Worker Displacement in France and Germany[*]

Stefan Bender[†], Christian Dustmann[‡], David Margolis[§]and Costas Meghir[¶]

April 1999

1 Introduction

In this paper, we describe the evolution of earnings and employment, post-displacement and post-other-separation, for workers in France and Germany. Although the literature on displaced workers (i.e. involuntary worker separations from stable jobs for reasons beyond their control) in North America is already extensive, the European literature is limited. We consider two labor markets, France and Germany, in which layoffs are heavily regulated (as opposed to the relatively flexible Canadian and United States labor markets). We exploit administrative data that matches workers to their employers from both countries, which has the advantages (relative to survey-based analyses) of providing large, representative samples of a wide range of workers from all sectors, and allowing for the straightforward construction of control groups. Administrative data have the additional advantage that reported earnings and employment durations are precisely measured and not subject to recall bias.

One particularity of our approach is that we focus our attention on workers whose separation is a result of the closure of the employing firm (in the case of France) or

[†]Institute für Arbeitsmarkt- und Berufsforschung, Nürnberg

[‡]University College London, and Institute for Fiscal Studies, London WC1E 6BT

[§]CNRS, LAMIA-TEAM Université de Paris 1 and CREST

[¶]University College London, and Institute for Fiscal Studies, London WC1E 6BT

plant (in the case of Germany). This is for two main reasons. First, our administrative data does not allow us to distinguish the reason for separation when the separation is not related to the employer's shutting down. Second, our measure avoids the frequently-cited problem of relying on workers to accurately report the reason for separation. This is particularly important in heavily regulated labor markets like those of France and Germany, since the administrative procedures that must be followed in the case of layoffs are typically much longer and more complicated than the procedures surrounding quits. For this reason, declared quits in these countries may frequently be layoffs disguised so as to avoid the administrative complications. Furthermore, workers often misreport firing for cause as layoffs - and these two events have possibly very different implications for the nonemployment durations and earnings losses involved.

A second issue is that we consider nonemployment, as opposed to unemployment, durations following displacement. This is due in part to the fact that, in France, our data do not allow us to distinguish whether the worker is actively looking for employment when not employed (as the ILO definition of unemployment requires). In Germany we only observe unemployment benefit and unemployment assistance durations, although individuals may experience spells of unemployment while being ineligible for benefits. Another reason is that the complexity of the unemployment insurance schemes (see section 2 below) brings the explicit modeling of their role beyond the scope of this paper.[1]

In addition to describing the institutional context in France and Germany, our analysis focuses on nonemployment durations and earnings changes experienced by workers who have stayed with a single firm for at least 4 years as the principal measures of interest. More precisely, we look at prime age males in the age range of 26-55 (for France) and 25-56 (for Germany). We distinguish in our analysis between workers who separate from their firm (in the case of France) or plant (in the case of Germany) as a result of a closure (referred to as *displaced workers*), and those who separate for unknown reasons. This last category includes workers who are fired for cause, workers who left the firm (plant) because they received a better offer, and workers who dropped out of the labor force.[2] The literature has concentrated primarily on these measures,[3] finding that displaced workers tend to experience earnings losses both pre- and post-displacement, and that workers displaced as a result of a firm/plant closure tend to have shorter nonemployment durations

---

[1]See, for example, Bonnal and Fougère (1993, 1996) for France and Hunt (1995) for Germany.

[2]Note that our age selection criteria are designed to eliminate retirement as a destination after separation from one's employer.

[3]See Fallick (1996) for a survey.

than workers who involuntarily separate from their employers for other reasons(Gibbons and Katz 1991).

The structure of our paper is as follows. We begin by describing the institutional setting surrounding layoffs and unemployment benefits in France and Germany in section 2. This discussion provides the context in which the subsequent results need to be considered. After describing the data sources that we use in section 3, we describe the incidence of displacement in the two countries in section 4. We then proceed with a more detailed analysis of the nonemployment durations following displacement in section 5, followed by a description of the earnings changes associated with displacement in section 6. Section 7 provides results of a regression analysis of earning changes before, around and after displacement, and section 8 summarizes our results and concludes.

2   Institutions

Both France and Germany have detailed regulations concerning layoffs and unemployment compensation. For each country, we describe the institutions surrounding layoffs followed by a brief description of the unemployment benefit system and the main prevailing wage setting mechanisms.

France

The following is a brief summary of the labor law and jurisprudence surrounding worker displacement, or more precisely, layoffs for economic reasons. An excellent reference for this (in French) is Lefebvre (1996).

Laws Concerning Layoffs for Economic Reasons

The legislation and jurisprudence surrounding layoffs for economic reasons [4] distinguishes 4 classes of layoffs: individual, less than 10 employees over 30 days, more than 10 employees over 30 days, and bankruptcy or reorganization.[5] One common characteristic of all layoffs for economic reasons is that the employer is required to propose the option of

---

[4]French labor law distinguishes between layoffs for economic reasons and layoffs for personal reasons, such as inadequate performance or misconduct.

[5]There are special considerations for large companies that lay off at least 10 people over a 3 month period without passing the 10 people in 30 day limit, but these will not be treated here.

participating in a (partially employer-funded) retraining scheme, run by the fund that finances unemployment benefits (ASSEDIC), to all employees who will be laid off.

- Individual layoffs for economic reasons have to meet the obligations surrounding both individual layoffs for personal reasons and layoffs of less than 10 employees over 30 days (with the exception of the obligation to inform the works council, see below). The individual layoffs for personal reasons obligations include a convocation to a "reconciliation" meeting at which the layoff will be discussed, the actual holding of the reconciliation meeting (to which the worker can bring an outside representative) and the notification of layoff letter, all with required delays and notice periods. In addition, the employee subject to an individual layoff for economic reasons must be guaranteed priority in future hiring for all jobs for which he or she is qualified, and this obligation runs for 1 year following the layoff.

- The case of layoffs for economic reasons involving less than 10 employees in a 30 day period is more complicated than that of individual layoffs for economic reasons. First, the works council (or personnel representatives in firms too small (less than 50 employees) to have a works council) must be consulted. The employer must provide all useful information to the works council concerning the economic circumstances that motivate the layoffs, the number of employees to be laid off by occupational category, the criteria used to determine the order of layoffs (i.e. which employees will go) and a preliminary calendar for the layoffs. Each employee still has to be invited to a "reconciliation" meeting, and the layoff letters can only be sent out after the appropriate waiting period following this meeting.

- In the case of collective layoffs involving more than 10 people over a 30 day period, things become even more complicated. The enterprise must devise a "social plan" which, in addition to proposing ASSEDIC retraining programs, must also describe the possibilities for an internal reclassification within the enterprise (when the enterprise is larger than 50 employees), and the steps the enterprise is prepared to take in terms of helping laid off employees become self-employed, providing training in new fields, or reducing the work week. Along with all of the information described above in the case of fewer than 10 layoffs, this plan has to be given to the works council (when one exists, otherwise it goes to the personnel delegates) for consultation, and the works council can request the help of an "expert accountant" to evaluate the different aspects of the employer's social plan and explanations for the layoffs. The local labor ministry office also receives a copy of the social plan, and both the works

council and the labor ministry can make suggestions to which the employer must respond. There must be 2 meetings held with the works council, or 3 if the works council brings in an accountant. There are specified delays between each meeting which vary with the size of the proposed layoff, but there is no obligation to meet individually with each employee in this case. The selection of the individuals to be laid off will typically be determined by a governing collective agreement, but in the absence of such an agreement it is the employer who fixes the criteria after consultation with the works council. The layoff letters can only be sent out after a fixed delay following the final meeting with the works council.

- The conditions surrounding layoffs in the case of bankruptcy or court-ordered re-organization are similar to those for layoffs of 10 or more employees, except that it is the court-appointed administrator who makes the proposals, and the judge responsible for overseeing the liquidation or reorganization must approve all layoffs.

Advance Notice and Severance Pay

The forewarning that workers receive before being laid off varies according to the size of the layoff, whether or not an expert accountant is called in, the size of the firm and whether the employer decides to buy off the notice period. The time taken by just following the legal procedure (prior to the official advance notice that starts running from the moment the layoff letter is received) can vary from 35 days from the mailing of the convocation to the "reconciliation" meeting to the sending out of the layoff letter (in the case of an individual layoff for economic reasons), to 74 days or more starting from the date at which the first works council meeting is held (in the case of a layoff of 10 or more people in 30 days, with expert accountant called in, not counting the time it takes to devise the social plan or respond to suggestions made by the works council and the labor ministry). After the layoff letters are sent out, the official advance notice period begins. This period is a function of seniority: 1 month for employees with 6 months to 2 years of seniority, 2 months for employees with at least 2 years of seniority. If there exists a collective agreement that provides for longer notice periods, then the longer periods prevail.

Severance pay is a function of seniority, whether or not the employee had accrued unused paid vacation time, and whether the employer buys off the official notice period. In general, the base rate of severance pay is 1/10th of monthly earnings per year of seniority (if seniority is greater than 2 years), with an additional 1/15th of monthly earnings per year of seniority if seniority is greater than 10 years. The worker also recovers the value

of unused paid vacation time, plus 1-2 months of earnings in the case where the notice time is bought off, corresponding to the level of seniority.

Unemployment Benefit Eligibility and Levels

To be eligible for unemployment benefits, workers must meet the following conditions.[6] First, they have to have been employed for a sufficiently long period preceding the start of the episode of unemployment. There are 5 criteria involving a minimum number of days or hours worked over a reference period.[7] Second, they must be enrolled on the National Job Search Agency (ANPE) lists. Third, they can not have voluntarily quit their previous job. All layoffs, even for cause, are acceptable.[8] Fourth, they must be actively looking for a job, or if over 57 1/2 years old, reside in France. Fifth, they can not be older than 60, or between 60 and 65 and eligible for retirement with full benefits. Sixth, they must be physically able to hold down a job. Finally, they can not be "seasonally unemployed"; that is, they can not have come from a job that is classified as seasonal, nor can they have had a job that, for 2 of the past 3 years, has regular periods of inactivity at more or less the same calendar dates each year.

Unemployment benefits are taxable as revenue and are made up of a base rate that applies for a first period, then a "digressivity coefficient" which lowers the benefits for a

---

[6]The links between the unemployment benefits schedules and eligibility requirements are quite complicated. What is presented here is a short synopsis of the important points of the unemployment insurance law prior to the substantial reforms that took place in 1996.

[7]The criteria are as follows. a) 122 days or 676 hours of work over the last 8 months preceding the end of the labor contract. b) 182 days or 1014 hours of work over the last 12 months preceding the end of the labor contract. c) 243 days or 1352 hours of work over the last 12 months preceding the end of the labor contract. d) 426 days or 2366 hours of work over the last 24 months preceding the end of the labor contract. e) 821 days or 4563 hours of work over the last 36 months preceding the end of the labor contract.

The end of the labor contract is defined as the last day of the notice period, regardless of whether this was bought off or not. Workers who become unemployed due to the closure of their plant are not required to satisfy criterion a). The levels and duration benefits varies according to the criterion satified, with the most difficult criterion (e) providing the highest benefits.

[8]Note that the eligibility rules for unemployment insurance give the worker the incentive to declare all separations as involuntary, while the administrative procedures described above give the firm the incentive to declare separations as voluntary. This conflict of interest often introduces a bargaining situation in the case where the employer intends to lay off a small number of workers. The firm can make side payments to the worker such that the worker declares the separation as voluntary (if asked) and does not apply for unemlployment benefits. Anecdotal evidence suggests that this is a relatively frequent phenomenon.

second period. The daily base rate is comprised of a fixed component (56.95 francs in June 1996) and a variable component corresponding to 40.4% of the reference earnings. The total can neither exceed 75% of the reference level of earnings nor be less than a statutory minimum level (138.84 francs in June 1996). There are also provisions relating to high-earnings workers that guarantee them at least 57.4% of their reference earnings.

The digressivity coefficient and the durations of the benefit periods are functions both of the age of the worker and his or her "length of affiliation" (cumulative seniority in any covered employers during a reference period). Durations range from 122 days (4 months) for workers with only 122 days or 676 hours of eligibility over the previous 8 months (all at the second period rate with a digressivity coefficient of 0.75) to an 821 day (27 month) first period and a 1004 day (33 month) second period, with digressivity coefficient of 0.92, for workers over 55 years old with 821 days, or 4563 hours of eligibility over the preceding 36 months. Thus if a 56 year old person worked 27 out of the 36 months preceding a spell of unemployment, he or she would have a right to 5 years of benefits, with the lowest rate still being 92 percent of his or her previous benefit level.[9]

Wage Setting Institutions

During the period of time covered by our French data (1984-1989), the French industrial relations environment was undergoing significant changes. Although union membership was steadily declining, union coverage remained relatively stable. This phenomenon was largely due to the policy of contract extension. This policy allows the Ministry of Labor to take a collective agreement negotiated by an employers association and several union confederations and extend its coverage to all other enterprises in the same region or sector, or all individuals in the same occupation, as those covered by the contract, regardless of their participation or membership in the employers association or union confederation that actually negotiated the contract.[10]

Despite the high level of contract coverage, important modifications in the structure of collective bargaining were brought about by the Auroux laws of 1982. Two of the most

---

[9]Note that, upon expiration of unemployment benefits, individuals may be eligible for the Minimum Insertion Allowance (Revenu minimum d'insertion), or RMI. The RMI is a means-tested income support whose conditions and levels are not directly linked to unemployment duration, previous wages or labor market histories.

[10]See Margolis (1993) for a detailed discussion of the institutional context surrounding contract extension in France, as well as an analysis of the implications of contract extension for wage setting and firm participation in employers associations.

important features were the establishment of works councils and the definition of their consultative role in mass layoffs (see above) and the requirement to engage in bargaining at the enterprise level for all firms over a minimum size. Although there was no obligation to come to an agreement, the fact that employers were required to negotiate locally encouraged a gradual shift of collective bargaining over wages from a centralized to a more decentralized level. This shift reduced the frequency with which the national, often extended, agreements had their salary grids renegotiated. Given the constant increase in the real minimum wage over the period (see below), the share of contracts for which the lowest earners on the salary grid earned more than the minimum wage fell from 15.3 percent in January of 1983 to 3.6 percent in January of 1985[11].

The first minimum wage law in France was enacted in 1950, creating a guaranteed hourly wage rate that was partially indexed to the rate of increase in consumer prices. Beginning in 1970, the original minimum wage law was replaced by the current system (called the SMIC, "salaire minimum interprofessionnel de croissance") linking the changes in the minimum wage to both consumer price inflation and growth in the hourly blue-collar wage rate. In addition to annual formula-based increases in the SMIC, the government legislated increases many times over the next two decades. The statutory minimum wage in France regulates the hourly regular cash compensation received by an employee, including the employee's part of any payroll taxes.

Although the original minimum wage program (called the SMIG, "salaire minimum interprofessionnel garanti") was only partially indexed, in particular the inflation rate had to exceed five percent per year (two percent from 1957 to 1970) to trigger the indexation, the real minimum wage did not decline measurably over the entire post-war period and increased substantially during most decades.[12] The French minimum wage lies near most of the mass of the wage rate distribution for the employed work force. In 1990, the first mode of the wage distribution was within five francs of the minimum wage and the second mode was within 10 francs of the minimum. In the overall distribution, 13.6% of the wage earners were at or below the minimum wage and an additional 14.4% were within an additional 5F per hour of the SMIC.[13]

---

[11]See Bughin (1985).

[12]The inflation threshold was removed in 1970 with the reform that converted the SMIG into the SMIC.

[13]For a detailed analysis of the minimum wage in France, see Abowd, Kramarz and Margolis (1998).

2.1 Germany

Employment Security and Dismissal Protection

German dismissal protection is based on an extensive system of legal rules and collective contracts. Historically, dismissal protection is rooted in a framework of directives developed during the Weimar Republic. It was developed in the 50's – 70's, and went through a process of amendments during the 70's and 80's (see Büchtemann (1990)).

One can distinguish between general dismissal protection and specific dismissal protection, with the latter applying to individuals in specific situations. The general dismissal protection is regulated in the *Bürgerliches Gesetzbuch* (BGB) and in the *Kündigungsschutzgesetz* (KSchG). Since then, it has undergone a number of slight revisions.[14] The most notable is the Employment Promotion Act (*Beschäftigungsförderungsgesetz*), or EPA of 1985, which is discussed below in more detail.

The KSchG applies to all blue and white collar workers with more than 6 months of uninterrupted tenure in firms with more than 6 regularly employed workers. According to Büchtemann (1990), it covers about 80 percent of all blue and white collar workers.

The general dismissal protection regulations as laid out in the KSchG are supplemented by regulations which apply to individuals in specific circumstances. For instance, specific regulations apply to handicapped people, people on maternity leave and people who are serving in compulsory military or civil service. In 1987-88, 16 percent of all dismissals fell under these complementary rules (see Büchtemann (1990)).

According to the KSchG, all dismissals of employees who are employed for more than 6 months without interruption, and which are initiated by the employer, are invalid if they are *socially unacceptable*. Accordingly, dismissals of all individuals to whom the KSchG applies have to be justified by the employer. Acceptable reasons for dismissal may be on the side of the firm (rationalization, macroeconomic shocks), or on the side of the employee (absenteeism, illness, etc.). In the case of dismissals which are caused by economic difficulties on the side of the firm, the KSchG stipulates that social criteria (e.g. seniority) should be used to determine which employees are to be dismissed. Employees who feel that they have been unjustly dismissed have the right to sue the employer in the labor courts. In 1987, about 10 percent of dismissals were brought to court by dismissed employees, although in very few cases did this lead to a continuation of the employment

---

[14]It has been complemented by the *Arbeitsschutzbereinigungsgesetz* (1969), the *Betriebsverfassungsgesetz* (1972) and the *Gesetz zur Änderung des KSchG* (1978).

relation (see Büchtemann (1990)). In addition, German dismissal protection has a strong collective component. For every dismissal, the works council has to be consulted.

Concerns about the negative effects of the rather rigid dismissal protection regulations on firms' employment policies lead to the Employment Promotion Act (EPA) of 1985. The EPA introduced some deregulating measures which do not replace, but rather complement, existing employment protection regulations. They mainly promote fixed term contracts as an instrument for enhancing flexibility. More specifically, the EPA allows fixed term contracts to be established without a particular reason (which was not the case before.) Contracts are limited to a duration of 18 months, and they are not renewable. The EPA was limited to 5 years, but has been extended twice, and at present its applicability lasts until 2000 (see Rogowski and Schömann (1996)).

2.1.1 Advance Notice and Severance Pay

The advance notice period in Germany varies according to the size of the layoff, the seniority of the worker, and whether he or she is a blue or white collar worker.[15] Furthermore, there are a number of collectively bargained regulations as well as firm-worker specific agreements that include notice provisions. The legal advance notice regulations stipulate 4 weeks of notice for blue collar workers who have been employed for at least 5 years, and 12 weeks for white collar workers. After 20 years of employment with the same firm, these periods rise to 12 weeks and 24 weeks for blue and white collar workers respectively (see Buttler, Brandes, Dorndorf, Gaum and Walwei (1992)).

If a firm dismisses a considerable fraction of its work force, the layoffs have to be reported to the local employment office and to the works council. For instance, a firm which employs between 21 and 59 workers has to report if the number of dismissals exceeds 6 workers within a period of 30 working days; a firm which employs between 60 and 499 employees has to report layoffs of more than 25 workers, or when layoffs exceed 10 percent of the firm's work force; a firm which employes more than 499 workers has to report if layoffs exceed 30 workers.

If the reduction in the firm's work force exceeds certain numbers, the works council can demand a social plan. For instance, when dismissals exceed 20 percent of the workforce (or at least 6 workers for a firm of size 21 - 59, for reporting to 25 workers (here) for social plans? or more than 36 workers for a firm of size 60 to 249), a social plan can

---

[15]The differential treatment of blue and white collar workers was abolished in October 1993. We report here the regulations that were in force up to 1993, since our data covers the period up to 1990.

be demanded. Social plans describe the conditions surrounding severance pay and other payments.

Unemployment Benefit Eligibility and Levels

The German unemployment compensation scheme distinguishes between unemployment insurance benefit (*Arbeitslosengeld* AG) and unemployment assistance (*Arbeitslosenhilfe* AH). To be eligible for AG, the employee must have contributed for at least 12 months over the preceding 3 years to the system. The system is financed by employer and employee contributions in equal parts (amounting to 3.25 percent of the employee's salary). There is a waiting period of 12 weeks if the separation was induced by the employee, but receipt of AG starts immediately if the separation was caused by the employer. The compensation is based on previous *net* earnings, and it amounts to 67 percent of the previous net wage (or 60 percent for employees without children). There is an upper threshold (for instance, 5200 DM in 1984, and 6000 DM in 1990). AG can be received for up to 32 months, with the duration of the entitlement period depending on age and the length of contributions to the scheme.[16]

If AG is exhausted, or if the employee is not eligible for AG, he can claim AH. A condition for receiving AH in case of non-eligibility for AG is having been in insured employment for at least 150 days during the last year. Like AG, AH is based on previous earnings; it amounts to 57 percent of previous net earnings (50 percent for employees without children). AH is means tested, and its duration is unlimited.

Both AG and AH are granted conditional on the recipient's agreement to accept a reasonable employment (*zumutbare Beschäftigung*) and are not subject to income taxation.

Wage-Setting Institutions

In Germany, wages are determined by (annual) negotiations between unions and employer federations (tariff parties, or *Tarifparteien*). Workers are represented in collective bargaining by unions that are organized nationwide according to industries (see Schmidt (1994), for more details). Union membership is not tied to a particular job or firm; union workers usually remain with the union irrespective of their mobility decisions, as well as through spells of non-employment.

---

[16]If an unemployed person fulfills the above criteria, the minimum period of eligibility is 156 days. Depending on the duration of contribution payments and the age of the applicant, this period can be extended to up to 832 days (see Kittner (1995), p. 192, for details.)

Collective bargaining takes place on industry and regional level. During negotiations, parties have a legally guaranteed autonomy. The results of the negotiations are laid down in tariff contracts (or *Tarifvertraege*), which determine working conditions and wages. These contracts are registered at the Ministry of Labor. Since the union is the legal representative of all workers covered by collective bargaining (irrespective of workers' union status), collective agreements apply to all workers within the respective segment.

There are no legal minimum wages in Germany; however, tariff contracts which specify wage levels for specific groups in specific sectors can be considered as an elaborate system of minimum wages.

To enforce their bargaining position, unions have the right to call strikes and employers have the right to lock out employees (*Aussperrung)*, although this latter instrument is regulated in a number of legal rules. If the two parties have difficulties reaching a compromise, they may call for a mediator. The legal rules concerning the bargaining procedures, as well as the commitment that binds the two parties to the agreed contract, are laid down in the tariff contract law (*Tarifvertragsgesetz*).

3   Data

We use administrative data from payroll tax/Social Security records for both countries, in some cases supplemented with data from other sources. We briefly describe below the data sources used in this paper.

France

The base data set for France is the Annual Social Data Reports (Déclarations Annuelles des Données Sociales), or DADS , which is a random 1/25 sample of the French population.[17] All people born in October of an even-numbered year, with the exception of civil servants (but including those employed by publicly held companies), are in the data whenever they are employed.[18] These data cover the period from 1976-1996, with the exception of 1981, 1983 and 1990, since the French National Statistics Institute (INSEE)

---

[17]An exhaustive DADS data set file does exist for use primarily by the tax authorities, but we were only given access to the 1/25 sample.

[18]Note that these data include self-employed workers who pay themselves salaries. Self-employed workers who act as pure residual claimants will not be included. Unfortunately, the data do not allow us to separate self-employed wage earners from other wage earners.

did not collect the 1/25 sample in these years. These data include earnings information on all employers of all of these individuals,[19] with both individual and employer identifiers attached to each year-individual-enterprise-establishment observation. We also have the number of days worked during the course of the year and the job start and end dates if the job began or ended during the year. We impute information using auxiliary regressions run on other data sets to determine the job start dates for the left-censored spells.[20] Temporary layoffs (of a length of shorter than one calendar year) are not considered as interruptions of an employment spell. With this information, we can calculate seniority at each job for each year. We observe seniority, sex, age, occupation, region, full- or part-time employment status (but not hours) and sector on all jobs held by the individual, and measure the length of nonemployment spells between jobs.

There are two problems with using this data to study displaced workers. First, the list of characteristics given above is exhaustive. Thus we do not know education, marital status or number of children, for example. The Permanent Dynamic Sample (Echantillon Dynamique Permanent), or EDP, provides some additional information. INSEE collected data on individuals born on the first 4 days of October that could be located in the 1968, 1975, 1982 or 1990 censuses, or for whom one of the following was available: the individual's birth, marriage or death certificate, or the birth, death or marriage of a parent or child of the individual concerned. Most of the demographic information of interest comes from the matches with the censuses. Since the EDP sampling frame overlaps that of the DADS in even-numbered years, it was possible to obtain a data set with all of the relevant variables from the DADS and the EDP.[21]

The remaining problem is to know the reason behind a separation.[22] We used a two-

---

[19]Our earnings data are available as 8-byte numeric variables and are subject to neither top nor bottom-coding. All labor earnings are reported.

[20]See Abowd, Finer, Kramarz and Roux (1997) for details. Given that our analysis sample begins in 1984 and that we consider seniority as a categorical variable for which the largest category is 10 years and above, our results are robust to most estimation error in the job start date due to the imputation for the left censored spells.

[21]For individuals for whom EDP data was not available, we used a multinomial logit to impute the probability that the individual had each of the educational degrees possible. See the data appendix of Abowd, Kramarz and Margolis (1999) for more details.

[22]From 1988-1992 (1990 excluded), INSEE introduced two variables distinguishing whether the observation corresponded to a plant that had ceased to exist as an "economic" or "administrative" entity. The main difference between these variables is that firms occasionally continue to exist "administratively", but with zero workers, after their "economic" death. The manner by which mergers and acquisitions affect the plant identifier in our data is rather involved. Unfortunately, these data have serious inconsistencies,

step approach to identifying displacements, or more precisely, firm deaths.[23] First, we used the Unified System of Enterprise Statistics (Système Unifié de Statistiques d'Entreprise), or SUSE, to determine the last year in which the employing firm filed accounts with any of France's administrative authorities.[24] We then looked at all of the observations in the DADS that correspond to a given enterprise (not establishment). If the last year in which we observe data corresponding to the enterprise is 1996, we consider all separations from that employer as being for reasons other than firm death.[25] If, on the other hand, we observe a firm for which the last year with DADS data is, say, 1985, we compare this date to the date found in the SUSE (where available). We considered the latter of the two dates for a given enterprise as its estimated death date, and we considered enterprises who filed accounts or were paying employees in 1996 as ongoing.

For the "dying" enterprises, we attempted to control for false firm deaths (change of firm identifier without cessation of activity) with the following procedure. Given that we only observe a random 1/25 sample of any firm's employment, we focused explicitly all firms with at least 3 observed employees.[26] For these firms, we tested the hypothesis that

_____

as individuals whose observations correspond to the economic or administrative death of their plant in the year t are just as likely to still be employed by the plant, and receiving a salary, in the year $t+1$ as they are to have separated from the plant. Thus we do not consider these variables informative for the analysis of worker displacements.

[23]Our approach to defining displacements is based on a combination of firm accounts data and payroll data. An alternative approach, such as considering separations that occur simultaneously with large reductions in firm employment as displacements (see Jacobson, LaLonde and Sullivan (1993)) is not feasible with our data, as firm employment is not available for all employees at all dates.

[24]The SUSE data used here are a sample of enterprises in France with differential sampling probabilities based on reporting requirements which vary with employment (the largest firms appear with probability 1). Depending on the size of the firm and the type of accounts it sends to the relevant regualting and tax authorities, infomation may be available on a detailed balance sheet, income statement and flow of funds statement. The smaller enterprises are not required to provide as much detailed information. Here we use the presence of *any* information on the firm as a sign of its continued existence. Thus we do not lose firms when they pass below the threshold for providing detailed accounts.

[25]For separations in years prior to 1996, the firm clearly continues to exist, as workers are observed employed by it. For 1996, we are unable to determine whether the firm will disappear in 1997. These observations could theoretically be considered displacements, but given our eventual sample selection restrictions (see below), the question of how to class these observations is moot.

[26]The requirement that there be at least 3 observed employees means that, in expectation, the corresponding firm has at least 75 employees. It prevents us from arbitrarily classifying all departures from small firms as false firm deaths. On the other hand, it may cause us to miss all false firm deaths among the smallest firms in our sample. Unfortunately, given that we only have access to the 1/25 sample of employment, we cannot improve upon the treatment for small firms beyond the SUSE sampling scheme.

50 percent or more of the firm's actual employees leaving the enterprise at its estimated death date were employed by the same subsequent employer, conditional on the total number of observed employees and the share of these who move together to the same subsequent firm identifier. This procedure is described in detail in appendix A.[27]

Based on this dating procedure and correction, we constructed two definitions of displacement. In the first, the worker separates from the firm within the calendar year preceding the calendar year of the firm's death.[28] In the second, we widen the window to two years preceding the year of the firm's death. We report below results based on the two-year window definition, since our procedure for dating firm deaths is not very precise (particularly when SUSE data is involved) and because advance notice provisions may mean that some workers separate from their firm prior to its actual shutdown.[29] All other separations are classed as "other separations".

It should be noted that, given the sampling scheme of the DADS, this approach over-attributes separations to the "displaced" category. This is even more likely to be the case for separations from small firms, especially when the separation occurs near the end of the sample period. Our selection criterion reduces the risk of this source of overclassification somewhat (see below), but nevertheless all of our results for France should be interpreted with this in mind.[30]

SUSE data are available from financial reports that are mandatory for firms with total sales of at least 500,000 FF per year (or at least 150,000 FF per year for firms in service industries) and are optional for all others.

[27]We are grateful to Peter Kuhn for suggesting this algorithm.

[28]We consider the year preceding the year of firm death since, with SUSE data at least, we do not know the precise date within the year at which the firm ceased operations. Furthermore, a firm whose fiscal year ends after June 30 of the year $t + 1$ will have year $t + 1$ SUSE information, even if operations ceased in year t.

[29]Results based on the more strict definition of displacement, considering only those separations occurring within a year of firm disappearance, are available upon request. A table indicative of the importance of the definitional differences can be found in appendix B.

[30]There exist other data sources that allow us to identify layoffs at the plant level and to classify them by type (economic or personal reasons). However, these data do not allow us to tell *which* workers are among those laid off and are subject to an even more restrictive sampling scheme than the SUSE data. One possible avenue for future research might assign a probability that a separation corresponds to a layoff for economic reasons, as opposed to relying on a simple indicator variable to denote the reason for each separation.

The Sample Retained for Analysis

From the overall data base, we focus in particular on men between 26 and 50 years of age and with 4 or more years of seniority in 1984.[31] These restrictions were imposed so that we could restrict our attention to adult,[32] high-attachment workers that do not risk taking early retirement in the later years in the sample.[33] We excluded all individuals with more than 3 different employers in any given year, as well as all individuals who held 2 or 3 jobs simultaneously at any point during our analysis window.[34] As a further control against early retirement, our duration analyses exclude all workers who, following separation from their employer, experienced a censored nonemployment spell that pushed them over 56 years old (the minimum age for men to receive early retirement). Appendix C shows the differential effect of imposing this latter restriction by age at separation.[35]

We focus on individuals observed during the window of 1984-1989 for our analyses for three reasons. First, given our definition of firm death for workers not matched to SUSE firms, we wanted to allow a time period after the end of the analysis period during which we might potentially observe people in a "dead" firm, in order to minimize incorrect classifications. Second, given the missing data in 1983 and 1990, this is the longest period without interruption in our data. Finally, this sample window makes the French data comparable with the German data (see below).

In general, we concentrate on the first separation observed for the individual in the sample window (1984-1989), and in so doing ignore the issue of multiple displacements (Stevens 1997).[36] As mentioned above, our data include information on the year, age,

---

[31]Margolis (1999) and Margolis (forthcoming) treat both men and women.

[32]Because of the complex interplay between youth employment promotion schemes (for which eligibility ends at 25 years of age) and the minimum wage in France (see Abowd, Kramarz, Lemieux and Margolis (forthcoming)), we begin considering individuals after they reach 26 years old.

[33]Note that this does not mean that there will be no workers with seniority of less than 4 years in our data. In particular, for the earnings change models, we use post-separation information during which workers who have experienced a separation will typically have less than 4 years of seniority.

[34]This latter constraint eliminates 15.2 percent of the individuals from the DADS, and 16.7 percent of the individual-year combinations that satisfy our eligibility criterion (26-50 year old men with at least 4 years of seniority in some job in 1984). In particular, 32.7 percent of the yearly observations corresponding to workers whose first separation was a displacement, and 28.6 percent of the yearly observations of workers whose first separation was for other reasons, were eliminated due to the restriction against simultaneous job holding. This may bias our results. Similar models that allow for simultaneous job holding are estimated in Margolis (1999) and Margolis (forthcoming).

[35]Note that the entire, non-selected, sample was used in the determination of firm "death" dates.

[36]In order to give a more accurate picture of the incidence of worker displacement, we consider all

16

education, seniority, log real annual gross earnings, sector of activity, skill level (unskilled blue collar, skilled blue collar or white collar), region and, of course, the reason for separation (displacement or other, calculated according to the procedures described above) if it occurred. Appendix D provides descriptive statistics for the sample in 1984.

For the analyses of incidence and earnings changes surrounding separations, we aggregated our data to one observation per individual per year.[37] In years preceding the separation, if the individual was employed by the employer from whom he or she will eventually separate, we keep the descriptive information (sector, occupation, seniority) corresponding to that job. For all other individual-year combinations, the descriptive information corresponds to the job that the person held for the longest duration during the year, and in the case of ties, the job that provided the highest gross earnings.

The earnings measure used for the French data was the log of Total Average Real Daily Earnings[38], corresponding to the log of the average of daily labor earnings from all sources, weighted by the number of days worked in the particular job (measured in thousands of 1980 francs).[39] The precise formula is

$$
LARDE_{i,t} = \log\left(\frac{\sum\limits_{j\in J(i,t)}\left[\left(\frac{RAE_{i,t,j}}{dw_{i,t,j}}\right)dw_{i,t,j}\right]}{\sum\limits_{j\in J(i,t)}dw_{i,t,j}}\right),
$$

where $RAE_{i,t,j}$ is the real gross annual earnings received by individual i in year t from firm j, $dw_{i,j,t}$ is the number of days worked by individual i in firm j during year t and $J(i,t)$ is the set of firms j in which individual i worked during year t.

Germany

The data used for Germany, which will be referred to as the IAB data, are comprised of three components.

---

separations in our sample, since only considering first separations would severely underestimate the incidence of worker displacement in the later years of our sample.

[37]The duration analyses are based on data with one observation per individual, corresponding to the first separation observed in our sample window.

[38]As our data do not allow us to measure revenues from non labor market sources, our earnings measure is only available for years in which labor market earnings are strictly positive.

[39]It should be noted, however, that using such a measure can obscure the role of part year employment on earnings (Farber 1999). Margolis (forthcoming) shows how conclusions concerning earnings movements are sensitive to the earnings measure, in particular by comparing log annual earnings with log daily earnings measures.

The core data are drawn from the *Beschaftigungsstichprobe* (BS) of the *Institut fur Arbeitsmarkt- und Berufsforschung* (IAB) in Nürnberg. The BS is a 1 percent sample from the overall employees' statistics, the so called historic file (*Historikdatei*), or HD, of the Federal Department of Employment in Nürnberg, which is constructed as an insurance account, and contains a continuous employment history for each employee covered by the social security system. The BS is drawn in 2 stages (see Bender, Hilzendegen, Rohwer and Rudolph (1996) for details) and covers a period of 16 years (1975-1990). It comprises 426,363 individuals in the longitudinal dimension and, on average, around 200,000 individuals in the yearly cross-sectional dimension.

On January 1, 1973, an integrated reporting procedure for health, retirement and unemployment insurance was introduced in Germany. The data collected using this process forms the basis for the HD. The procedure requires employers to report any commencement and termination of an employment relation which is subject to social security contributions. Additionally, to guarantee continuity in the registration of employment histories, employers have to provide information on every ongoing employment relation which is subject to social security payments on December 31 of every year. The information reported by the employer at every observation includes individual characteristics, such as gender, nationality, and educational attainment, as well as gross earnings over the past employment spell which served as the basis for social security contributions.[40] Furthermore, the HD also contains information on spells of interrupted employment relations, like maternity leave, or obligatory military and civil service.

The HD does not contain individuals who are below the earnings threshold which makes social security contributions compulsory, except if they have been in an employment relation which is subject to social security contributions at an earlier stage of their career. It further excludes the self-employed, state civil servants, and individuals who are in compulsory military service, or alternative compulsory activities. For 1980, Herberger and Becker (1983) estimate that the HD comprises 79 percent of the total labor force.

Apart from information available in the BS, the IAB data contains information from a second important data source, the *Leistungsempfangerdatei* (LD) of the employment office. The LD contains spells for individuals who received certain benefit payments from the Federal Department of Employment. These payments include unemployment benefits, unemployment assistance, and payments while participating on training and

---

[40]Accordingly, the sample is left truncated and right censored. The truncation refers to the lowest level of earnings for which social security contributions are obligatory; the right censoring refers to the highest level of earnings which are subject to contributions.

re-training programs. This additional data source allows us to follow individuals also during periods of registered non-employment. It is important to note, however, that not all spells of registered non-employment are included in the LD. For instance, active labor market programs (*Arbeitsbeschaffungsmassnahmen*) are not covered. Furthermore, individuals have to fulfill certain requirements to be eligible for unemployment benefits or unemployment assistance (see above). Those who do not fulfill these requirements are likewise not contained in the LD.

The IAB data set combines information on individual employees (from the BS and the LD) with plant information. Every individual in the HD is associated to a plant with a plant identifier. In a separate step and using the entire data base, information about individuals was regrouped at the plant level. This allowed us to add plant information to individual records contained in the IAB data. In particular, information about plant size and the educational structure of the work force, as well as industry information, was added. The plant-level statistics, however, concern only those individuals who are covered by the social security system.

The Sample Retained for Analysis

From the overall data base, we extract a sample of high attachment workers. We select male workers who are between 25 and 50 years old in 1984. We use this age group to avoid including separations for early retirement reasons, and excluding individuals who might not yet have finished their schooling.

Although our observation window covers the period between 1975 and 1990, we concentrate our analysis on the last decade. The reason is that the earnings information before 1984 is only of limited use. Until 1983, it was up to discretion of the employer whether wages reported to the authorities contained additional payments, like holiday or Christmas money. It was compulsory to include these payments after 1983. Additional payments constitute a substantial part of the wage bill of German employees (around 7 percent; see Dustmann and VanSoest (1997)). Furthermore, they are likely to be correlated with variables like seniority, industry and firm size. For these reasons we have decided to use earnings information only for the period between 1984 and 1990.

We select all workers who have been continuously employed with the same establishment for at least 4 consecutive years in 1984. Between 1984 and 1990 (the last year of our observation window) these workers either stay with their establishment or they separate. Temporary spells of unemployment or non employment with subsequent continued

employment at the previous plant are not considered as separations.

We distinguish two types of separations: separations due to plant closure, and separations for other reasons. We define a worker as a *displaced worker* if his separation is related to the establishment closing down, or to a significant reduction in the number of employees. We adopt three alternative definitions: a worker is displaced if his plant closes down within one year of his departure (definition 1), within 2 years of his departure (definition 2), or if he separates from a plant whose employment contracts by at least 40 percent within two years of his departure (definition 3). A plant closure occurs if the number of employees within a plant drops to zero.[41]

The most strict definition is the first one. By using this definition, we may exclude workers who left earlier because they foresaw a closure, or who were dismissed while the firm cut down on size prior to closure. The last definition avoids this problem, but it may include workers who separate for other reasons. In most of the analysis, we adopt the second definition. We use the first and last definition to check the robustness of our results. Table A1 in Appendix B describes how these measures differ.

Another problem with the type of data we use is censoring. If individuals lose their job, they may or may not return to the sample within the observation window. Those who do not return may change into states not recorded by our data, like non-participation, retirement, or self–employment and civil service; they may also leave the country. This type of censoring is a particular problem with administrative data. The question is how to treat censored observations. Analyses of non-employment duration, or re-employment probabilities, are sensitive to the definition of the underlying sample, and have also to be understood in that light. We decided not to impose any restrictions; results should therefore be understood as referring to the whole population of workers conditional on separation or displacement.

For illustrative purposes, we used information about whether individuals claim unemployment insurance or unemployment assistance after separations as a device to sort out individuals with a high likelihood of leaving the sample. After at least 4 years of continuous employment (which is one of our criteria to enter the sample), every individual is in principle eligible for both types of benefits. Workers who intend to return to the labor market are most likely to claim benefits. We single out workers who do not return to the sample after separation and who do not claim benefits. Appendix E splits up the

---

[41]While we observe separations of workers at the exact date of occurrence, information on plant size is measured at a fixed date each year. Plant size refers to employment in June of the relevant year. Accordingly, the time of closure can not be exactly dated.

total sample of workers who separate from a firm into those who return into employment within the observation window (74 percent) and those who do not return into the sample within the observation window (26 percent). Of those who do not return, 30.6 percent claim benefits.

Appendix F displays sample statistics of worker characteristics for the year 1984, where we distinguish between workers continuously employed between 1980 and 1990, workers whose first separation between 1984 and 1990 was a displacement (where displacement refers to separation from a plant within two years of the plant closing down), and workers whose first separation between 1984 and 1990 was for unknown reasons.

The numbers in the table indicate that average gross daily earnings of workers who are in continuous employment over the entire period are higher than those of workers who separate for unknown reasons and for workers who are displaced. Continuously employed workers have also a higher seniority in 1984, with more than 44 percent being with their firm for more than 9 years (as compared to 27 percent for displaced workers, and 24 for workers who separate for unknown reasons). Interesting are the numbers on plant size, which we measure in 1982, two years before any closure can take place in our sample. The average plant size for continuously employed workers is 3086, as compared to 1653 for other separations, and 160 for displacements. Accordingly, workers who are displaced according to our definition separate predominantly from small firms. The distributions are not symmetric, as indicated by a comparison between the median and the mean.

4   The Incidence of Displacement in France and Germany

We address the question of the rate of incidence of permanent job loss, or displacement, in our data by two approaches. First, we look at the share of observations that correspond to displacements and separations for other reasons in our data, and then we estimate probit models of the incidence of displacements and other separations. We follow different approaches for the two countries.

For France, we consider the share of individuals in a given year that experience each sort of separation. Table 1 breaks annual incidence for our sample down by year, whereas we restrain our attention to the 1984 sample year for the decomposition of the incidence of separation and the estimation of its determinants in tables 2 and 3. This is because all individuals in the 1984 sample year have at least 4 years of seniorirty on their first

job that year, whereas individuals observed in later years may be on post-separation jobs with low senioirty, and thus the distribution of job types in later years will not necessarily be comparable with that of the year on which the sample selection criterion was applied.

For Germany, we split our sample into three groups: Those who are continuously employed with the same firm over the entire period between 1980 and 1990 (32594 individuals), those whose first separation (after 1984) is a displacement (3273 individuals), and those whose first separation (after 1984) is a separation for unknown reasons (12933 individuals). In table 4, we display characteristics of these three samples, where the decomposition is by variables measured in 1984. In table 5, we estimate simple probability models, which relate the probabilities to be in any of the three groups to individual characteristics, again measured in 1984.

4.1 France

Table 1 below describes the incidence of permanent separation,[42] i.e. the share of individuals in a given year experiencing a given type of permanent separation, in our data for all unique individual-year combinations. Note that, as we are aggregating jobs to the individual-year level, a person can experience both displacements and other separations in the same year, and as such the sum of the number of individual-years with displacements and other separations may exceed the number of individual years with any separation. This table covers all separations that occur in our sample window, and not just first separations, since (as noted above) considering only first separations would bias our sample increasingly towards stable individuals in the later years, and thereby seriously underestimate the incidence of separation towards the end of our sample window. The spike in 1989 is due to the fact that we are missing data from 1990 (see section 3), and our coding algorithm would attribute all changes in employer identifier between 1989 and 1991 to the 1989 observation year, whereas at least some changes in employer certainly occurred during the (missing) 1990 observation year.[43] We include women as a reference, although in what follows we restrict our attention to men.

---

[42]Recall that we are only looking at permanent separations in this paper, and thus individuals who spend less than a full calendar year on temporary layoff are not considered as separators.

[43]The discussion that follows supposes that the separations attributed to 1989 were more or less evenly distributed between 1989 and 1990.

Table 1 : Incidence of Permanent Separation by Year - France

Year	Total Observations	Total Separations	Total Displacements	Other Separations	Separations in Total	Displaced in Total
Men						
1984	99479	8309	2821	5584	8.35	2.84
1985	95842	8620	3487	5244	8.99	3.64
1986	93009	8730	3365	5478	9.39	3.62
1987	90458	10517	3633	7000	11.63	4.02
1988	86749	8439	3557	5006	9.73	4.10
1989	85317	15459	6349	9380	18.12	7.44
Σ	550854	60074	23212	37649	10.91	4.21
Women						
1984	57595	5274	2142	3172	9.16	3.72
1985	54588	5113	2044	3119	9.37	3.74
1986	52267	5275	2245	3069	10.09	4.30
1987	50226	5094	1895	3242	10.14	3.77
1988	48699	4790	1888	2961	9.84	3.88
1989	47465	8184	3301	5010	17.24	6.95
Σ	310840	33730	13515	20573	10.85	4.35

Sources: Author's calculations from DADS data.

Notes: Multiple observations in the same year are aggregated to the unique individual-year level.

We find that the incidence of separation increased in France to a peak at 1987 for both men and women, and then declined of the remainder of the sample window. Whereas the share of individuals experiencing displacements likely peaked in 1988 for men, the figures for women suggest a peak around 1986. The increase for men towards the end of the sample is likely related to the onset of the recession that began in the early 1990s,[44] while the peak for women in 1986 corresponds to the slump that began in mid 1986 and ran through spring 1987. Furthermore, there seem to be no major, consistent differences between men and women over the entire sample period in terms of either the share of separations in the total or the share of displacements. Since maternity leave, albeit generous by North American standards,[45] typically does not last longer than a full calendar year, and since women are guaranteed a job with their previous employer upon returning

---

[44]Recall that we are using separations in the 2 calendar years preceding the calendar year in which the firm identifier disappears as our criterion for distinguishing displacements from other separations.

[45]Women in France are guaranteed 8 weeks of maternity leave by law, of which 2 are intended to be taken before childbirth and 6 after. However, collective agreements often extend the durations of available maternity leave, sometimes to 16 weeks or more. Furthermore, the employment relation is not interrupted because of maternity leave, and the woman is guaranteed a comparable position to the one she left upon returning from maternity leave.

from maternity leave, such a lack of differences in separation and displacement rates is less surprising.

Table 2 presents a similar breakdown of our data, aggregated to the individual-year level, by seniority on the lost job and by age, all measured in the 1984 data year. As 96 individuals experienced both a displacement and an other separation, we only count the first separation in the top half of the table, since the elimination of multiple job holders implies that the second separations are from low seniority jobs that follow the first separation.

Table 2 : Incidence of Permanent Separation by Previous Seniority and Age - France, 1984						
	Total Obs.	Total Separations	Total Displacements	Other Separations	Separations in Total	Displaced in Total	Displaced in Separations
$4 \leq$ Seniority< 6	19920	2488	728	1760	12.49	3.65	29.26
$6 \leq$ Seniority< 8	24026	2235	753	1482	9.30	3.13	33.69
$8 \leq$ Seniority< 10	2791	259	124	135	9.28	4.44	47.88
$10 \leq$ Seniority	52742	3327	1163	2164	6.31	2.21	34.96
Σ	99479	8309	2768	5541	8.35	2.78	33.31
$25 \leq$ Age < 30	11963	1135	406	752	9.49	3.39	35.77
$30 \leq$ Age < 35	26154	2267	765	1523	8.67	2.92	33.75
$35 \leq$ Age < 40	19431	1553	539	1034	7.99	2.77	34.71
$40 \leq$ Age < 45	20400	1560	528	1043	7.65	2.59	33.85
$45 \leq$ Age < 50	14322	1112	351	774	7.76	2.45	31.56
$50 \leq$ Age < 55	7209	682	232	458	9.46	3.22	34.02
Σ	99479	8309	2821	5584	8.35	2.84	33.95

Sources: Author's calculations from DADS data.
Notes: Multiple observations in the same year are aggregated to the unique individual-year level. Numbers refer to 1984 data year. 96 individual experienced both displacements and other separations in 1984. Only the first separation is counted in the displacements and other separations columns in the top half of the table, as the second separations are from (by construction) low seniority jobs.

Table 2 shows that, although there is a clear decline in the share of separations in total observations and the share of displacements in total observations with previous job seniority in France (with the exception of the relative underpopulated 8-10 years of seniority category),[46] the share of separations represented by displacements (defined as separations in the two calendar years preceding the calendar year of firm closure) is relatively invariant to seniority, and may even be slightly increasing.

---

[46]These results concerning incidence of displacement are comparable to the studies cited by Fallick (1996), who notes that job seniority is negatively related to the incidence of displacement in the United States.

Although the share of displacements and separations in the total seems reasonable by North American standards, the share of separations attributed to the displaced category is quite high. This is likely due to two main reasons. First, given the sampling frames in our data, most departures from small firms will be classed as displacements, since the chances of observing another sampled individual in the firm, or observing firm financial data, after the separation are very low. Second, we are classifying separations occurring in a relatively long window preceding the calendar year of firm death as displacements. This approach will mislabel all separations that occur within the window but are independent of the firm's impending demise as displacements. Unfortunately, given our data constraints, there is little we can do about these problems.

A final point worth noting in table 2 is that the share of individuals experiencing a displacement, or any sort of separation, is highest for the youngest and oldest age categories. Given that younger workers are less stable than older workers, the results for young people are not surprising. Despite our restraining our attention to workers who are at most 50 years old in 1984, it may be the case that some of these workers' employers offer exceptional early retirement plans that could explain the results for older workers.[47] For this reason (as mentioned in section 3 above), we impose an additional control for early retirement in our analyses for post-separation nonemployment durations.

In order to get a more precise view of the determinants of displacement, we estimate probit models of the incidence of 1) displacement, 2) other types of separation and 3) all separations combined on our data from 1984. The reference category is all alternative states (other separations and no separations for model 1, displacements and no separations for model 2, and no separations for model 3). Constraining ourselves to 1984 data provides us with estimates of the determinants of annual probabilities of each sort of separation, and has the advantage of substantially reducing the risk of separations into early retirement, as the oldest workers at this date are 50 years old. Table 3 presents the results of these models.[48]

---

[47]The fact that the share of displacements in total separations is lower for 50-55 year olds than for 35-40 year olds suggests that the phenomenon generating the additional separations is not necessarily linked to firm closure.

[48]Appendix G presents the results of a similar estimation, but where the reference group is only those workers who remain continuously employed with the same employer throughout the 1984-1989 sample window.

Table 3: Probit Models of Incidence of Separation, Total and by Type of Separation Relative to All Alternative States - France, 1984

	Displacements		Other Separations		All Separations	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
Age	-0.0048	0.0136	-0.0077	0.0108	-0.0065	0.0096
$Age^2/100$	0.0081	0.0177	0.0146	0.0139	0.0126	0.0124
$4 \leq$ Seniority < 6	0.1400	0.0224	0.3563	0.0173	0.3236	0.0155
$6 \leq$ Seniority < 8	0.1016	0.0215	0.1849	0.0170	0.1784	0.0150
$8 \leq$ Seniority < 10	0.1378	0.0463	0.0194	0.0436	0.0884	0.0362
Elementary School	-0.0895	0.0689	-0.0047	0.0550	-0.0326	0.0487
Junior High School	0.0918	0.1020	0.0185	0.0852	0.0584	0.0743
High School	0.1011	0.1262	0.1022	0.1013	0.0783	0.0912
Basic Vocational School	-0.0748	0.0658	-0.1150	0.0541	-0.1113	0.0474
Advanced Vocational School	-0.2412	0.1184	-0.0812	0.0846	-0.1472	0.0767
Undergraduate	0.1072	0.1185	0.1829	0.0911	0.1787	0.0821
Graduate School & Grande Ecole	-0.0696	0.1114	0.3318	0.0772	0.2452	0.0711
Constant	-2.2219	0.2755	-1.6680	0.2144	-1.5684	0.1911
N. Obs.	99479		99479		99479	
Log Likelihood	-12251.04		-20885.75		-27551.54	

Source: Authors' calculations from DADS data.
Notes: Estimates include data from 1984 only, aggregated to one observation per individual.
All models also include controls for previous seniority, sector (15 categories) and skill level
(3 categories). Reference groups: No educational certification and 10 or more years of seniority.
Models estimate probability of specified type of separation relative to all alternative situations.

Table 3 suggests that the highest educational categories are the most likely to separate for reasons other than firm closure, while the only diploma that affects displacement is an advanced vocational education (which reduces the risk of displacement relative to those without any educational certification). The probability of both displacement and other sorts of separations is not significantly related to age in 1984, a result which has also been found for the United States (Seitchik 1991). However, the most senior workers are clearly less likely to experience a separation, ceteris paribus, among the workers in our sample. Although the differences between 4-6, 6-8 and 8-10 years of seniority are not significant between these categories, all have a significantly higher probability of experiencing a displacement than workers with 10 or more years of seniority. These results are consistent with table 2 and further reinforce the idea that the incidence of worker displacement is declining in the seniority of the worker. Similar results are found for workers with 4-8 years of seniority (relative to 10 and above) when considering separations for other reasons. Many theoretical models predict a decline in mobility with job senioirty, so this result is not surprising.

4.2 Germany

In Table 4 we report numbers on continuously employed workers over the period 1980-1990 (our reference group), and the number of displaced workers, and workers who separate for unknown reasons during our sample window.[49] Recall that our selection criterion is that all workers joined the plant in 1980 or earlier. Seniority and age refer to 1984.

Table 4 : Breakdown of Separations by Type and Seniority, Germany						
	1	**2**	**3**	**4**	**5**	**6**
	Continuously Employed	Total Separations	Other Separations	Total Displacements	Displaced in Separations	Displaced in Total
$4 \leq$ Seniority < 6	5246	4285	3596	689	16.07	7.23
$6 \leq$ Seniority < 8	4505	3009	2395	614	20.40	8.17
$8 \leq$ Seniority < 10	8539	4913	3806	1107	22.53	8.23
$10 \leq$ Seniority	14304	3999	3136	863	21.58	4.72
Σ	32594	16206	12933	3273	20.19	6.71
$25 \leq$ Age < 30	4066	2686	2214	472	17.57	6.99
$30 \leq$ Age < 40	10746	5921	4795	1126	19.01	6.76
$40 \leq$ Age < 50	14830	6243	4870	1373	21.99	6.52
$50 \leq$ Age	2952	1356	1054	302	22.27	7.01
Σ	32594	16206	12933	3273	20.19	6.71

Source: Authors' calculations from IAB data.
Notes: Seniority and age refer to 1984.

Columns 1 and 2 report the total number of continuously employed workers, and the total number of workers who separate from their firm between 1984 and 1990. Columns 3 and 4 break separations in column 2 down into separations for unknown reasons and separations due to a plant closure (which we label displacements). The last two columns report the percentage of displacements among all separations, and among all workers. The first panel distinguishes between different seniority levels, and the second panel between different age groups. Our sample consists of a total of 32594 continuously employed workers, 12933 workers who separate for unknown reasons, and 3273 workers who separate due to plant closure (according to definition 2, see above).

On average, 6.71 percent of all workers who have been in continuous employment with one firm between 1980 and 1984 experience a separation between 1984 and 1990 because the plant closes down. This percentage is slightly higher at the lower seniority levels, and

---

[49]Our distinction between displaced and separated workers refers to the reason for the first separation after being in continuous employment between 1980 and 1984.

lower at the higher seniority levels, indicating that plants which close down tend to have workers with lower levels of seniority. One reason may be that these plants are younger. There is no clear age pattern. Displaced workers account for 20.19 percent of the sample of separated workers.

Among the continuously employed workers, 44 percent have been with the same plant for at least 10 years in 1984; for displaced workers and workers who separate for unknown reasons, this number is lower: 26 percent and 24 percent respectively. Accordingly, although we used the same selection criterion to construct our samples (to have been with the same firm for at least 4 years in 1984), the distribution of seniority differs according to their future separation status. The age distribution is more similar between the three groups, with more than 70 percent of workers concentrated in the age range between 30 and 50.

To investigate the effect of observables on the separation and displacement probability in finer detail, we estimate simple probit models, where the dependent variable is equal to one if the individual is displaced (column 1) or separated for unknown reasons (column 2) over the period 1984-1990.[50] The values of regressors refer to 1983, the last year before a separation could take place. The benchmark group are workers who are continuously employed with the same firm between 1980 and 1990. Results are displayed in table 5, where marginal effects, calculated at the mean of the explanatory variables, are reported.

---

[50]Recall that separation status refers to the first separation only.

Table 5: Probability of Displacement/Separation, 1984-1990; Germany (Marginal Effects)

	Displacements		Other Separations	
	Marg. Effect	Std. Err.	Marg. Effect	Std. Err.
Age/100	0.005	0.020	-0.238	0.030
$5 \leq$ Seniority<7	0.003	0.004	-0.039	0.006
$7 \leq$ Seniority<9	-0.014	0.003	-0.088	0.005
$9 \leq$ Seniority	-0.035	0.003	-0.153	0.005
Apprentice, No High School	0.008	0.003	-0.006	0.005
No Apprentice, High School	-0.023	0.019	0.052	0.032
Apprentice, High School	0.016	0.015	0.046	0.020
Polytechnic	-0.028	0.007	0.061	0.012
University	-0.018	0.009	0.141	0.014
Education Unknown	0.026	0.008	0.053	0.011
Sec2: Energy	-0.085	0.001	-0.189	0.014
Sec3: Mining	-0.062	0.005	0.119	0.031
Sec4: Manufacturing	-0.146	0.012	-0.092	0.022
Sec5: Construction	-0.038	0.007	-0.001	0.023
Sec6: Distributional Services	-0.063	0.006	-0.004	0.023
Sec7: Industry Services	-0.078	0.003	-0.055	0.021
Sec8: Consumer Services	-0.069	0.003	-0.081	0.024
Sec9: Public Services	-0.101	0.003	-0.112	0.019
N. Obs.	36689		44402	
Probability	0.086		0.244	

Source: Authors' calculations from IAB data.

Note: All estimations refer to 1983. Excluded categories: Agricultural sector, no apprenticeship, no high school and $3 \leq$ seniority< 5. Comparison group: Continuously employed in same plant, 1984-1990.

We first discuss displacement. The estimates compare characteristics of workers in plants which close down between 1984 and 1990 with characteristics of workers in plants which do not; this is conditional on the two groups being employed for at least 4 years in 1984, and the latter group being employed between 1980 and 1990 with the same plant.

Age has a non-significant effect on the displacement probability. This may be interpreted as an indication that the age structure of workers in firms which close down is not different from that that of the reference group. The displacement probability decreases slightly with seniority – workers affected by a closure over the 1984-1990 window are characterised by less tenure than workers who are not. The benchmark for the education categories are workers without apprenticeship and without high school degree. The negative signs of higher education dummies indicate that the skill mix of workers affected

by displacement is weighted toward lower education groups, compared to our reference group.

The results in the second column are quite different. Remember that workers separated for unknown reasons include workers who are fired for cause, as well as workers who quit. Age has now a strong and negative effect. This is to be expected, given that age should affect the separation probabilities for both groups of workers in this category negatively: First, firing of workers becomes more expensive the older they are because of institutional regulations. Second, age is positively related to the match quality, and mobility of workers decreases with age. Unlike displaced workers, higher education now has a positive effect on the separation probability. This may indicate a higher degree of mobility for the well educated.

5   Durations Out of Work

In North America, displaced workers often experience periods out of work following their displacement and prior to finding another job. In the more heavily regulated labor markets of France and Germany (see section 2), advance notice requirements are meant to reduce or eliminate periods out of work. The analysis of nonemployment durations following displacement in France and Germany may provide additional insight into the functioning of the labor markets in these countries, and into the role that differences in the institutional environment might play in determining the speed of re-employment. In both countries, we focus on the first separation that occurs within our sample windows.

5.1   France

Table 6 breaks down all first separations in our data by seniority, and describes the share of separations which are followed by a period out of work. This is further broken down into displacements and other sorts of separations.

Table 6: Non-Employment Spells after First Separation by Seniority - France						
	1	**2**	**3**	**4**	**5**	**6**
Seniority	All Separations	% Nonemp Spell	Displacements	% Nonemp Spell	Other Separations	% Nonemp Spell
$4 \leq$ Seniority < 6	1699	85.40	437	79.63	1262	87.40
$6 \leq$ Seniority < 8	2912	84.38	802	81.92	2110	85.31
$8 \leq$ Seniority < 10	2685	83.99	762	82.94	1923	84.40
$10 \leq$ Seniority	8998	79.06	2406	74.44	6592	80.75
$\sum$	16294	81.48	4407	77.79	11887	82.86

Sources: Authors' calculations from DADS data.

Notes: Column 1: Total Number of Separations, by Seniority. Column 2: Percentage of nonemployment spells in total. Columns 3, 5: Number of Displacements and Other Separations. Columns 4, 6: Percentages of Displacements and Other Separations that are followed by positive duration nonemployment spells. Statistics include only first separations and impose the retirement constraint (see section 3).

The numbers in table 6 demonstrate that the percentage of those who experience a nonemployment spell after separating from the firm declines with seniority in France. Furthermore, the share of positive-duration nonemployment spells is lower in general for displaced workers than for workers who separate for unknown reasons, with the difference being the most flagrant for the least senior workers.

Overall, table 6 shows that approximately 22 percent of workers who lose stable jobs because of firm closure never experience an interruption in their employment histories as a result of their displacement. This may be due to the employment protection legislation described in section 2 above. In fact, given the rigidity of the employment protection legislation and the long advance notice periods it implies, one might wonder why the share of direct transitions is not higher. This is likely due to the length of the window used for defining displacement (see section 3), which includes separations that are not necessarily related to the firm closure and thus do not necessarily benefit from such generous employment protection legislation.

To get a sense of the duration of nonemployment spells when they do occur, figure 1 shows the Kaplan-Meier estimates of the nonparametric survival functions of post-separation nonemployment spells for all spells of positive duration. Note that these results are conditional on experiencing a nonemployment spell of positive length, and that (as is always the case in duration modeling) our estimates are sensitive to the treatment of censored observations.[51]

---

[51]In France, we treat all spells that do not end before December 31, 1989 as censored.

Figure 1: Kaplan-Meier Survivor Functions - France
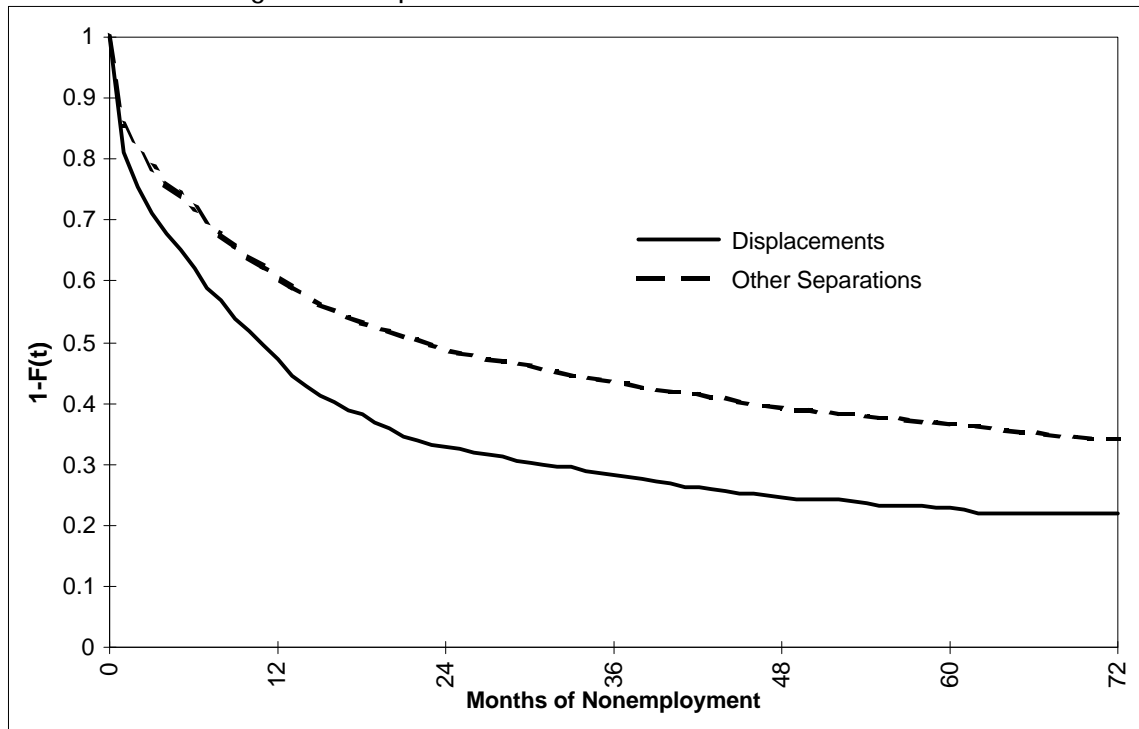
Figure 1 shows that displaced workers clearly leave nonemployment at a faster rate than workers who separate for other reasons. These differences are highlighted by the differences in long-term nonemployment between displaced workers and those who separate for other reasons. In France, less than 20 percent of displaced workers who experience a nonemployment spell are still without employment 5 years after displacement, while over 33 percent of workers who separate for reasons other than firm closure and enter nonemployment are without a job 5 years after separation.[52]

Of course, the differences between displaced workers and other separators in France may only be superficial, as the Kaplan-Meier survivor functions we have drawn in figure 1 do not consider the differences in the characteristics of the two populations. It may simply be the case that other separators have characteristics that make finding a new job harder after separation than displaced workers, and thus these workers would take longer to find new jobs independent of the reason for the separation. To control for observable heterogeneity in the populations, we estimate durations of nonemployment by

---

[52]Informal discussions with ASSEDIC administrators suggests that, in 1998 at least, approximately one third of individuals drawing unemployment insurance exhausted their benefits. These figures are roughly consistent with the survivor function measured a decade earlier shown in figure 1.

using proportional hazard models with Weibull-distributed baseline hazards in France.[53] The effects of different covariates on nonemployment durations following separations are given in table 7 for workers with at least 4 years of seniority on the job of their first separation.[54] We estimate models with 1) both types of workers and an indicator variable for firm closure, as well as separately for 2) displaced workers and 3) workers who separate for other reasons. The first specification is equivalent to imposing an identical baseline hazard and identical coefficients on all covariates except the constant across the second and third specifications.

---

[53]The estimated Kaplan-Meier hazards underlying figure 1 are roughly linear and decreasing in the log of the hazard rate, which suggests that a Weibull distributed baseline hazard is the most appropriate parametric specification. Semiparamteric (Cox) models were not estimable under the material constraints (memory allocation and CPU time) imposed by INSEE.

[54]Note that, since the parameter estimates refer to the proportionality factor in the hazard function, a positive coefficient means that higher levels of the corresponding variable are associated with higher values of the hazard function, and thus shorter expected nonemployment durations.

	All Separations		Separated for Unknown Reason		Displaced	
Table 7: Weibull Proportional Hazard Models - France						
Variable	Coef.	Std.E.	Coef.	Std.E.	Coef.	Std.E.
Constant	-1.4272	0.2757	-1.5000	0.3018	-0.3903	205.6546
$6 \leq$ Seniority < 8	-0.4538	0.1306	-0.4079	0.1429	-0.5210	0.1772
$8 \leq$ Seniority < 10	-0.4928	0.1389	-0.4261	0.1528	-0.5817	0.1858
$10 \leq$ Seniority	-0.4807	0.1276	-0.4106	0.1398	-0.5827	0.1719
Firm Closure	0.2081	0.1049				
Age	0.0080	0.0286	0.0064	0.0317	0.0102	0.0382
Elementary School	0.2461	0.2101	0.3020	0.2333	0.1395	0.2776
Junior High School	0.2906	0.2570	0.4343	0.2743	-0.0313	0.3860
High School	0.6020	0.2685	0.6739	0.2967	0.5216	0.3601
Basic Vocational School	0.3829	0.2042	0.5054	0.2287	0.1283	0.2670
Advanced Vocational School	0.4219	0.2530	0.5048	0.2708	0.2810	0.3744
Undergraduate	1.0114	0.2611	1.4623	0.2940	0.1666	0.3535
Graduate School & Grande Ecole	0.6371	0.2459	0.6628	0.2679	0.5379	0.3411
1985	-0.0187	0.1192	-0.0825	0.1307	0.1043	0.1633
1986	0.1601	0.1267	0.0811	0.1381	0.3163	0.1746
1987	0.2202	0.1302	0.1505	0.1422	0.3519	0.1782
1988	0.1938	0.1395	0.1367	0.1529	0.2986	0.1897
1989	0.2968	0.1462	0.1606	0.1613	0.5577	0.1984
Weibull Shape Parameter	0.4335		0.4311		0.4464	
Number of Observations	13838		10136		3702	
Number of Failures	8350		5698		2652	
Log Likelihood	-25937.53		-18134.16		-7701.72	

Source: Authors' calculations from DADS data.

Notes: Right censoring occurs when the individual is not reemployed by December 31, 1989.
All models included controls for sector of preseparation firm (15 categories) and skill level
(3 categories). Reference groups: 1984, 4-6 years of seniority and no educational certification.

Table 7 shows that the shape parameter of the Weibull model is always less than 1, indicating that the conditional probability of leaving unemployment decreases over time (decreasing hazard). This is consistent with the nonparametric hazard underlying figure 1. The results in column 1 show that individuals who separate because of a closure have a higher conditional probability of re-entering employment than individuals who are separated for other reasons. This can be explained by the set of individuals in the samples we are analyzing; since we only consider individuals who experience a non employment spell of positive duration, the group of workers who separate for other reasons may now consist mainly of workers who were fired for cause.[55]

---

[55]The layoffs and lemons model of Gibbons and Katz (1991) predicts such a phenomenon.

Seniority in the pre-separation firm seems to slow exit from nonemployment in France for both sorts of separations, and this effect seems slightly stronger for displaced workers (relative to those who separate for other reasons). In general, most types of education seem to help workers leave nonemployment faster, relative to workers without any degree, although which degrees help the most varies by reason for separation. For displaced workers, those with an advanced vocational school, graduate school or grande école degree find new jobs the fastest, while among workers who separate for reasons other than firm closure, the degrees that count are a high school baccalauréat, an undergraduate, grande école or graduate school degree (the vocational degrees are marginally less important). The results for displaced workers suggest the importance of a being able to signal a particular competency after one's firm closes via an advanced vocational certification or a relatively specialized graduate degree. One explanation could be that since firm closure is such a dramatic event, when a firm closes it may be the sign of ill health in the industry in general. As such, workers who are able to point to advanced skills may find it easier to get new jobs than those whose abilities are more closely linked to their previous employer's industry. The results for other separators may reflect the value that a more general education might have in counterbalancing the negative signal sent by a firing for cause, as well as the extensive networks that some grandes écoles have available to help place their alumni who might otherwise have difficulty.

5.2   Germany

Table 8 reports the number and the percentage of workers who experience a non-employment spells in Germany. On average, about 50 percent of workers who separate from their firm immediately find another job. The number is slightly lower for displaced workers (39.5 percent), and slightly higher for workers who separate for unknown reasons (51.6 percent). The likelihood of a non-employment spell decreases slightly with job tenure, in particular for displaced workers.

Table 8: Non-Employment Spells after Separation by Seniority - Germany						
	1	2	3	4	5	6
Seniority	All Separations	% Nonemp Spell	Displacements	% Nonemp Spell	Other Separations	% Nonemp Spell
$4 \leq$ Seniority < 6	1749	54.94	281	51.60	1468	55.58
$6 \leq$ Seniority < 8	2422	50.28	458	46.28	1964	51.22
$8 \leq$ Seniority < 10	3977	52.07	863	44.38	3114	54.30
$10 \leq$ Seniority	8043	46.15	16721	33.01	6371	49.59
$\sum$	16191	49.16	3274	39.46	12917	51.62

Sources: Authors' calculations from IAB data.

Notes: Column 1: Total Number of Separations, by Seniority. Column 2: Percentage of nonemployment spells in total. Columns 3, 5: Number of Displacements and Other Separations. Columns 4, 6: Percentages of Displacements and Other Separations that are followed by positive duration nonemployment spells.

Figures on non-employment include all individuals who do not experience a job-to-job transition, including individuals who leave the labor force into other states (see discussion above). The numbers are therefore not directly interpretable as the percentage of individuals who experience non employment after a separation and would like to remain in the labor market. Figures for this type of worker will generally be lower.

Next, we investigate the duration of spells of nonemployment for those individuals who experienced a nonemployment spell after separation. Figure 2 shows the Kaplan-Meier estimates of the survival functions of post-separation nonemployment spells for all spells of positive duration. Observations are treated as censored if they have not re-entered the work force at the end of the observation window (December 1990). The graphs indicate that displaced workers leave nonemployment at a faster rate than workers who separate for other reasons.

In order to learn about the relation between individual characteristics and the conditional probability of re-entering employment after a separation and conditional on having had a non-employment spell, we estimate durations of nonemployment using Cox models, which avoid parametric assumptions about the baseline hazard. The effect of different covariates on nonemployment durations following separation are given in table 9. We estimate the models separately for displaced workers and workers who separate for other reasons.

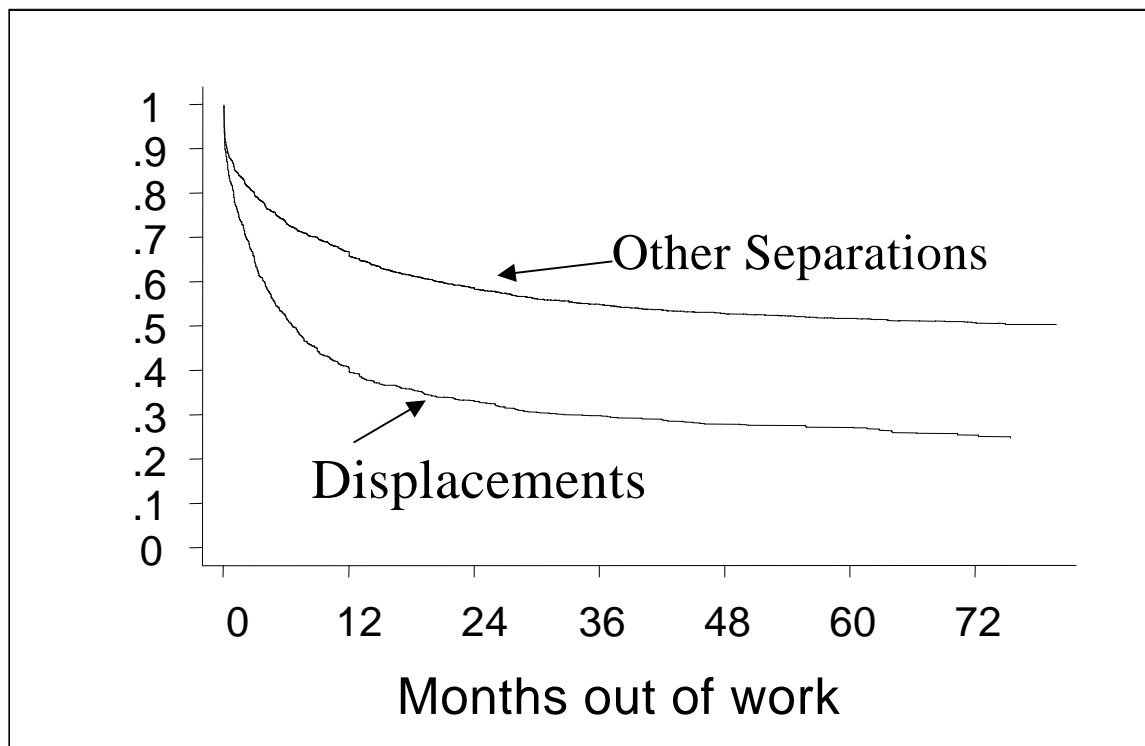Figure 2: Kaplan-Meier Survivor Functions - Germany

	All Separations		Separated for Unknown Reason		Displaced	
Variable	**Coef.**	**Std.E.**	**Coef.**	**Std.E.**	**Coef.**	**Std.E.**
Age/100	-3.1258	0.2257	-3.5590	0.2599	-1.8075	0.4644
$6 \leq$ Seniority < 8	0.0310	0.0571	0.0293	0.0641	0.0801	0.1286
$8 \leq$ Seniority < 10	0.0641	0.0532	0.0340	0.0602	0.2053	0.1178
$10 \leq$ Seniority	-0.0217	0.0617	-0.1062	0.0703	0.2880	0.1324
Closure	0.4035	0.0388				
Apprentice, No High School	0.3749	0.0407	0.4084	0.046	0.2669	0.0826
No Apprentice, High School	0.1485	0.3041	0.1886	0.3367	-0.0092	0.7159
Apprentice, High School	0.0099	0.1709	0.3215	0.1936	-0.6717	0.3636
Polytechnic	0.1972	0.1309	0.3311	0.1421	-0.2354	0.3427
University	0.0879	0.1276	0.1994	0.1302	-1.8720	1.0043
Education Unknown	0.0524	0.0721	0.0764	0.0842	-0.0361	0.1404
1985	0.1230	0.0486	0.1528	0.0565	0.0886	0.0967
1986	0.2224	0.0549	0.2278	0.0629	0.2249	0.1143
1987	0.1694	0.0621	0.2408	0.0709	-0.0342	0.1305
1988	0.1709	0.0696	0.2146	0.0796	0.0635	0.1438
1989	0.1533	0.0784	0.2347	0.0884	-0.0739	0.1734
1990	-0.0167	0.1027	-0.0879	0.1171	0.6807	0.2101
Number of Observations	5019		3998		1021	
Number of Failures	3720		2813		907	
Log Likelihood	-28924.35		-21269.33		-5557.59	

Table 9: Cox Models - Germany

Source: Authors' calculations from IAB data.

Notes: Right censoring occurs when the individual is not reemployed by December 1990. Reference group: No Apprenticeship, no high school.

In the first model, we do not distinguish between the two types of separation. We include an indicator variable which is equal to 1 if separation is due to closure. As already indicated by the Kaplan Meier estimates, workers who are displaced and experience a subsequent non-employment spell are more rapidly reabsorbed by the labor market than workers who separate for other reasons. This latter group is likely to include primarily workers who were dismissed for cause, since workers who quit because they received a better outside offers are unlikely to experience non-employment spells after separation.

The seniority variables refer to seniority prior to separation. Seniority plays no role in changing the rate of exit from nonemployment for workers who are displaced for unknown reasons, but it increases the conditional probability of a return into work for displaced workers. Recall that seniority also reduces the probability of experiencing a non-employment spell for these workers. Age has a negative effect for both groups, indicating that older workers find it more difficult to receive a job offer than younger ones, independently of the reason of separation. The educational indicators are marginally sig-

nificant. They indicate a negative relationship between education and the conditional probability of exit from non-employment for displaced workers. This may reflect the higher level of benefits for educated workers.[56]

6 Earnings Before and After Separation

The literature notes that wage losses occur, in particular, for workers who lose jobs in which they had a high level of seniority. It has also been noted that these wage losses begin prior to displacement, and that measuring wage losses by comparing only the final wage on the job from which the worker was displaced with the new wage is likely to underestimate the size of these losses. In this section, we describe the time paths of daily earnings and changes in earnings growth in the years surrounding separations.

6.1 France

Figure 3 plots average daily earnings for French workers who were continuously employed over the at-risk period (1984-1989), workers whose first separation was a displacement during that period and workers whose first separation was for another reason during that period. We only include individuals with strictly positive average daily earnings for our calculations.[57] For expository purposes, we look in particular at individuals whose first separation took place in 1987 (if at all). We consider separations from all years combined starting with table 10 below.

In France, average daily earnings increased faster between 1986 and 1988 for workers displaced in 1987 than for workers who were continuously employed over the entire 1984-1989 period with the same employer and for those whose first separation was in 1987 and for reasons other than firm closure. Average real daily earnings grew by 2.01% for continuously employed workers between 1986 and 1988 and by 7.80% for other separators

---

[56]Benefit payments are proportional to the most recent earnings prior to separation (see section 2.1).

[57]Jacobson et al. (1993), on the other hand, suppose that workers not in employment after separation have zero earnings, and keep these workers in the sample for the calculation of their average earnings changes.

Figure 3: Average Daily Earnings Over Time by Type of Separation - France
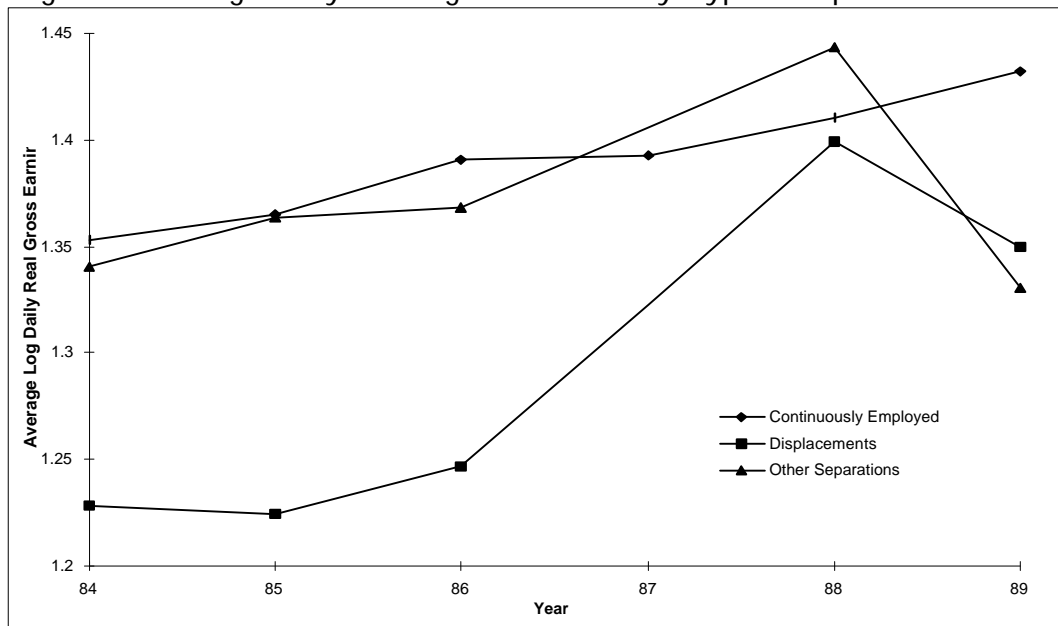
over the same interval,[58] while average daily earnings jumped by 16.43% for displaced workers across the 1986-1988 interval. Part of this might be due to what is called \partial unemployment" in the period leading up to ¯rm closure. In France, a ¯rm can negotiate a contract with the unemployment insurance fund to put its workers on partial unemployment, in which case the worker receives a ¯xed fraction of his or her initial salary with the costs split between the employer and the unemployment insurance fund. The worker does not report to work, but maintains the employment relation. If employers report only the (lower) share of the (lower) workers' earnings paid during this period while not reducing the reported number of days for which compensation was paid, this would arti-¯cially lower the pre-displacement earnings level. However, ¯gure 3 does not show such a pre-separation drop in relative earnings, and even if such a phenomenon were present, it seems unlikely that average daily earnings in France decline around separation.[59]

---

[58]Note that the earnings change for other separators combines individuals who left their jobs for better outside o®ers with workers who were ¯red for cause and workers who were laid o® from ¯rms that did not shut down within the following 2 calendar years.

[59]One might ask why displaced workers did not leave earlier if they were going to have such large earnings gains associated with changing employers. There are several possible explanations. First, the employment protection legislation provided them with job security on their previous employer that they stood to lose if they changed earlier. However, the prospect of imminent ¯rm closure reduces the value

Another interesting point to draw from figure 3 is the order of earnings levels between the three categories. It appears that in the time before separation, displaced workers have earnings that are, on average, lower than other sorts of workers, be they continuously employed or separated for other reasons than displacement. Workers who separate from their employers in France for the first time (in the 1984-1989 window) by displacement in 1987 earn 11.8 percent less in 1984 than those whose first separation is for other reasons, who in turn earn 1.3 percent less than workers who are continuously employed over the whole period. During the period preceding separation, there seems to be very little difference between continuously employed workers and those who separate for reasons other than displacement, while throughout this period displaced workers earn less. Still, in the period immediately after the separation, average daily earnings for displaced workers who have found new jobs have almost completely caught up with continuously employed workers, being only 1.2 percent below, and workers who separate for other reasons and are employed in the year after separation pull ahead of continuously employed workers, earning 3.2 percent more.

A final point worth noting is the dip in average real daily earnings between the year following separation and two years after separation, for both displaced workers and those who separate for other reasons. Since we are calculating the averages used to draw figure 3 from employed individuals only, this dip, or rather lack of recovery, could be due to a composition effect. It may be that workers who take longer to find a job after separation earn less on their new job than those who find their new job sooner (and already have a year of seniority). We explore this idea further below.

Table 10 considers the raw averages in more detail, looking at long differences (of at least 2 periods) in average daily earnings around the displacement or separation date by seniority (prior to separation), distinguishing between continuously employed workers, displaced workers, and workers who separate for other reasons. For the continuously employed, the table simply provides 2-year differences in average earnings. For displaced

of this non-wage component of job-specific utility, thus making outside offers relatively more attractive.

A second possible explanation is that the offer arrival rate for on-the-job search may be lower than that for off-the-job search (or search during the notice period). In this case, workers whose first separation was a displacement may simply not have received another offer prior to their separation.

A final explanation is that 1988 was a good year for the French economy, with 3.95% GDP growth, relative to an average of 1.51% over the 1984-1987 period (BLS Macroeconomic Statistics, http://stats.bls.gov/flsdata.htm). As such, there may have been better outside offers in 1988 than in earlier years.

and other separated workers, the numbers refer to the earnings difference between the new job in the year after the separation year (if a new job has been found, otherwise it refers to the first year in which a new job has been found) and the old job in the year prior to the separation year. We have further distinguished between workers who are observed in employment at the earliest two calendar years after separation; we refer to these workers as Slow Displaced and Slow Other Separations.

Table 10: Two Period Earnings Growth by Seniority at Date of First Separation										
	Continuously Employed		All Displaced		Slow Displaced		Other Separations		Slow Other Separations	
	$\%\triangle w$	Obs.	$\%\triangle w$	Obs.	$\%\triangle w$	Obs.	$\%\triangle w$	Obs	$\%\triangle w$	Obs
$4 \leq$ Seniority < 6	4.70	13712	16.62	825	-9.34	175	10.43	1521	-12.02	349
$6 \leq$ Seniority < 8	4.38	35453	12.22	1642	1.48	213	8.91	2180	-25.92	531
$8 \leq$ Seniority < 10	3.55	31659	13.51	1375	-3.67	154	10.05	1464	-11.04	238
$10 \leq$ Seniority	2.58	138298	9.87	4708	-6.07	441	3.37	4194	-23.56	556
Σ	3.15	219122	11.88	8550	-4.64	983	6.85	9359	-20.12	1674

Source: Authors' calculations from DADS data.
Notes: Data correspond to one observation per indivdual per year. "Slow" refers to individuals who were not reemployed in the calendar year following the separation.

Table 10 confirms the intuition derived from figure 3. Considering all displacement dates simultaneously, we find that displaced workers as a whole make faster earnings gains than continuously employed workers or workers who separate for other reasons. Earnings losses occur on average for both displaced and other separating workers who take more than a year to find a new job, as indicated by figure 3. Despite the fact that slow job finders make up a relatively small share of workers who eventually find jobs following separation within our sample window, it will clearly be important to distinguish them from workers who find new jobs within the first calendar year after separation in our earnings regressions in section 7 below.

6.2 Germany

Figure 4 plots average daily earnings for German workers who were continuously employed over the at-risk period (1984-1990), workers whose first separation was a displacement, and took place in 1988, and workers whose first separation was for another reason, and took place in 1988. The separation year 1988 is omitted. Only employed individuals contribute to the averages on which the figures are based. We do not include workers who are not employed in a given year after separation.

Figure 4: Average Daily Earnings Over Time by Type of Separation - Germany
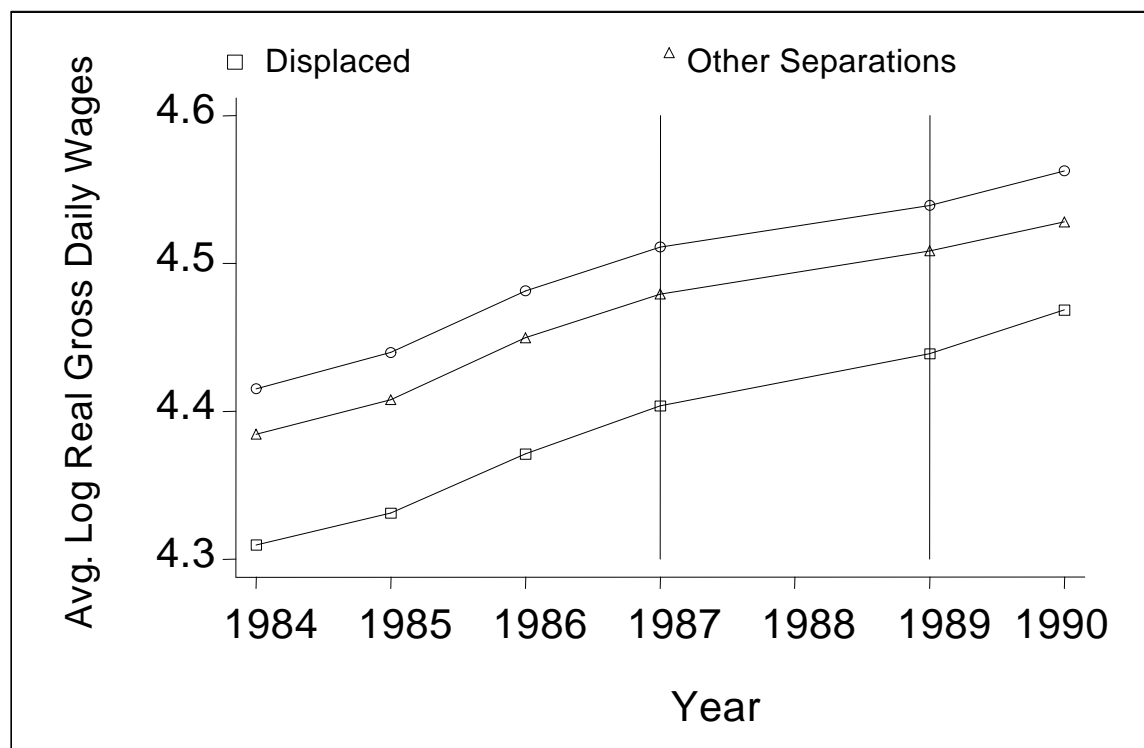
The figure indicates that displaced and other separated workers experience earnings growth at a rate similar to continuously employed workers between the pre- and post separation year. Another interesting point to draw from the figures is the order of average earnings levels between the three categories. It appears that displaced workers have daily earnings that are, on average, lower than other sorts of workers, be they continuously employed or separated for other reasons than displacement.

Table 11 considers the raw averages in more detail, looking at long differences (of at least 2 years) in average earnings around the displacement or separation date. We distinguish between different levels of seniority (prior to separation), and between continuously employed workers, displaced workers, and workers who separate for other reasons. For the continuously employed, the table simply provides 2-year differences in average earnings. For displaced and separated workers, the numbers refer to the earnings difference between the new job in the year after the separation occurs, and the old job in the year prior to the separation. Obviously, this includes only workers who have found a job in the year after separation. The columns *Displaced I* and *Separated I* report earnings growth of workers who are observed in employment at the earliest two calendar years after separation. The earnings data is top coded - overall, 12.7 percent of the sample is affected in 1983 (see data section for details). We do not account for this in table 11, although this point is considered explicitly in section 7 below.

Table 11: Two Period Log Earnings Growth, by Seniority at Date of First Separation						
	Displaced		Displaced I		Displaced II	
Seniority	$\%\Delta w$	N. Obs.	$\%\Delta w$	N. Obs.	$\%\Delta w$	N. Obs.
$4 \leq$ Seniority < 6	2.44	242	-20.43	15	0.83	89
$6 \leq$ Seniority < 8	5.74	397	7.04	22	2.60	111
$8 \leq$ Seniority < 10	1.93	737	-3.42	41	-2.10	190
$10 \leq$ Seniority	2.36	1288	-15.45	34	-3.57	254
Σ	2.75	2665	-7.29	112	-1.46	644
	Separated		Separated I		Cont. Employed	
Seniority	$\%\Delta w$	N. Obs.	$\%\Delta w$	N. Obs.	$\%\Delta w$	N. Obs.
$4 \leq$ Seniority < 6	4.58	1048	-8.21	102	3.50	12603
$6 \leq$ Seniority < 8	4.31	1422	-12.72	107	3.98	22305
$8 \leq$ Seniority < 10	2.94	1979	-13.07	135	4.82	50482
$10 \leq$ Seniority	2.46	3273	-23.66	113	3.14	167374
Σ	3.21	7730	-14.24	458	4.64	255331

Displaced I, Separated I: workers who have not found a job in the year after displacement (separation). Displaced II: Workers who experience a non-employment spell of at least 1 week after displacement.

Table 11 indicates that average two year earnings growth for continuously employed workers is 4.6 percent. Pre-post displacement earnings growth for displaced workers and workers separated for unknown reasons are 2.8 percent and 3.2 percent, respectively. The numbers confirm the intuition derived from figure 4 that workers who separate continue to make earnings gains. Gains have a slight tendency to decrease with seniority, but a clear pattern is only visible for workers separated for unknown reasons.

The picture looks entirely different, however, for workers who are only able to find a job two years after displacement at the earliest (columns *Displaced I* and *Separated I*). Here earnings decrease substantially; they drop by 7.3 percent for displaced workers, and by 14.2 percent for workers who separate for other reasons. The large earnings loss of the latter group may reflect that this group is likely to consist mainly of workers who have been laid off for cause.

A problem in our data is that we observe closures only at the plant level. Therefore, some plants may disappear due to reorganization, and workers may continue to work in the same firm, but in a plant with a different identifier. Although this event is not likely to be frequent, it may distort our results. On the basis of the data we have available, it is not possible to sort out these "false" plant closures.

Workers whose plants disappear because of a re-organization should appear as direct transitions. We have therefore computed earnings losses for displaced workers who have experienced a non-employment spell after separation lasting at least one week. This may most likely eliminate workers who change plant numbers for reorganizational reasons. However, it also restricts the sample to lower quality workers - workers who are not able to find a new job immediately. Accordingly, the corresponding numbers may be seen as lower bounds for earnings losses incurred by displacement. We report the results in the column *Displaced II*. A total of 644 displaced workers experience a non-employment spell of at least 6 days after displacement and are re-employed in the year after displacement. Their average earnings loss is -1.46 percent. Earnings losses are clearly higher for workers with higher levels of seniority before displacement. This may be an age effect, or it may indicate the loss of firm specific human capital incurred by these workers.

We conclude from these numbers that average losses incurred by displacement are, in the worst case, around 1.5 percent. Those workers who are continuously employed experience at the same time an earnings increase of about 4.6 percent. Assuming that this number reflects also the earnings growth that workers who are displaced would have experienced had their plants not closed down, the worst case scenario is that the decline in earnings growth associated with a plant closure related displacement is 6 percent.

However, more serious earnings losses are experienced by workers who are not able to rejoin the labor market in the year after displacement.

7 Regression Analysis of Pre- and Post Separation Earnings

In this section, we compare the pre- and post-separation earnings paths of displaced and continuously employed workers more generally. As a descriptive tool, we estimate simple earnings regressions on various subpopulations. The general estimation strategy is as follows.[60]

We regress log earnings on time-invariant and time-varying individual specific characteristics (x_i and z_{it}), time effects δ_t, and a vector of indicator variables k_{is}, which switch from 0 to 1 s years after separation, or $-s$ years before separation. Depending on the specification, the coefficients on the k_{is} variables measure the difference in the level of earnings of workers s years before or after separation and the earnings of either continuously employed workers, or the difference in earnings with respect to other workers who separate for the same reason measured in a reference year,[61] conditional on time effects and observable individual characteristics. We also add the variables $ks_{i\tau}$, which take on the value 1 in the after separation period for those individuals who are not observed in employment in the year after separation. The parameter on these variables, ξ, picks up a negative permanent effect for those individuals who remain out of work for more than one year after separation. Finally, u_{it} is a disturbance term. Thus, our estimation equation is as follows:

$$\ln w_{it} = x_i\beta_1 + z_{it}\beta_2 + \delta_t + \sum_{s\in A} k_{is}\gamma_s + \xi \sum_{\tau\in\omega} ks_{i\tau} + u_{it}, \tag{1}$$

where ω is the set of post separation dates and A is the set of pre- and post-separation dates (with or without an indicator for the year immediately preceding separation, depending on the specification).

---

[60]Our estimation strategy resembles that on Jacobson et al. (1993).

[61]For France, the reference year is 5 years prior to separation. For Germany in table 13, it is the year immediately preceding separation.

46

7.1 France

Table 12 provides the results of estimating this model on average daily earnings in France.[62] To ease interpretation of the results, we replace the indicator variable for 5 years before separation with an indicator variable that takes on the value 1 for all individuals who separate (the variable *Separated*). This allows us to sweep out the average difference between separators and the continuously employed, and we can interpret the coefficients on the other relative year indicators (Sep_i) in terms of an earnings path for workers who separate.

Column 1 compares workers who are displaced because of plant closure between 1984 and 1989 with workers who are continuously employed over that period. Column 2 compares continuously employed workers with workers who separate for unknown reasons. As mentioned above, these latter separations consist of voluntary quits and firings for cause. The variable *Perm* takes on the value 1 in all years following the first separation if it took the individual more than 12 months to find a job after displacement. As mentioned above, the variable *Separate* takes on the value 1 for all workers who separate, and the Sep_i variables assume the value one in the ith year prior to or following the worker's first separation. Thus the coefficient on *Separate* can be interpeted as the difference in earnings 5 years prior to separation for workers who will eventually separate from their employers relative to the continuously employed, and the coefficients on the Sep_i variables are interpreted as variations in earnings for workers who will eventually separate relative to their 5 years before separation earnings. Note that, as in section 6, we are considering only the first separation as the reference in these regressions, and that we have excluded earnings in the separation year for workers who separate. The reason is that the earnings in the separation year may be partly comprised of pre- and post-separation employers, and the interpretation of this coefficient is unclear.

---

[62]See Margolis (forthcoming) for estimates of this model using log total annual earnings as a dependent variable. Margolis (1999) estimates a similar model but with individual fixed effects.

Table 12: Log Average Real Daily Earnings Regressions - France

	Displacements		Other Separations	
	Coef.	Std.E.	Coef.	Std.E.
Separated	-0.0917	0.0068	-0.0553	0.0060
Sep_{-4}	-0.0042	0.0084	-0.0035	0.0075
Sep_{-3}	-0.0121	0.0080	-0.0230	0.0069
Sep_{-2}	-0.0124	0.0077	-0.0256	0.0067
Sep_{-1}	-0.0281	0.0075	-0.0520	0.0066
Perm	-0.0479	0.0109	-0.1061	0.0069
Sep_1	0.1265	0.0080	0.1349	0.0073
Sep_2	0.0377	0.0082	0.0255	0.0075
Sep_3	0.0196	0.0086	-0.0137	0.0077
Sep_4	-0.0049	0.0094	-0.0187	0.0083
Sep_5	-0.0250	0.0115	-0.0162	0.0098
Age	0.0465	0.0010	0.0472	0.0010
$\text{Age}^2/100$	-0.0440	0.0012	-0.0448	0.0012
1985	-0.0004	0.0022	-0.0006	0.0022
1986	0.0081	0.0022	0.0106	0.0022
1987	-0.0081	0.0022	-0.0050	0.0023
1988	-0.0045	0.0023	-0.0044	0.0023
1989	0.0016	0.0023	-0.0025	0.0024
Elementary School	0.0553	0.0053	0.0439	0.0055
Junior High School	0.2207	0.0080	0.2151	0.0082
High School	0.3447	0.0096	0.3533	0.0100
Basic Vocational School	0.1357	0.0051	0.1180	0.0053
Advanced Vocational School	0.2807	0.0075	0.2677	0.0077
Undergraduate	0.4108	0.0092	0.4018	0.0093
Graduate School & Grande Ecole	1.0866	0.0081	1.0687	0.0081
Constant	-2.8427	0.0205	-2.8827	0.0210
N. Obs.	402174		433627	
R^2	0.3608		0.3339	

Reference Groups: 1984, No Educational Certification. The variable
Separated equals one for all observations corresponding to individuals
who separate at some point between 1984 and 1989. The variable Perm
equals one for observations after separation if time between the 2 jobs
exceeded 1 year. The Sep_i variables equal one in the ith year before/after
separation.

Table 12 shows that, even after controlling for observable individual characteristics,
workers who separate because of firm closure earn 8.8% less than continuously employed
workers 5 years prior to the actual separation.[63] This could be due in part to unobserved

---

[63]Note that, for a given coefficient β on a regressor x in tables 12-14, $\triangle \log(y) = \beta \triangle x$. To calculate
the *percentage* change in y induced by $\triangle x$, i.e. $\frac{y_{t+1}-y_t}{y_t}$, one typically makes use of the approximation
$\log(1+x) = x$. This approximation is not valid when x is far from zero, and thus the coeffieicents are

heterogeneity across individuals; i.e. individuals employed by firms who will close earn less anyway.[64] Alternatively, it could be that low wage firms have a higher risk of going out of business than better paying firms.[65] This gap increases slightly as the displacement date approaches, with the dip only being significant in the year immediately preceding displacement, in which earnings of displaced workers are approximately 2.8 percent lower than they were 5 years before displacement. Workers who separate for reasons other that firm closure start with earnings closer to the continuously employed (5.4 percent below), but the pre-separation dip starts sooner (3 years prior to separation) and is much larger, with earnings in the year preceding separation being approximately 5.1% lower than they were 5 years before separation.

Table 12 also shows that both displaced workers and other separators make earnings gains between the year before separation and the year after separation. However, as suggested by figure 3 and table 10, there is a significant additional penalty to taking a long time to find a job after separation. For displaced workers, slow job finders earn an extra 4.7 percent less than other displaced workers post-separation, while the slow job finding penalty is more than twice as large (10.1 percent) for workers who separate for other reasons. The result for displaced workers could be interpreted in the context of a declining reservation wage, in which case workers who take longer to find jobs would have, on average, lower reemployment wages. On top of this "penalty" comes an additional negative signal for workers who separate for other reasons. If these workers take longer than a year to find a new job, the separations are more likely to have been firings for cause than voluntary quits, and thus these workers would receive, on average, lower wage offers as the market infers that they have a lower value of marginal product.

Finally, the earnings path in the post-separation period shows that, on average, the gains made by workers around the separation date are eliminated and become losses as time passes, so that displaced workers 5 years after displacement are earning essentially the same as they were earning in the year immediately preceding displacement. The post-separation decline is not as dramatic for workers who separate for other reasons. Given the concave form of seniority returns in France[66], such a pattern is surprising, as returns

---

not directly interpretable as percentage changes in the dependent variable. For this reason, we have used the exact formula, i.e. $\frac{y_{t+1} - y_t}{y_t} = \exp(\beta) - 1$, in the discussion of these tables.

[64]See Margolis (1999) for further analyses in this direction.

[65]Abowd et al. (1999) show that the firm specific component of earnings is negatively related to the probability of firm survival on the same DADS and SUSE data, but the estimates are relatively imprecise.

[66]See Margolis (1996) for a detailed analysis of returns to seniority in France.

are steepest in the first few years with an employer. This declining pattern may suggest that our specification of a fixed intercept shift in the post-separation period for all slow job finders may not be a flexible enough functional form to capture the heterogeneity in earnings that is correlated with the speed of reentry into the labor market.[67]

7.2   Germany

Table 13 displays parameter estimates of equation (1) for Germany, where we use the sample of displaced workers and the year preceding displacement as the reference earning level. All regressions are Tobit specifications, which take care of the top coding occurring in our data. The first column includes all workers who separate from a plant that closes down within 2 years of the worker's departure. Relative to their average earnings in the year before a closure, displacement leads to a 1-2 percent wage decrease in the years after closure; 4 years after closure, their wage disadvantage relative to their position before a closure becomes insignificant. Workers who are not observed in employment in the year after displacement face a permanent additional wage loss of about 19 percent. Wages more than 1 year before displacement do not vary largely from wages in the pre-displacement year.

---

[67]Margolis (1999) estimates a similar specification with individual fixed effects on a data set that does not eliminate individuals with simultaneous job holding, as finds that the size of the post-separation decline in average daily earnings is reduced, but not eliminated. One alternative strategy, as used by Jacobson et al. (1993), might be to include all workers in the post separation period, but attribute zero earnings to workers who have yet to find jobs.

Table 13: Earnings Regressions - Germany
Censored Regression Models
Displaced Workers Only

	All		N.E. Spell	
	Coef.	Std.E	Coef.	Std.E.
Sep_{-6}	-0.0029	0.0222	-0.0403	0.0691
Sep_{-5}	0.0023	0.0142	-0.0586	0.0390
Sep_{-4}	0.0275	0.0113	0.0231	0.0282
Sep_{-3}	0.0156	0.0098	0.0217	0.0227
Sep_{-2}	0.0062	0.0088	0.0052	0.0196
Perm	-0.2159	0.0170	-0.1310	0.0191
Sep_1	-0.0161	0.0080	-0.0414	0.0176
Sep_2	-0.0222	0.0086	-0.0207	0.0190
Sep_3	-0.0246	0.0093	-0.0015	0.0207
Sep_4	-0.0121	0.0103	0.0280	0.0225
Sep_5	-0.0103	0.0118	0.0415	0.0250
Sep_6	-0.0280	0.0156	0.0411	0.0317
age	6.2292	0.3114	5.4975	0.6326
$age^2/100$	-6.9903	0.3771	-6.3207	0.7638
1985	0.0002	0.0086	-0.0097	0.0185
1986	0.0355	0.0090	0.0308	0.0196
1987	0.0733	0.0095	0.0561	0.0209
1988	0.1045	0.0100	0.0654	0.0223
1989	0.1140	0.0106	0.0560	0.0234
1990	0.1165	0.0113	0.0647	0.0251
Apprentice, No High School	0.1892	0.0056	0.1722	0.0108
No Apprentice, High School	0.4315	0.0468	0.3151	0.1262
Apprentice, High School	0.3751	0.0222	0.1775	0.0512
Polytechnic	0.6356	0.0194	0.4961	0.0611
University	0.6990	0.0231	0.7647	0.0813
Education Unknown	0.0893	0.0095	0.0602	0.0183
Constant	2.8313	0.0630	2.9633	0.1275
N. Obs.	19018		4995	
Pseudo R^2	0.295		0.176	

Base Education Group: No Apprentice, No High School Degree.
The variable Perm equals one for observations after separation if
time between the 2 jobs exceeded 1 year. The Sep_i variables equal
one in the ith year after separation.

We have run the same regression, using our alternative definitions for displacement. When considering a worker as displaced if he separates from a firm within 1 year of the firm closing down (which reduces the number of observations to 13539), the permanent loss for workers who have not rejoined the labor market in the year after displacement is again 19 percent; the average wage loss in the three years after displacement is 3 percent. Using the third definition (contraction by at least 40 percent), the respective numbers

are 20 percent, and 4.3 percent respectively (this corresponds to 35031 observations). All these numbers are fairly close, and indicate that our results are quite robust to the definition of a displacement.

The second column in table 13 reports results for displaced workers who experienced a non-employment spell of at least 6 days after separation. The permanent effect of not having found a job in the year after displacement reduces now to 12 percent (which is probably due to a change in average wages of the reference group). Displacement is associated with a wage loss in the first job in the year after displacement of 4.1 percent, and of 2.0 percent 2 years after displacement, both relative to wages in the year before displacement. The difference becomes insignificant thereafter.

These results indicate that wage losses of displaced workers relative to their pre-displacement wages are fairly moderate, and these results are quite robust to different definitions of displacement and different samples. Furthermore, there is a slight decline of wages in the three years before separation. As already indicated in table 11, losses are substantial if the worker does not find a job in the year after separation.

In Table 13 we compare the wage position of a displaced worker after displacement to his pre-displacement wage. We now estimate a similar specification to the one underlying the results in table 13, where this time we pool displaced workers (or workers separated for unknown reasons) and continuously employed workers. We add an additional indicator variable for the year immediately preceding displacement. This gives us the wage profile of displaced (separated) workers, relative to continuously employed workers, in the years before and after displacement. Results are displayed in table 14.

Table 14: Earnings Regressions - Germany
Censored Regression Models

	Displaced		Separated	
	Coef.	Std.E.	Coef.	Std.E.
Sep_{-6}	-0.118	0.0177	0.020	0.0089
Sep_{-5}	-0.107	0.0107	0.014	0.0059
Sep_{-4}	-0.084	0.0082	0.008	0.0047
Sep_{-3}	-0.095	0.0068	-0.002	0.0040
Sep_{-2}	-0.105	0.0058	-0.007	0.0034
Sep_{-1}	-0.112	0.0050	-0.021	0.0029
Perm	-0.217	0.0150	-0.289	0.0074
Sep_1	-0.121	0.0045	-0.047	0.0027
Sep_2	-0.125	0.0049	-0.040	0.0030
Sep_3	-0.124	0.0054	-0.041	0.0033
Sep_4	-0.110	0.0061	-0.034	0.0037
Sep_5	-0.101	0.0074	-0.040	0.0045
Sep_6	-0.110	0.0108	-0.050	0.0063
age	0.051	0.0007	0.055	0.0006
$age^2/100$	-0.055	0.0008	-0.060	0.0008
1985	0.015	0.0019	0.016	0.0018
1986	0.053	0.0019	0.055	0.0018
1987	0.080	0.0019	0.083	0.0018
1988	0.116	0.0019	0.122	0.0018
1989	0.111	0.0019	0.117	0.0018
1990	0.100	0.0019	0.104	0.0019
Apprentice, No High School	0.175	0.0012	0.184	0.0012
No Apprentice, High School	0.330	0.0081	0.341	0.0075
Apprentice, High School	0.408	0.0050	0.434	0.0045
Polytechnic	0.549	0.0031	0.571	0.0029
University	0.604	0.0038	0.625	0.0033
Education Unknown	0.080	0.0026	0.082	0.0025
Constant	3.143	0.0150	3.045	0.0140
N. Obs.	267044		323916	
Pseudo R^2	0.4950		0.4255	

Base Education Group: No Apprentice, No High School Degree.
The variable Perm equals one for observations after separation if
time between the 2 jobs exceeded 1 year. The Sep_i variables equal
one in the ith year after separation.

As already indicated in figure 4, wages of displaced workers are, on average, 10 percentage points lower than wages of continuously employed workers. This difference may be due to firm effects, or may be a result of workers of lower quality selecting into firms which close down. The immediate pre-post wage difference is again small - about 0.9 percent. Compared to continuously employed workers, displaced workers continue to have lower wages. Again, those who are not in work in the year after displacement suffer substantial

permanent losses.

Column 2 displays results for workers who separate from their firm for unknown reasons. Here wages begin to decline about 2 years before separation, but do not differ from those of continuously employed workers before that. After separation, wages are on average 4 percentage points lower, as compared to those of continuously employed workers. Again, workers who have not found a job in the years after displacement suffer substantial losses.

8   Discussion and Conclusions

In this section, we bring together the results from the two countries and briefly relate them to the existing literature from North American studies of worker displacement. It bears repeating that we focus on prime age men in stable jobs (at least 4 years of jobs seniority). Furthermore, our definition of displacement, used throughout this paper, is a separation within 2 years of firm closure in France and within 2 years of a plant closure in Germany.

8.1   Incidence

Worker displacement seems to be slightly more frequent in France than in Germany.[68] Among our sample of high seniority workers, 2.78 percent experienced a displacement in 1984, whereas 6.71 percent of eligible German men had a displacement as their first separation during the 1984-1990 window. This suggests that a lower bound on annual incidence of worker displacement due to plant closures might be below 1 percent in Germany. Both of these numbers, and the German figures in particular, are lower than what has been found for the United States; Farber (1993) finds a probability of experiencing a displacement of 6.9 percent for the 1984-1985 two-year period using the Displaced Worker Supplements of the Current Population Survey. However, this may be due largely to the

---

[68]A word of warning is necessary when comparing our results for incidence. The figures for France refer to the number of individuals who experience a type of separation per year, while the numbers for Germany refer to the number of individuals whose first separation in a 7 year period is of a given type. Thus the figures are not directly comparable, although we attempt to draw some conclusions below nevertheless.

fact that Farber considers all self-reported displacements,[69] whereas (for data reasons) we restrict our attention to firm and plant closures.

As a share of total separations, worker displacements are more important in France than in Germany. Part of this difference may be due to our different definitions of displacement (firm closure in France, plant closure in Germany).

The determinants of displacement are roughly similar across countries. In both France and Germany, age is not significantly related to the probability of displacement. The highest levels of education are negatively related to the probability of being displaced in both countries. Seniority in 1984 is negatively related to the probability of displacement in France and Germany. All of these results are generally consistent with what has been found for the United States (Fallick 1996).

8.2   Duration

In both France and Germany, a large share of displaced workers transit to their subsequent employers without spending any time in nonemployment. The share of direct transitions is always higher for displaced workers than for workers that separate for other reasons, and the share of displaced workers making direct transitions is slightly increasing with seniority. There is a larger share of direct transitions in the German data than in the French data, which may be due to the differences in the definitions of displacement (firm closure in France versus plant closure in Germany).

The durations of spells out of the work force, when they occur, are shorter in both countries for displaced workers than for those who separate for other reasons. The long term nonemployment rates for France seems slightly lower (around 20 percent after 5 years) than that of Germany (around 27 percent), and the gap in the survivor functions between displaced and other separating workers is larger in Germany. Recall that our administrative data suffers from the problem of censoring - some individuals do not return into the labour force after seperating from their job within the observation window. They may have changed into other states, like self-employment (in Germany), or retirement, or they may have left the country. Therefore, one has to be cautious when interpreting these results as durations in non-employment.

---

[69]Given that the Displaced Worker Supplements are survey-based, they may be subject to measurement error as a result of individuals misreporting firings for cause as layoffs.

Estimations of duration models confirm the faster exit of displaced workers in both countries. However, displaced workers with high seniority tend to leave nonemployment slower than those with low seniority in France, whereas the reverse is true in Germany.[70]

8.3   Earnings Changes

In both countries, we find a result that is contrary to the majority of North American results on worker displacement. Displacement does not seem to be associated with large earnings losses. In the French case, average daily earnings of displaced workers actually increase, relative to continuously employed workers, between the year preceding and the year following displacement. In Germany there is still a small drop in average daily earnings relative to continuously employed workers, but the drop is less than 1 percent in relative earnings terms. One explanation for our different results may be the way the earnings variable is constructed: While we use data on daily earnings, which are calculated using employment periods only, many North American studies use data on quaterly or yearly earnings, without taking account of the number of days worked. Furthermore, some studies (Jacobson et al. 1993) substitute zero earnings for workers who are not in work, while we construct our comparisons conditional on employment.

We do find an important earnings differential associated with taking longer than a year to find a new job following displacement for both countries. In France, this corresponds to a 5 percent earnings disadvantage relative to other displaced workers who are reemployed within the calendar year following displacement, while it is between 13 and 20 percent in relative terms in Germany.

8.4   Conclusion

In conclusion, the labor markets of France and Germany, although different along certain dimensions, seem to provide roughly similar outcomes for displaced workers. One reason for these similarities may be similar institutional regulations, like employment protection offered by labor law. Our analysis is purely descriptive, and we have not attempted to attribute findings, and differences to the North American literature, to differences in institutional regulations. This is a very promising avenue for future research.

---

[70]As a comparison, Swaim and Podgursky (1991) find that the rate of exit from nonemployment among displaced workers decreases with seniority in the United States.

References

Abowd, John M., Francis Kramarz, and David N. Margolis, "Minimum Wages and Employment in France and the United States," *CREST and LAMIA Working Paper*, August 1998.

＿＿ , ＿＿ , **and** ＿＿ , "High Wage Workers and High Wage Firms," *Econometrica*, March 1999, *67* (2), 251–333.

＿＿ , ＿＿ , **Thomas Lemieux, and David N. Margolis**, "Minimum Wages and Youth Employment in France and the United States," in David G. Blanchflower and Richard B. Freeman, eds., *Youth Employment and Joblessness in Advanced Countries*, Chicago: NBER, forthcoming.

＿＿ , **Hampton S. C. Finer, Francis Kramarz, and Sébastien Roux**, "Job and Wage Mobility: An Analysis of the Dynamics of Employment Durations Using Matched Employee and Employer Data from the U.S. and France," Present at NBER Summer Institute, Labor Studies group (July 1997), July 1997.

Bender, S., J. Hilzendegen, G. Rohwer, and H. Rudolph, *Die IAB-Beschäftigtenstichprobe 1975-1990* BeitrAB, Nürnberg: Institut für Arbeitsmarkt- und Berufsforschung, 1996. 197.

Bonnal, Liliane and Denis Fougère, "Estimating the Structural Effect of Unemployment Benefits on Job Search Costs," CREST Working Paper, 1993.

＿＿ **and** ＿＿ , "Estimating the Structural Effects of Unemployment Benefits and the Minimum Wage Level on Unemployment Durations," CREST Working Paper, July 1996.

Büchtemann, C.F., "Kündigungsschutz als Beschäftigungshemmniss?," *Mitteilungen aus des Arbeitsmarkt- und Berufsforschung*, 1990, *23*, 394–410.

Bughin, Evelyne, "La négociation salariale de branche en 1984," *Travail et Emploi*, June 1985, *24*, 51–57.

Buttler, F., W. Brandes, E. Dorndorf, W. Gaum, and U. Walwei, "Flexibility and Job Security in the Federal Republic of Germany," Technical Report 1, SAMF working paper 1992.

Dustmann, Christian and Arthur VanSoest, "Wage Structures in the Private and Public Sectors in West Germany," *Fiscal Studies*, 1997, *18*, 225–247.

Fallick, Bruce C., "A Review of the Recent Empirical Literature on Displaced Workers," *Industrial and Labor Relations Review*, October 1996, *50* (1), 5–16.

Farber, Henry S., "The Incidence and Costs of Job Loss, 1982-91," *Brookings Papers: Microeconomics*, 1993, pp. 73–132.

———, "Alternative and Part-Time Employment Arrangements as a Response to Job Loss," March 1999. NBER Working Paper 7002.

Gibbons, Robert and Lawrence F. Katz, "Layoffs and Lemons," *Journal of Labor Economics*, October 1991, *9* (4), 351–380.

Herberger, L. and B. Becker, "Sozialverischerungspflichtige Beschäftigte," *der Beschäftigtenstatistik um im Mikrozensus, Wirtschaft und Statistik*, 1983, pp. 290–304.

Hunt, Jennifer, "The Effect of Unemployment Compensation on Unemployment Duration in Germany," *Journal of Labor Economics*, January 1995, *13* (1), 88–120.

Jacobson, Louis S., Robert J. LaLonde, and Daniel G. Sullivan, "Earnings Losses of Displaced Workers," *American Economic Review*, September 1993, *83* (4), 685–709.

Kittner, M., *Arbeits- und Sozialordnung*, Köln: Bund Verlag, 1995.

Lefebvre, Francis, *Social 1996, droit du travail et sécurité sociale* Mementos Pratiques, Levallois, France: Editions Francis Lefebvre, 1996.

Margolis, David N., "Compensation Practices and Government policies in Western European Labor Markets." PhD dissertation, Cornell University, Ithaca, New York, U.S.A. 1993.

———, "Cohort Effects and Returns to Seniority in France," *Annales d'Economie et de Statistique*, January-June 1996, *41/42*, 443–464.

———, "Worker Displacement in France," April 1999. LAMIA and CREST mimeo.

___ , "Part-Year Employment, Slow Reemployment and Earnings Losses: The Case of Worker Displacement in France," in James Spletzer Jules Theeuwes John Haltiwanger, Julia Lane and Kenneth Troske, eds., *The Creation and Analysis of Linked Employer-Employee Data*, Amsterdam: North Holland, forthcoming.

Rogowski, Ralf and Klaus Schömann, "Legal Regulation and Flexibilty of Employment Contracts," in Jacqueline O'Reilly Gunther Schmid and Klaus Schömann, eds., *International Handbook of Labour Market Policy and Evaluation*, Cheltenham, U.K.: Edward Elgar, 1996.

Schmidt, Christoph M., "Relative Wage Effects of German Unions," 1994. CEPR Working Paper No. 918.

Seitchik, Adam, "Who Are Displaced Workers?," in John T. Addison, ed., *Job Displacement: Consequences and Implications for Policy*, Detroit, Michigan: Wayne State University Press, 1991.

Stevens, Ann Huff, "Persistent Effects of Job Displacement: The Importance of Multiple Job Losses," *Journal of Labor Economics*, January 1997, *15* (1), 165–188.

Swaim, Paul and Michael Podgursky, "Displacement and Unemployment," in John T. Addison, ed., *Job Displacement: Consequences and Implications for Policy*, Detroit: Wayne State University Press, 1991.

A Correction for False Firm Deaths in France

Suppose we observe n_1 workers associated with firm j_1 in the last available year for the firm (prior to 1996), and a share p_{1k} were observed the following year in firm j_k, $k \neq 1$. Using p_{1k} as an estimator of $\tilde{p}_{1k}$, the true share of workers moving from firm j_1 to firm j_k, we take a normal approximation to the underlying binomial distribution under which the standard error of p_{1k} is $\sigma_{1k} = \sqrt{\frac{p_{1k}(1-p_{1k})}{n_1}}$. Thus, if for any k, $k \neq 1$, $p_{1k} + 2\sigma_{1k} \geq 0.5$, we can not reject the hypothesis that at least 50 percent of the firm's work force moved together to the same successor firm ($\tilde{p}_{1k} \geq 0.5$) at the 95 percent confidence level. If this is the case for any $k \neq 1$, we only consider separations to firms for which we can reject $\tilde{p}_{1k'} \geq 0.5$, i.e. for which $p_{1k'} + 2\sigma_{1k'} < 0.5$, to be real separations. All of these are classified as separations for reasons other than displacement, since there is at least one possible successor firm to j_1. All changes in firm identifier for individuals moving to firm k'' with $p_{1k''} + 2\sigma_{1k''} \geq 0.5$ are considered to be false firm deaths, and are not coded as separations.[71] In the event that the test statistic is less than 0.5 for all k, $k \neq 1$, we maintain the estimated firm death date. This procedure leads us to reclassify 2.6% of our estimated firm deaths in France as false firm deaths.

---

[71]We nevertheless restart the seniority counter at zero the year following the false firm death. This is because the individuals moving to a new firm identifier in this manner are "new employees" for the successor firm, despite their experience with the predecessor firm.

B   Definitions of Displacement

	Total	Closure within		Closure within		Contraction	
	Separations	one year	Percent	two years	Percent	by 40	Percent
France							
84	8309	2498	30.06	2821	33.95		
85	8620	3159	36.65	3487	40.45		
86	8730	2993	34.28	3365	38.55		
87	10517	3072	29.21	3633	34.54		
88	8439	3238	38.37	3557	42.15		
89	15459	5622	36.37	6349	41.07		
$\sum$	60074	20582	34.26	23212	38.64		
Germany							
84	3181	432	13.58	637	20.02	1101	34.64
85	2777	423	15.23	625	22.50	1097	39.50
86	2464	402	16.31	530	21.50	955	38.75
87	2030	323	15.91	460	22.66	774	38.12
88	1821	294	16.14	420	23.06	729	40.03
89	2117	263	12.42	375	17.71	755	35.66
90	1805	227	12.57	227	12.57	570	31.57
$\sum$	16191	2364	14.59	3274	20.21	5981	36.93

Table A1: Type of Closures

Sources: Authors' calculations from DADS and IAB data.

Notes: For France, multiple observations in the same year are aggregated to the unique individual-year level.

C Impact of the Retirement Constraint in France

Figure 5: Impact of Retirement Constraint by Age at First Separation
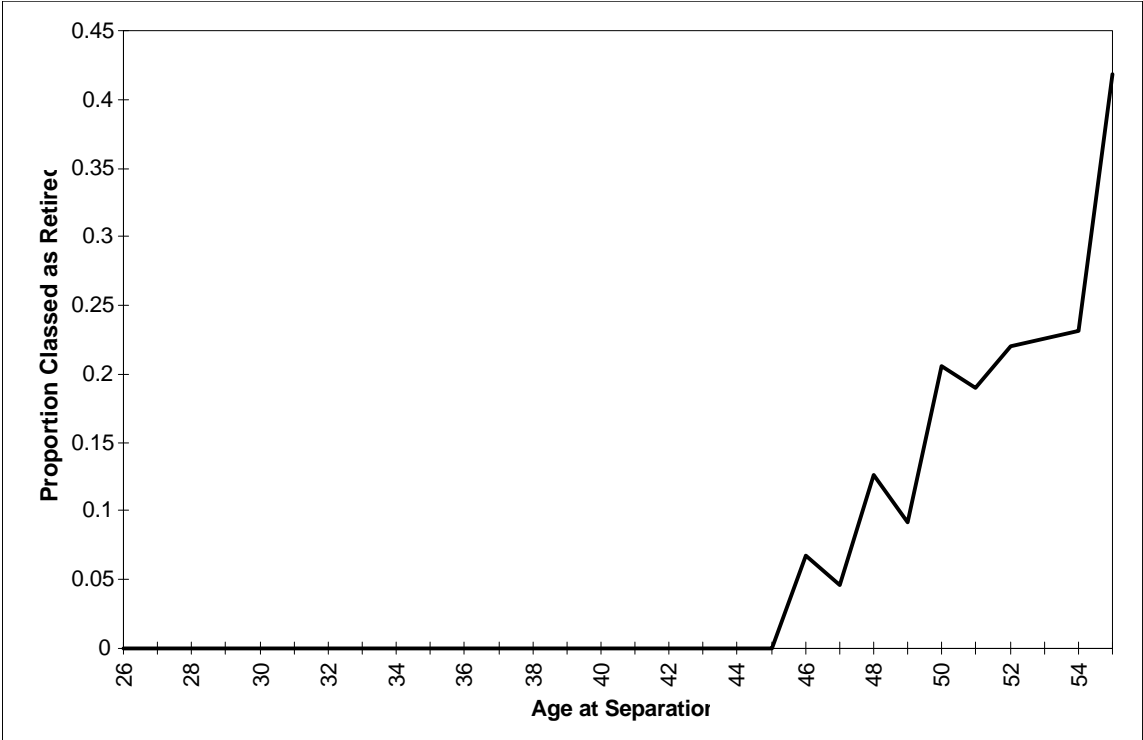
D Descriptive Statistics-France

Table A2: Sample Statistics - 1984 - France						
	Continuously Employed 84-89		First Separation Displacement		First Separation Other Reason	
	Mean	Std.Dev.	Mean	Std.Dev.	Mean	Std.Dev.
Age	37.82	6.93	37.65	7.20	38.26	7.37
Log (Average Daily Earnings (1980 KF))	-1.65	0.45	-1.81	0.50	-1.73	0.57
$4 \leq$ Seniority < 6	0.17		0.22		0.26	
$6 \leq$ Seniority < 8	0.23		0.25		0.26	
$8 \leq$ Seniority < 10	0.03		0.04		0.03	
$10 \leq$ Seniority	0.58		0.48		0.46	
No Educational Certification	0.20		0.20		0.20	
Elementary School	0.26		0.26		0.26	
Junior High School	0.06		0.06		0.06	
High School	0.04		0.04		0.04	
Basic Vocational School	0.29		0.30		0.29	
Advanced Vocational School	0.06		0.06		0.06	
Undergraduate University	0.04		0.04		0.04	
Graduate School & Grande Ecole	0.05		0.05		0.05	
N. Obs	54918		16876		27685	

Notes: Table constructed with one observation per person per year (as in section 4).

E Treatment of Censoring in Germany

Figures for Germany appear in table A3 below. There are 16195 first separations between 1984 and 1990. 4242 do not return to the labor force within the observation period, and 2943 do not claim benefits. In the subsample of workers who are displaced (according to definition 2 above), only 8 percent do not claim benefits after separation, and do not return into the sample.

Table A3: Separation and Censoring		
All	No.	Percent
Total number of first separations, 1984 - 1990	16195	100.00
Total number of separations who return into work	11953	73.81
Total number of observations who do not return into work	4242	26.19
Of which:		
Claim benefit	1299	30.62
Do not claim benefit	2943	69.38

F   Descriptive Statistics-Germany

	Continuously Employed 84-90		First Separation Displacement		First Separation Other Reason	
Table A4: Sample Statistics - 1984 - Germany	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std.Dev.
Age	39.42	7.30	39.10	7.30	37.59	7.40
Daily wage*	85.01	21.07	77.15	21.07	83.15	21.88
Log of daily wage	4.41	0.30	4.30	0.30	4.38	0.27
$4 \leq$ Seniority < 6	15.89		18.74		26.52	
$6 \leq$ Seniority < 8	13.79		17.24		17.47	
$8 \leq$ Seniority < 10	25.76		29.13		25.23	
$10 \leq$ Seniority	44.47		26.90		23.81	
No Apprentice, No High School	19.55		18.41		17.21	
Apprentice, No High School	68.72		71.22		66.85	
No Apprentice, High School	0.37		0.26		0.47	
Apprentice, High School	1.05		0.96		1.44	
Polytechnic	3.53		1.49		4.46	
University	2.63		1.03		4.46	
Education Unknown	4.10		6.59		5.09	
Firm Size, 1982	3086	8376	160	394	1653	5003
Firm Size, 1982 (Median)	369		34		173	
Sec1: Primary	0.59		3.72		1.83	
Sec2: Energy	2.59		0.39		0.98	
Sec3: Mining	1.08		1.39		1.86	
Sec4: Manufacturing	54.40		42.45		46.37	
Sec5: Construction	7.95		21.41		11.60	
Sec6: Distributional Services	13.09		20.61		19.18	
Sec7: Industry Services	6.08		4.52		6.79	
Sec8: Consumer Services	1.24		1.03		1.38	
Sec9: Public Services	12.93		4.42		9.97	
N. Obs	32235		3003		10266	

*: In German Marks (deflated to 1975 prices).

G Incidence Probit Models Using the Continuously Employed as the Reference Group - France

Table A5: Probit Models of Incidence of Separation by Type
Relative to Continuously Employed - France, 1984

	Displacements		Other Separations	
	Coef.	Std. Err.	Coef.	Std. Err.
Age	-0.0104	0.0145	-0.0090	0.0113
Age^2/100	0.0184	0.0188	0.0165	0.0145
$4 \leq$ Seniority < 6	0.2268	0.0240	0.3764	0.0181
$6 \leq$ Seniority < 8	0.1453	0.0227	0.1989	0.0177
$8 \leq$ Seniority < 10	0.1529	0.0489	0.0414	0.0462
Elementary School	-0.1076	0.0728	0.0112	0.0578
Junior High School	0.0989	0.1072	0.0273	0.0886
High School	0.1504	0.1303	0.0940	0.1076
Basic Vocational School	-0.1130	0.0697	-0.1009	0.0569
Advanced Vocational School	-0.2434	0.1244	-0.0669	0.0877
Undergraduate	0.1933	0.1216	0.2030	0.0940
Graduate School & Grande Ecole	0.0065	0.1165	0.3766	0.0802
Constant	-2.0991	0.2920	-1.6256	0.2243
N. Obs.	71794		82603	
Log Likelihood	-11264.46		-19432.70	

Source: Authors' calculations from DADS data.
Notes: Estimates include data from 1984 only, aggregated to one
observation per individual. All models also include controls for sector
(15 categories) and skill level (3 categories). Reference groups: No
educational certification and 10 or more years of seniority. Models
estimate the probability of specified type of separation relative to
workers who were continuously employed with the same firm throughout
the sample window (1984-1989).

H Weibull Proportional Hazard Model - Germany

Table A6: Weibull Proportional Hazard Models - Germany						
	All Separations		Other Separations		Displacements	
	Coef.	Std.E.	Coef.	Std.E.	Coef.	Std.E.
Age	-3.2793	0.2255	-3.7131	0.2597	-1.9628	0.4639
$6 \leq$ Seniority < 8	0.0248	0.0570	0.0228	0.0641	0.0664	0.1284
$8 \leq$ Seniority < 10	0.0633	0.0531	0.0293	0.0602	0.2250	0.1177
$10 \leq$ Seniority	-0.0232	0.0617	-0.1118	0.0704	0.3081	0.1321
Displacement	0.4250	0.0387				
Apprentice, No High School	0.4008	0.0407	0.4332	0.0468	0.3000	0.0826
No Apprentice, High School	0.2073	0.3041	0.2422	0.3367	0.0591	0.7156
Apprentice, High School	0.0200	0.1710	0.3562	0.1935	-0.7274	0.3639
Polytechnic	0.2319	0.1309	0.3627	0.1421	-0.2392	0.3426
University	0.0909	0.1276	0.2074	0.1302	-1.9875	1.0042
Education Unknown	0.0522	0.0721	0.0748	0.0842	-0.0251	0.1404
1985	0.1383	0.0485	0.1707	0.0564	0.0949	0.0963
1986	0.2598	0.0547	0.2658	0.0626	0.2745	0.1137
1987	0.2319	0.0619	0.3066	0.0706	0.0180	0.1302
1988	0.2537	0.0694	0.2971	0.0794	0.1344	0.1437
1989	0.2703	0.0781	0.3438	0.0879	0.0447	0.1732
1990	0.0950	0.1026	0.0222	0.1170	0.7691	0.2106
Constant	-2.3947	0.1054	-2.1522	0.1184	-2.8565	0.2349
Weibull Shape Parameter	0.51		0.49		0.56	
Number of Observations	5019		3998		1021	
Number of Failures	3720		2813		907	
Log Likelihood	-9666.48		-7531.57		-2087.78	

Right censoring occurs when the individual is not reemployed by December 1990.

I Estimations Comparing Different Definitions of Displacement for Germany

Table A7: Constrained Earnings Regressions - Germany						
Displaced Workers						
	Within 1 Year		Within 2 Years		40 Shrinkage	
	Coef.	Std.E	Coef.	Std.E..	Coef.	Std.E.
Perm	-0.2087	0.0220	-0.2161	0.0169	-0.2318	0.0123
Sep_1	-0.0233	0.0075	-0.0228	0.0062	-0.0331	0.0045
Sep_2	-0.0333	0.0083	-0.0291	0.0069	-0.0410	0.0050
Sep_3	-0.0353	0.0094	-0.0307	0.0078	-0.0435	0.0056
Sep_4	-0.0286	0.0106	-0.0189	0.0088	-0.0360	0.0063
Sep_5	-0.0339	0.0127	-0.0162	0.0104	-0.0437	0.0075
Sep_6	-0.0499	0.0176	-0.0343	0.0144	-0.0576	0.0105
age	6.3572	0.3513	6.1706	0.2909	5.8927	0.2112
$age^2/100$	-7.1835	0.4260	-6.9319	0.3529	-6.4522	0.2561
1985	-0.0065	0.0091	-0.0007	0.0076	0.0042	0.0055
1986	0.0351	0.0093	0.0389	0.0078	0.0437	0.0056
1987	0.0720	0.0096	0.0710	0.0081	0.0769	0.0058
1988	0.1064	0.0100	0.1065	0.0084	0.1114	0.0060
1989	0.1183	0.0105	0.1133	0.0088	0.1204	0.0063
1990	0.1259	0.0114	0.1167	0.0096	0.1204	0.0068
Apprentice, No High School	0.1816	0.0064	0.1883	0.0052	0.2041	0.0038
No Apprentice, High School	0.3962	0.0510	0.4260	0.0442	0.3774	0.0314
Apprentice, High School	0.3247	0.0267	0.3799	0.0211	0.4318	0.0147
Polytechnic	0.6629	0.0222	0.6363	0.0181	0.6263	0.0098
University	0.6635	0.0258	0.6933	0.0216	0.6787	0.0120
Education Unknown	0.0952	0.0109	0.0918	0.0089	0.1097	0.0065
Constant	2.8071	0.0709	2.8521	0.0586	2.9082	0.0427
N. Obs.	15346		21519		39669	
Pseudo R^2	0.2743		0.2980		0.3618	

Base Education Group: No Apprentice, No High School Degree.
The variable Perm equals one for observations after separation if time between the 2 jobs exceeded 1 year. The Sep_i variables equal one in the ith year before/after separation.