outcomes. The worst performance is the increase of the nonemployment probability two years after entry in a short training (or integration) program of the last category ("other programs"). However we should notice that workplace training effects are less negative (and sometimes positive although statistically non significant) for long-term unemployed workers; this result is just at the opposite of the result obtained ten years before.

6. (Temporary) Conclusions

- Youth employment programs were generally less effective between 1995 and 1998 than ten years before, although these two periods (1986-1988 and 1995-1998) were comparable from a macroeconomic point of view (both were characterized by a relative economic expansion and a decrease of the unemployment rate); so how can we explained these differentiated effects? Is it because more unemployed workers (not only young unskilled workers, but also adult long-term unemployed, adult welfare recipients, and older workers) became eligible to these programs during the late nineties? Or is it because young eligible workers were then more heterogenous? (Much work has to be done)

- In the late eighties, long-term unemployed young workers benefited from short training programs (organized by public employment agencies and public training centers) that were especially addressed to them. Ten years after, they were less penalized than short-term unemployed after a workplace training program in the private sector; other types of programs influenced the outcomes of short-term and long-term unemployed with the same negative magnitude. On the whole, long-term unemployed young workers benefited from at least some active labor market policies over the last fifteen years in France. However they benefited from different types of programs over different subperiods.

7. References


FIGURE 1: Nonparametric estimates of the density functions of the balancing scores according to the unemployment duration before program entry (first data set: 1986–1988)
FIGURE 2: Nonparametric estimates of the density functions of the balancing scores according to the unemployment duration before program entry (second data set: 1995–1998)
FIGURE 3: Kernel matching estimates of the effects of workplace programs on various outcomes, first data set: 1986–1988 (-- -- -- is the 5% confidence interval)
FIGURE 4: Kernel matching estimates of the effects of community jobs on various outcomes
first data set: 1986–1988 (--- is the 5% confidence interval)
FIGURE 5: Kernel matching estimates of the effects of other programs on various outcomes
first data set: 1986–1988 (--- is the 5% confidence interval)
FIGURE 6: Kernel matching estimates of the effects of workplace programs on various outcomes, second data set: 1995–1998 (--- is the 5% confidence interval)
FIGURE 7: Kernel matching estimates of the effects of community jobs on various outcomes, second data set: 1995–1998 (--- is the 5% confidence interval)
FIGURE 7: Kernel matching estimates of the effects of community jobs on various outcomes, second data set: 1995–1998 (--- is the 5% confidence interval)
FIGURE 8: Kernel matching estimates of the effects of other programs on various outcomes.
second data set: 1995–1998 (--- is the 5% confidence interval)