Universitat Pompeu Fabra

Department of Economics and Business

Doctoral Thesis

The Economics of Labor Contracting Through Temporary Help Agencies

by

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May 2000

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Acknowledgments

I would like to thank first Eduardo C. Rodes. His continuous support and dedicated supervision along this five‑year experience has been essential for the completion of this work.

Walter García‑Fontes, J. Ignacio García‑Pérez and Silvio Rendon deserve special thanks for helpful suggestions at different stages of the thesis, and for their direct contribution to my work.

I would also like to thank Spanish Ministry of Labor for providing the database used in this research, and Dörte Dömeland‑Narváez and Martin Menner for their dedicated help in data handling.

Conversations with Benito Arruñada and members of the Department of Economics at Universidad de Salamanca, in particular, Miguel Ángel Malo and Cristina Pita are gratefully acknowledged.

Finally, I would like to thank my family for their invaluable support throughout my doctoral studies. They have suffered and enjoyed the writing and completion of my thesis as much as I have.

Chapter 1

Introduction

Temporary help agencies | known in the European context as Empresas de Trabajo Temporal, ETTs for short | constitute one of the possible means to establish non{standard or atypical labor contracts, in opposition to \standard" labor contracts which are those implying permanent and full{time employment relationships. Because of this, the workforce managed by ETTs has been encompassed by economic literature to be \contingent" work | a concept originally from Audrey Freedman in 1985[1] | which has also been identi¯ed with a wide range of employment practices, including part{time work, temporary work (without resorting to ETTs), employee leasing, self{employment, contracting out and home{based work.

ETTs can be de¯ned as service ¯rms that hire temporary workers and send them out to do temporary work on the premises of, and under the supervision of, client ¯rms solicited from the business world[2] . As labor market intermediaries, their basic

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[1] See Freedman (1985).

[2] In Spain they were allowed to operate for the ¯rst time under regulation provided for by the 1994 labor market reforms. The 14/94 Law | which rules those agencies and has been recently reformed by the 29/99 Law| entered into force in June, after the approval on December the 3rd

function consists of connecting labor demand and labor supply. With this aim, ETTs develop several functions; for instance, they do screening of applicants prior to referral to potential employers through interviews and testing; they may instruct applicants in how to behave on a job interview or even on the job itself, and they do not usually terminate their connection with a job applicant at the time the applicant obtains a job: on the contrary, the ETT keeps in touch with the individual to monitor her progress on the job, developing functions such as, for instance, giving advice and assistance in adjusting their vocational objectives and attitudes, o®ering orientation to work or providing them with actual training. Were the applicant to lose the job, the ETT might investigate the reasons, and attempt to assist her in remedying any de¯ciencies prior to referring the person to another potential employer[3] .

Their activity belongs to the private placement sector, in which other intermediaries also develop their functions in a parallel way. Among the latter, we ¯nd such varied ¯gures as, e.g., private employment agencies | which are allowed in other Europen countries in spite of being actually forbidden in Spain| search ¯rms (specialized in speci¯c job positions) or casting bureaus. The basic di®erence between ETTs and these other intermediaries lies on the contractual design through which the economics of ETTs is based: workers contracted through ETTs remain on the ETT's payroll while under the direction of the client ¯rm, giving way to a triangular

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1993 by the Government of the 18/93 Decree{law on \urgent measures to promote employment", which introduced a series of changes aimed at improving placement services, stimulating part{time employment and creating job opportunities for young people, and the 10/94 Law which had already approved those labor market intermediaries. Prior to this date, ETTs had developed in Spain in fairly anarchical conditions, free of the constraints of a well{de¯ned legal framework (for details, vid. Rodriguez{Piñero, 1992 and 1994).

[3] Some of these functions have been described in analyses on the general functioning of intermediaries (Mills, 1978) and on the temporary placement sector in particular (Moore, 1965).

relationship between the client ¯rm, the worker and the ETT which has originated several problems from the point of view of Labor Law, whose relevance has caused an abundant juridical literature[4] .

This way, ETTs provide one example of the increasing complexity of the labor market. The traditional bilaterality of the labor relationship has been substituted by a trilateral link between three agents: the ETT, the temp, and the client ¯rm. Once contracted by the ETT, the worker is sent to render her services to a client ¯rm, which contracts the provision of the worker with the ETT. There exists a standard labor contract for a limited duration between the ETT and the worker, and a commercial contract (called `assignment contract') between the ETT and the ¯rm, so that both market and employment relationships are established (see Figure 1 in Appendix B).

From a juridical point of view, the ETT develops two activities: (i) manpower cession towards the client ¯rm, and (ii) interposition in the labor contract, since the client ¯rm needs not directly contract the temporary worker (it is the ETT who assumes this responsibility instead).

From the point of view of the worker, it is as if she were subject to a two{sided management from two di®erent `employers': a de iure employer (i.e., the ETT) who hires the worker, and a de facto employer (i.e., the client ¯rm) who receives worker's services. This latter employer manages workers' services, integrating them with their own employees in the organization of production. This way, client ¯rms make use of some rights that are usually attributed to the employer in the traditional bilateral

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[4] For a detailed analysis of the main juridical di®erences between the ETT and other intermediaries with which the ETT coexist, vid. Rodriguez{Piñero (1992).

employer/employee relationship. Nonetheless, it is the ETT the one that takes charge of all the duties and responsibilities foreseen in labor regulation: it pays wages, as well as Social Security contributions, and it must carry out the obligations that it has assumed in front of the client ¯rm.

1.1   Motivation

During the last ¯ve years, organizations' use of ETT workers has increased tremendously, to the extent that they are actually managing an important share of temporary employment. As can be seen in Table 1 (Appendix A), in Spain the proportion of temporary contracts managed by ETTs over the total of temporary contracts registered in INEM (Instituto Nacional de Empleo) was almost multiplied by three between 1995 and 1998. Nowadays, around 20 percent of all temporary contracts are being managed by ETTs[5] . As the ETT labor force becomes more numerous and diverse, it is therefore important to explore which economic implications this form of labor contracting may have for workers.

Studying this form of labor contracting is also relevant because their opponents have been increasingly vociferous against the pernicious social reality that those intermediaries are supposedly hiding. Common criticisms are, for instance, that ETT temps only receive brief assignments interspersed with relatively long periods of unemployment (Bronstein, 1991); that such a situation may create uncertainty and greater economic risk for these workers (Blank, 1998), and that extensive reliance on ETT workers may create two classes of employees: permanent workers with relatively

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[5] According to Ministerio de Trabajo y Asuntos Sociales.

secure, high{paying employment and ETT workers (along with temporary workers in general) who would only have sporadic, low{paying work (Mangum et al., 1985). In sum, those intermediaries are being critized for creating a two{tier system of labor market segmentation.

In addition, to date, research on ETT temps has been primarily descriptive, reporting statistics on the demographic characteristics of ETT workers, the kinds of jobs sta®ed by them or the industries in which they are employed. Even though some studies have gone beyond descriptive statistics in analyzing the temporary placement sector, several of them, as we will see in this chapter, have signi¯cant limitations. On the one hand, failure to understand the similarities and di®erences between ETT labor contracting and other employment relationships hampers progress towards the analysis of this employment relationship from a theoretical point of view. On the other hand, it has been di±cult to identify robust ¯ndings that are likely to generalize across industries and jobs.

1.2   Map of the thesis

This thesis is structured as follows. The present chapter o®ers a review of the literature on ETTs, underlying what we know so far on those intermediaries as well as introducing potential research questions which are yet unresolved.

Chapter two and chapter three establish the theoretical framework on which the empirical analysis of the last two chapters of the thesis is based. In chapter two, we establish a model of human capital accumulation, whose main prediction is related to the functioning of ETTs in the labor market in chapter four. In chapter three, we

provide a rationale for the existence of ETTs in the labor market by developing a model of job assignment signalling, whose empirical testing is tackled in chapter ﬁve.

Chapter four deals with the empirical analyses of both inﬂows and outﬂows of employment for two groups of workers | one of them employed through ETTs and the other one who are not| as well as with the study of the inﬂuence that ETT{ intermediated work may have on workers' probability of occupational upgrading. Finally, chapter ﬁve analyzes the impact that work achieved through those intermediaries may have in workers' promotion chances to permanent job positions.

1.3   Literature: review and assessment

This section oﬀers a review of the literature concerning the theoretical, descriptive and empirical studies on ETTs existing so far. Its purpose is to draw the reader's attention towards a series of issues about which currently we have no answers and little data to explore them.

To date, literature on ETTs has basically focused on three aspects:

² workers' and ﬁrms' motivations for addressing to ETTs

² reasons underlying the growth along time in the demand for ETT services, and

² the relationship between labor contracting through ETTs and precariousness.

1.3.1   Demand of ETT services

Conventional economic explanations on the motivations underlying the use of workforce contracted through ETTs have indicated reasons related both to labor demand

and labor supply. While the former ones consider the determinants of the use of ETT work by client ¯rms, the latter are connected with the advantages that temporary work may represent for workers.

Client ¯rms' motivations

Literature has underlined three motivations of employers to address to ETTs for hiring labor.

Variable demand. Contingent arrangements through ETTs can help employers meet changes in demand for their products (either systematic or not). At times, ¯rms may be uncertain whether their product demand will continue at its current level. In the initial stages of an economic recovery, for example, employers may be uncertain about whether an increase in demand will be sustained. Consequently, even though ¯rms may need extra workers, they may be reluctant to hire permanent sta® until the economic outlook becomes more certain. Firms may choose, instead, to meet their labor demand with workers to whom they have no permanent commitments (Carey and Hazelbaker, 1986). This way, it becomes possible to maintain a \regular" workforce | i.e., the one hired through permanent contracts| employed in a more e±cient way, especially during the periods of low demand, during which it would be frequent to ¯nd permanent employees working below the level of full capacity. Moreover, the ETT would allow the client ¯rm to avoid potential delays in the contracting of the needed workforce, since the former disposes of a database of potential candidates who have already passed through an initial process of screening. This is the reason why ETT workers could be addressed to as \just{in{time" workers.

Therefore, this practice would allow for cost savings even though the hourly cost of the ETT were high or temps were less productive than regular workers. On the contrary, maintaining a constant workforce through those demand changes in demand would be costly (Carey and Hazelbaker, 1986; Polivka and Nardone, 1989).

Moreover, an ETT would allow the client ﬁrm to attain the ﬂexibility required to reduce the current staﬀ of the company whenever it becomes necessary while, at the same time, avoiding internal morale problems which often arise when a share of the permanent worforce must be laid oﬀ (Blank, 1998).

The use of ETTs as a \buﬀer" for client ﬁrms is consistent with the extreme seasonality and cyclicality of their workforce when compared to non{ETT workers. Houseman (1997) ﬁnds that ﬁrms with higher variability in demand resort to ETTs more frequently. This is consistent with the fact that changes in temporary employment through ETTs lead the economic cycle: some authors have found that labor contracting through ETTs substantially reduces at the beginning of recessions but increases a lot at the beginning of expansion periods (Abraham, 1988; Segal and Sullivan, 1995), which is a sign of the reluctancy of client ﬁrms to change their levels of permanent employment when it is not clear whether an increase in demand will be sustained. For instance, in the recovery from the economic 1981{82 recession in the U.S., the observed increase from 1982 to 1983 in labor contracts managed through ETTs was of 17.5 percent, while the yearly growth in employment was lower than 1 percent (Appelbaum and Granrose, 1986).

Compensation policies. Client firms may also turn to ETTs as a convenient way to implement qualitatively different compensation policies for different groups of workers. This may occur either because certain jobs involve different incentive and management problems that imply alternate pay structures, or because different workers have varying preferences or because some workers have greater bargaining power. In such circumstances, a reasonable strategy may be for firms to use regular, permanent employees to fill positions where generous wages and benefits are needed, and to use temporary services workers to fill other positions where such generosity is not needed.

Efficiency wage theory suggests a number of reasons why firms might want to pay some workers more than their market wage. For example, if hiring and training costs are high, paying above-market wages may be profitable because it reduces turnover. If it is hard to assess workers' productivity before they are hired, paying above-market wages may be profitable because it attracts workers with higher average productivity. If monitoring workers is costly, firms may decide to pay above-market wages to raise the cost to workers of being terminated upon being discovered shirking. In addition to efficiency wage considerations, investment in firm-specific human capital may result in some workers earning more than their next best alternative (Becker, 1964; Mincer, 1971). Firms may also decide to "tilt the wage-tenure profile" and offer higher pay in a deferred form — like a generous pension, for instance — in order to create incentives for hard work in the present (Lazear, 1998).

There is no reason why firms that find it efficient to pay above-market wages to some of their workers must find it efficient to pay above-market wages to all of their

workers. However, a firm that wishes to offer a two-tier compensation structure must tread cautiously. Productivity may suffer if morale is reduced when two groups of permanent workers are treated differently enough that one group or both begin to question the fairness of their compensation. The firm must also take care that its two-tier structure does not run afoul of antidiscrimination laws or other legal restrictions. This may be especially true when firms want to employ generalizations of the "tilted" wage-tenure profile that rely on properties of pension programs, since excluding some workers from those programs will likely violate legal regulation. In this context, hiring temporaries may be a convenient way to offer a generous compensation package only to those workers for which the firm finds it efficient (Abraham, 1990; Abraham and Taylor, 1996; Segal and Sullivan, 1997).

Firms may also want to offer two-tier compensation packages when workers have different preferences over the mix of wages and benefits. Suppose, for example, that firms require the services of workers in two classes of jobs, one in which workers tend to be young and healthy and therefore place little value on health insurance coverage, and another in which workers tend to be middle-aged and to consider health insurance coverage essential. The firm would naturally want to offer health insurance to those who value it higher than its cost. However, legal regulations may make it difficult to offer insurance benefits to only some within a firm and still keep the tax advantages of employer-provided health insurance. From the firms' point of view, using ETT workers to perform the first class of jobs might be a better alternative.

Another case in which firms may want to differentiate between classes of workers is when some incumbents have substantial bargaining power. This could obviously be

the case when some workers are unionized. However, some researchers have suggested that even without unions, groups of \insiders" may be able to disrupt the smooth functioning of the ¯rm if they are unhappy (Lindbeck and Snower, 1988). Similarly, when technological change or other factors reduce the going wage for a class of work- ers, the morale e®ects of cutting the wages of incumbent workers may be too severe. In each of these cases, a two{tier wage structure may evolve in which union members, insiders, or incumbents earn high wages, while outsiders earn low wages. Since paying di®erent groups of similar permanent workers signi¯cantly di®erent wages may itself create morale problems, ¯rms may prefer to ¯ll the outsider slots with ETT workers. For instance, there exists evidence describing that many of the two{tier wage struc- tures implemented during the 80's in the U.S. had to be dismantled at the beginning of the 90's due to the negative e®ect on the employees' morale (Abraham, 1990).

Sugarman (1978) found evidence on hiring temps as a way to institutionalize di®erent strategies and practices of recruitment and employer/employee relationships; this was the reason why forty{nine out of ¯fty{two ¯rms from California maintained a group of °exible workers. Also, more contracting out has been observed in ¯rms with higher wage levels and fringe bene¯ts (Mangum et al, 1985): high{wage employers who want to limit labor costs for certain worker categories may ¯nd it easier to contract them out than to create and maintain a low{wage tier in the midst of a high{wage ¯rm.

Nonetheless, available data are not useful enough to determine whether the hourly cost associated to ETT work is lower than the one associated to the use of permanent workers. The ETT charges the client ¯rm an additional percentage fee on top of the

amount the temporary worker is paid, so that there is a wedge between the wage the worker receives and the cost to the client ¯rm. Therefore, ETT workers might report lower wages than regular employees doing similar work, but still cost employers more.

As regards wages, some estimations indicate that, on average, ETT workers earn less than permanent workers. For instance, according to the Employment Survey done by the Bureau of Labor Statistics (Segal and Sullivan, 1997), the wage di®er- ential between those two groups of employees was around twenty percent in 1996 for permanent workers ($9.15 versus $11.75 per hour), and di®ered according to the type of job. Similarly, although in this case with data from the Active Population Survey, the di®erence was of sixty{two percent (Blank, 1998). In spite of those studies, Segal and Sullivan (1995) show evidence that only some ETT workers receive lower wages | white collar employees earned slightly higher wages| and the previously cited sur- vey of Houseman (1997) stated that 62 percent of employers considered the hourly wage paid by ETTs to be larger than that of permanent employees in similar job positions.

In any case, although in some cases wages are, on average, lower, it may be the case that the ¯nal cost of addressing to an ETT for the client ¯rm exceeds the cost of hiring permanent employees. For instance, in a survey conducted by Abraham (1990) concerning the relative per{hour costs of employing ETT workers compared with the per{hour cost of employing regular employees, a strong plurality of users of ETT temporaries reported higher per{hour costs than those associated with regular employees; only about a quarter reported that per{hour costs were lower.

While this is interesting information, it does not establish that using ETT workers

lowers per{unit production costs. To draw any conclusions about per{unit production costs, one would also need information on relative productivities. If ETT workers are unfamiliar with the tasks they are asked to perform, their productivity may well be lower than that of regular employees. This may o®set any cost saving associated with their lower hourly compensation. This would be suggesting that reducing hourly compensation costs would not generally be motivation for reliance on ETT workers.

Screening. Hiring ETT workers to monitor them and then to o®er permanent positions only to those who perform well seems to have become a common strategy in the U.S. to reduce their need to terminate permanent employees (Segal and Sullivan, 1997). The intermediary, therefore, becomes a source for future recruitment (this line of business in the U.S. labor market is known as \temp{to hire"). If it is hard to determine whether a worker is motivated or ¯ts well into a work culture from a written job application, then observing that individual on a limited{term contract may provide much better information about her potential as a good employee.

According to Houseman (1997), one{¯fth of client ¯rms in this country addressed to ETTs as a source of future recruitment. Similarly, Abraham (1988) ¯nds that twenty{three percent of ¯rms that used °exible forms of employment intended to identify adequate candidates for permanent jobs.

Workers' motivations

From the point of view of the worker, three motivations for addressing to ETTs have been put forward.

First, individual job applicants on their own would have fewer opportunities to

obtain a range of potential jobs (Belous, 1989; Mills, 1978). Without intermediaries like ETTs, applicants would suffer potential high costs in their job search process. Moreover, workers may take ETTs' contingent positions if they are unsure about their commitment to a particular field or to the labor market in general. To test their interests, new entrants or re{entrants to the job market may take a contingent position in a field they are considering for a career. The temporary placement sector may encourage market testing by providing workers an organized method of sampling specific jobs as well as the job market in general (Polivka and Nardone, 1989).

Second, many workers appreciate the more limited work hours or the greater flexibility in scheduling that nonstandard employment offers (Blank, 1998). In order to meet family, school or other non{work responsibilities, many workers may need more flexible schedules than can typically be found in permanent work arrangements (Blank, 1998; Polivka and Nardone, 1989).

Third, ETT work may facilitate the search of a permanent job, since ETT workers are offered permanent positions at the firms where they work as temporaries. Although data available so far has not allowed to determine whether a large number of ETT workers find employment in the same establishment where they formerly were temporaries, according to surveys conducted by NATSS (1994), thirty{eight percent of ETT workers report having been offered permanent jobs at the firms where they worked as temporaries.

1.3.2   Driving forces

While demand and supply{side motivations for using atypical employment relation-ships have lead research into the temporary placement sector, an equally interesting question has been what accounts for employers' growing use of this arrangement in the last years. Although hard evidence on this issue is di±cult to come by, some clues concerning the factors that have been at work can be found. Research has started from the premise that the most plausible explanation is that the central motivations for the growing use of ETTs have become more compelling over time. That is, any de-velopment that might have increased the attractiveness of using ETT workers would provide an appealing explanation for the growing use of ETTs.

Flexibility

Samuel Sacco, a representative of the temporary placement sector in the U.S. began a list of factors explaining the continuing growth of this industry with the statement that \business organizations, in order to compete in an interconnected global econ-omy, need to be °exible in all of their company operations"[6] . Clearly, using ETT workers o®er client ¯rms greater °exibility, whether as a response to the absence of regular workers or because of volatile demand for a ¯rm's products.

Moreover, in an actual environment of changing market conditions and organi-zational requirements, ¯rms are valuing °exibility more today than they did in the past. Reasons ¯rms have sought greater concern for °exibility include, among others, the rise in international competition and the deregulation of many industries[7] .

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[6] National Association of Temporary and Sta±ng Services (1996).
[7] See MacKay (1988).

This concept of "flexibility" includes, first of all, the so-called numeric flexibility or ability to adapt productive capacity to the changing tendencies in demand: the ETT allows to quickly adjust the staff of the company, depending on what level of product demand exists in each moment. In the second place, the concept also refers to flexibility in terms of the skills possessed by employees: when new skills are required, the firm can use a different set of ETT workers, rather than confronting the costs of retraining the permanent worforce (Pfeffer and Baron, 1988).

A few years ago, discussing strategic choices and labor contracting at the same time would have sounded pretentious. Strategic choices that influence the entire direction of a company were made in departments such as finance and marketing. The personnel department was not involved in strategic thinking | its staff created and designed forms, recruited and hired workers, assisted in skill development, and processed workers' separations. The staff also helped plan and form compensation policies that complied with government regulations. While all of this was very important to the life of a corporation, it was often viewed by some as admininistrative work and even as bureaucratic.

However, because of flexibility and the growing use of ETT workers, corporate managers have discovered that human resources provide a vital and effective strategic lever. In fact, in certain cases, it may be the most important control mechanism that management has in the short-run, given that management can often treat labor as a variable cost while other costs are usually fixed.

This way, some firms are developing fairly long-term attachments to ETTs: in those cases, the ETT partners with clients to understand and integrate business

strategies and workforce needs with the goal of creating competitive advantage. This implies that the services offered by ETTs are not always the \traditional" staffing solution, in which short{term hires are provided to meet clients' needs for only relative short periods of time. Instead, the depth and breath of services is widened to \managed" staffing, which involves longer periods of time and allows the ETT to work with the client firm in order to create and manage an overall staffing plan, moving beyond the conventional supplier/client relationship: customized worforce strategies are then implemented, which help to institutionalize trust between purchasers and suppliers of temporary labor and to facilitate those employment market{based transactions because the difficulties in crossing organizational boundaries are reduced (Belous, 1989).

Institutional environment

Apart from changes in the dynamics of global competence, there also exists labor market regulation which may have constituted an incentive for the growth along time in the use of ETT workers.

For instance, there are reasons to suspect that it has become more expensive for U.S. employers to adjust the size of their regular workforce due to some changes in Labor Law which have made more difficult to lay off workers. An important development has been the passage of equal employment opportunity legislation that prohibits dismissal of employees because of their sex, race, color, creed or, most important in our context, age. Any employer who carries out a large{scale layoff runs a significant risk of being sued by former employees who believe that discrimination

was a factor in their being let go. The number of cases charging age discrimination in dismissal or layo® decisions rose particularly rapidly in the 80`s (Abraham, 1990). Even if the employer wins a case, legal fees and adverse e®ects on other employees' morale may be quite costly. Casual observation suggests that many employers have deemed it worthwhile to o®er expensive voluntary severance and early retirement programs rather than carry out layo®s; this must at least in part re°ect the increased costs associated with reducing the size of the workforce through layo®s.

Another development with similar consequences has been the erosion of the employment at will doctrine. Under U.S. common law, employers have had the right to ¯re any employee, for any reason, at any time. As already noted, this right has been restricted by legislation that prohibits the use of certain speci¯c criteria in ¯ring decisions, but a series of judicial decisions handed down beginning the 1970's began a potentially more fundamental attack on the at{will concept: in some cases, judges have gone so far as to hold that employers' assurances to employees concerning their jobs created an \implicit contract" that the employer was obligated to uphold (Abraham, 1990).

This hypothesis that labor market rigidities may lead to a more intensive use of temps is also consistent with evidence from Europe. In France, for instance, where strong restrictions to the dismissal of permanent workers have been established, the use of temporary work has increased (Blanchard et al., 1995; Grubb and Wells, 1993).

Labor supply

The use of ETT temps has also been facilitated by an increased supply of workers who presumably have less attachment to the labor force, more preference for convenience and °exibility in hours and location, and less interest in making careers within a single organization. In particular, this is the case of women with small children at home, whose labor force participation has substantially increased during the last years (Gannon, 1984; Mayall and Nelson, 1982; Shank, 1988; Shaw, 1983).

Another factor potentially facilitating labor hiring through ETTs concerns how people view work, its importance and role in their lives, and how they view their attachment to a speci¯c organization. For instance, there is evidence that employees are more willing to turn down transfers requested by their companies for personal reasons, there seems to be growing acceptance of the idea of changing employers at all organization levels, and growing respectability associated with working at ETTs, even among high status occupations. As ETT work has encompassed engineers, computer programmers, accounting professionals, etc., there is less social stigma attached to working for such organizations (Pfe®er and Baron, 1988).

E±ciency of ETTs' services

Finally, the growth in the demand of ETT services has also been attributed to the enhanced e±ciency of their intermediation services.

The growth of the ETT industry has helped to bring down its costs, through a series of scale e®ects. When in the past ETTs were not widely employed by client ¯rms, fewer workers probably thought to contact such ¯rms when they were seeking

employment, implying higher recruitment costs. Conversely, as the industry has expanded, many more workers are likely to have seen ETTs as potential employers, thus lowering the industry's recruitment costs; in addition, learning and specialization by ETTs has become possible as the ETT industry has become larger (Mangum et al., 1985; Polivka, 1996; Segal and Sullivan, 1997). And a larger ETT industry with more client ¯rms has also greater opportunities to spread recruiting costs over several job matches, thus reducing their costs per placement.

In addition, the use of ETTs has been facilitated by the fact that the activities of these employment \brokers" can be more easily monitored by client ¯rms: market{based organization of work and employment has become more feasible as brokerage relationships between labor suppliers and their customers have become institutionalized through ETTs. As client ¯rms gain experience with transacting across organizational boundaries, they acquire skills in contracting for work and for workers, as well as an expanded network of personal ties to ETTs, facilitating increased externalization and reduced risk of market failure in the future (Granovetter, 1985; Miles and Snow, 1986; Pfe®er and Baron, 1988).

1.3.3 ETTs and precariousness

It is necessary to underlie three negative attributes that have been ascribed to work through ETTs and might lead an observer to classify it as `bad' work.

First, a common criticism is that work through ETTs creates substantial risk or uncertainty among workers about employment and employment hours. For instance, some evidence indicates that employees with an ETT may not know whether they

will be placed on a job or how many hours of work will be available in any week (Blank, 1998; Golden and Appelbaum, 1992; Segal and Sullivan, 1997).

Second, it is often claimed that ETT work has low returns to human capital. There are three possible reasons about why ETT work pays less:

- ² employers invest less in ETT workers' training or in capital requirement to enhance ETT workers' productivity

- ² ETT workers are less career{oriented or less motivated, and

- ² ¯rms pay wages below their competitive level because they have greater market power over ETT workers.

However, evidence on this issue is fram from de¯nite; on the one hand, controlling for worker characteristics substantially reduces the estimated gap between temporary and permanent wage rates: the overall gap found by Segal and Sullivan (1997) fell by over one{third, from 21.8 percent to 13.8 percent, showing that a good deal of the temporary/permanent wage gap can be explained by standard worker characteristics known to be related to wages[8] . On the other hand, ambiguity over the returns to human capital investment of ETT temps has arisen: Cohen and Haberfeld (1993), using data from Israel, ¯nd that, compared to full{time non{ETT workers, there were lower returns to human capital investments for some occupations of ETT workers, but not in others (see below).

Third, some observers object to employment through ETTs because ETT work- ers often have no permanent association with the client ¯rm, so that the latter may

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[8] This gap was obtained by estimating with data from the 1983{93 Current Population Survey an ordinary least squares regression model for the log of the wage rate.

treat this labor as the residual factor of production, whose use changes as demand °uctuates. Such a situation may reduce the ability of workers to organize or exert in°uence on employer behavior, since employers have fewer ¯xed investments in these workers: it has been argued that ETT temps are less likely to be used in positions with high ¯rm{speci¯c knowledge (Abraham (1988)) or in ¯rms with more industry{speci¯c skills (Mangum et al., 1985). Nonetheless, the estimated frequency of transitions from temporary to permanent employment suggests that the size of any permanent `underclass' of temporary workers may be small: Segal and Sullivan (1997) calculate that 56.7 percent of ETT workers achieve a permanent job from one year to the following; they implement a matching of year{to{year data to obtain a longitudinal perspective of labor histories of ETT workers using records from the Current Population Survey; however, this ¯gure must be taken with caution due both to its interpretation and its calculation method[9]. Using a similar but, in this case, month{to{month matching, Bortnick and Harrison (1992) ¯nd jobseekers using private employment agencies | some private employment agencies in U.S. own ETTs (Mangum et al., 1985) | to have the highest likelihood of ¯nding employment among a range of other job search methods.

If ETT work did not su®er from any of those problems, it should not be characterized as problematic. However, even a job in which some of these three attributes were present is not automatically a bad job: workers who need no compensation to

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[9] First, for those individuals classi¯ed as temporarily occupied the year before and who declare to enjoy an open{ended contract the following year, there is no reason to suppose that they have necessarily been employed during the whole year. Second, the ability to match across years was lower in 1985 and 1986 because the 1985 survey tested new population weights and area identi¯ers. Moreover, approximately 25 percent of the records could not be matched across years.

move from a temporary to a permanent job are disadvantaged by ETT work. But other workers require compensation to leave a contingent job (Blank, 1998). More precisely, if the compensation a worker requires to be as well{o® in permanent work as in similar ETT work is greater than the compensation di®erential between these jobs, then she is better{o® in ETT work. These are workers who want to work only limited number of hours each week, or who enjoy the °exibility and independence of temporary work. Thus, even when ETT jobs provide less wages or job security, some workers still ¯nd these jobs preferable to higher wages and more job security because of the other bene¯ts these jobs o®er[10] .

For instance, Albert and Garc¶ªa (1993) ¯nd in a study done for Great Britain that between forty and sixty percent of jobs managed through ETTs correspond to high{quali¯ed jobs (e.g., engineers, computer programmers,...). Moreover | and this results even more signi¯cant| a relevant group of those workers address to those intermediaries due to their own preferences, and they would not be willing to accept a permanent job even though they were o®ered the possibility to do so. Those authors cite a study on two groups of auditors in London, the ¯rst of them working in the largest ¯rms of the sector, and the second one employed through ETTs; they show that professionals in this latter group, when compared to their colleagues of the large ¯rms, prefer to work in an ETT due precisely to the possibility of being able to control the time dedicated to their job.

Cohen and Haberfeld (1993) ¯nd that for ETT temps in Israel there is no evi-

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[10]In any case, this argument on wage di®erentials seems to be better applicable to the U.S. than to Europe. The underlying reason is the wide spread of collective bargaining in Europe, due to which no compensating wage di®erentials are much more relevant than in U.S.

dence to suggest that they constitute a homogeneous group of \secondary" workers. They analyze the situation from 1983 to 1985 of a group of Israeli workers in four occupations | typists, book{keepers, clerks and key{punch operators| a part of whom were enjoying permanent contracts and the other being contracted through one of the largest ETTs in Israel at that time. If we take into account that some of those temporary workers (in particular, clerks and key{punch operators), \given their demographic characteristics and education could have found full{time, year{around employment" (pp. 286), why, then, do they work temporarily through an ETT? The authors consider that those workers are willing to work through intermediaries in order no to be attached to the labor force or to a speci¯c job for a long time, and that they may be using ETT employment as a relatively cheap method in their search for a permanent position while obtaining on{the{job training. Although further data were not available in order to resolve this issue, they conclude that \rather than blocking careers and mobility of employees, ETT employment may help some workers to gain access to permanent employment in the primary labor market" (pp. 287).

Hunter et al. (1993) provide some evidence that °exible manning policies are not due solely to a change in strategy by employers towards the search of \°exibil- ity". Rather, they conclude that the observed increase in atypical employees is best described by `traditional' reasons. Importantly, they brie°y report (pp. 394) that employers feel that \in some professional occupations where there was skill shortages, workers who might previously have worked as direct employees had become self{ employed or worked through agencies in order to take full market advantage of their scarce skills and to command higher incomes. This was deplored by management,

who had to cope with a degree of unreliability on the part of such workers who had no compunction about changing their allegiance in mid{contract if better opportunities arose elsewhere".

In contrast to what traditional labor market theories tend to consider | basically, that the increase in employees working through atypical employment arrangements results from a strategic change in policy business organizations to increase °exibility | this evidence is suggesting that atypical employment could reasonably provide workers with a means of achieving their objectives. The ability of labor demand in order to associate ETTs with the concept of labor precariousness seems insu±cient at this point: the importance of the preferences of labor supply must also be taken into account.

1.4 Conclusions and research questions

This chapter has o®ered a review of the most relevant economic literature studing the potential advantages of ETT{intermediated work for the demand and supply{sides of the labor market, the di®erent factors underlying the growth along time of the ETT sector in the last years, and the debate on the potential precariousness usually associated to this particular form of atypical employment.

It should be clear from this chapter that there are a subtantial number of research questions to which currently we have no answers and little data to explore them. To conduct this research, we need more extensive employer and worker data on the use of ETT labor contracts. In this context, the present thesis is principally concerned with providing evidence on dynamic labor market patterns of ETT{intermediated work,

on which virtually no work has so far been done.

First, there exists no de¯nite evidence in favor of or against the di®erent explanations o®ered on the growth along time in the resort to ETTs. The claim that regulatory rigidities and changing competitive structures in the labor market are driving the rise in ETT work can perhaps be tested through cross{national comparisons. Di®erent countries impose di®erent costs on employers who hire ETT workers. Different countries also have di®erent sectorial shifts in demand. These cross{national di®erences can provide the background data for more complete research on the determinants of the use of ETT work.

Second, it is far from certain that any job that is not permanently attached to a ¯rm must create economic uncertainty for the worker that ¯lls it. We have no information on the extent to which ETT workers face economic uncertainty because of the non{permanent nature of their job contracts. The heterogeneity among these workers would sugest that some individuals regularly earn as much as they desire, while others face economic di±culties. Longitudinal data tracking employment, earnings, and overall household income | with a large enough sample of non{permanent workers to look at their economic and family characteristics| would provide much better information on the e®ect of ETT jobs on people's economic well{being.

Third, it is unknown to what extent are the lower wages of many ETT jobs o®set by the advantages of these jobs. Data on a broader range of job characteristics and on workers' evaluations of those characteristics would be useful. This information would allow researchers to look more deeply at the \compensating di®erentials" issues involved.

By last, one of the key issues on ETT work is the question of whether those jobs form a discrete segment of the labor market. If people work through nonstandard ETT contracts at times when they have high demands on their time outside the workplace, this may not be a problem if they are able to move easily back into standard labor market contracts and into jobs with higher human capital returns. On the other hand, if workers who move into contingent jobs become stuck in them, then we would view those jobs with much more concern.

1.5   Appendix A. Tables

Table 1

Temporary contracts managed by ETTs in Spain

Year	Temporary Contracts (1)	Temporary Contracts managed by ETTs (2)	Proportion (2)/(1)
1995	5.519.350	361.633	0.06
1996	8.273.175	748.601	0.09
1997	9.386.084	1.258.635	0.13
1998	10.692.315	1.704.834	0.16

Source: Spanish ministry of Labor

1.6 Appendix B. Figures

Figure 1
The trilateral relationship characteristic of labor contracting
through ETTs

ETT

Assignment   Labor

contract   contract

CLIENT FIRM   **WORKER**

Cession
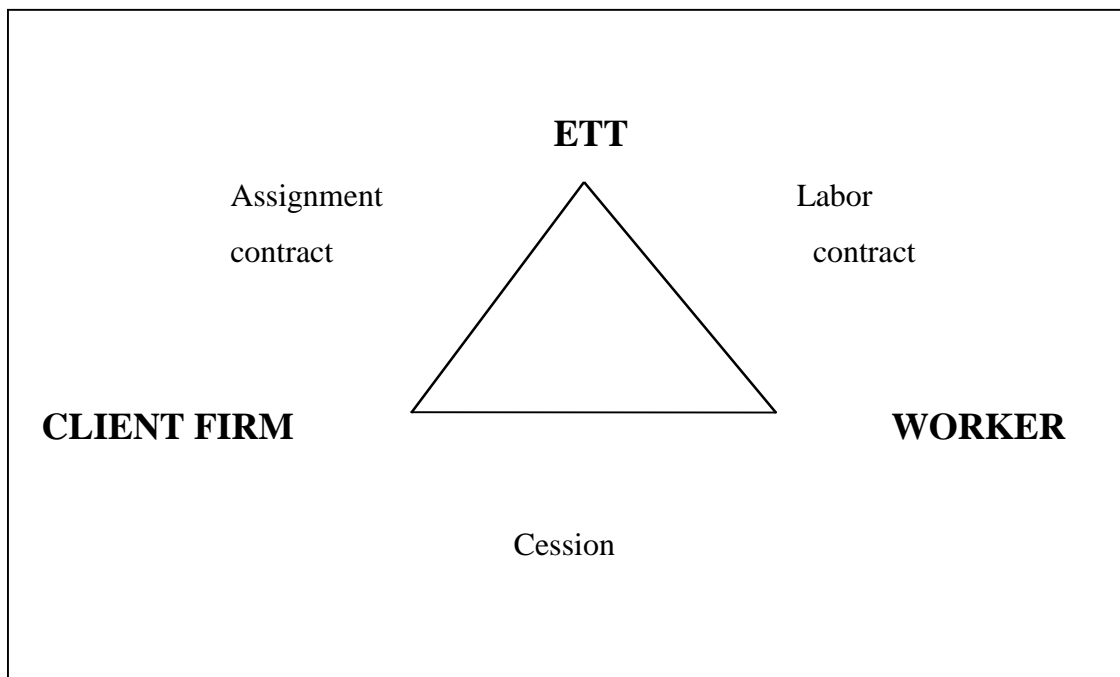
Chapter 2

Human capital accumulation

2.1 Introduction

Graduation from some level of schooling seldom implies the completion of a training process: instead, it is usually the beginning of an often prolonged process of acquiring occupational skills. Indeed, there exists evidence suggesting that a large fraction of directly marketable skills possessed by individuals are not acquired from formal schooling, but rather from work experience (Mincer, 1971); this means that, after some point, learning and work are complementary, and investment in human capital is more e±ciently accomplished in conjunction with work experience[1] .

Nonetheless, in order to acquire training, it is necessary to have expectations of future employment. In this context, this chapter focuses on the e®ects of the prospect of becoming unemployed on the optimal amount of investment in human capital. In a context where the risk of future unemployment makes investment in human capital subject to uncertain returns, our main prediction lies on the fact that a reduction in expected unemployment probability raises the optimal level of human

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[1] The role of the labor market in the transmission and acquisition of skills and knowledge was modelled by Rosen (1972).

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capital accumulation.

First, the result is obtained by resorting to a simple two–period consumption model of human capital accumulation developed in section 2.2. Then, a more general T–period model which allows to explain phenomena related to sequential accumulation of human capital is introduced in section 2.3.

The idea about the inherent risk to which investment in human capital is subject has been widely recognized in the literature[2] . Indeed, it is clear that people are usually deciding at the beginning of their work lives which skills to acquire and face considerable uncertainty about their future earnings stream; that is, most decisions on human capital acquisition are taken under uncertainty with respect to the future job opportunities and the returns on the investment.

The theoretical framework developed in this chapter is closely related to the ones utilized by Levhari and Weiss (1974) and Ben–Porath (1967) in their seminal papers on investment in human capital. On the one hand, Ben–Porath (1967) presented a formal model of optimal human capital accumulation and showed that the optimal investment sequence implied an optimal pro¯le for earnings. On the other hand, Levhari and Weiss (1974) extended the human capital model to include an uncertain future wage and an alternative, riskless ¯nancial asset in which workers might invest. They assume human capital to be more risky than physical capital (to diversify her human capital, the individual must acquire \general" education); as a conclusion, investment in human capital is too low relative to investment in physical capital when the riskiness of future income is increasing with the level of accumulated human

[2] See Becker, 1962, and Schultz, 1971.

capital.

The purpose of this chapter is to formulate a life{time income maximizing model to determine the optimal path of investment in human capital by taking into account that individuals consider future (un)employment prospects in their decision on investment. This will allow us to establish a theoretical result to be tested empirically in Chapter 4: when unknown employment prospects are the source of earnings uncertainty, there is some intuitive appeal in the idea that intermediation in the labor contract may reduce the riskiness associated with investments in human capital and, in turn, might induce increases in the level of human capital chosen. This intuition is con⁻rmed in sections 2.2.2 and 2.3.2 below. Indeed, although no empirical work is accomplished in this chapter, speci⁻cally, informal evidence ⁻nds ETTs to reduce the expected unemployment probability of their workers | or, at least, of their \best" workers| by linking their temporary assignments along time so that | by insuring the investment in market skills| the riskiness of human capital investments may be reduced and the optimal level of human capital accumulation can be increased.

The chapter is structured as follows. Section 2.2 presents a two{period model of human capital accumulation. Section 2.3 generalizes this two{period model to a T{ period model of sequential human capital accumulation. Finally, section 2.4 presents the main conclusions.

2.2   Two{period model

This section presents a two{period consumption model of endogenous general human capital accumulation. Within the model, the e®ect of unemployment uncertainty on

the level of investment in human capital is underlined.

2.2.1 Human capital production

The individual is assumed to be employed only for two periods. As we will see, this two{period framework will serve to clarify the sequence of events developed in the T{period model of next section. In the ¯rst period, the individual is already employed, so that investment in human capital is accomplished at the cost of foregoing a known exogenous wage (w_1).

There is only one kind of human capital (general) that is assumed to be fully and costlessly transferable across ¯rms; therefore, if a job change occurs between periods, there will be no loss in the expected return from human capital accumulation exerted during the ¯rst period. As in traditional human capital theory, it is assumed that each individual increases her future earning capacity by investment in herself and that she chooses a time pro¯le of her investment that maximizes her expected utility from consumption.

In the second period, there are two possible states of the world which make un-certain the earning capacity from a given level of human capital:

² With probability ¼ (¼ 2 [0; 1]), the individual becomes unemployed after period 1[3] . In this case, she receives unemployment bene¯ts b.

² With probability (1 ¡ ¼), the individual will continue being employed in the second period. In this case, she receives a non{stochastic wage, w_2, which

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[3] For the sake of simplicity, the shocks that bring about a realization of ¼ are assumed to be exogenous to the level of human capital accumulation in the ¯rst period.

depends on the level K of human capital acquired during period 1 (assume unemployment benefits to be lower than labor income; i.e., $b < w_2(K)$; for every K). The fraction $K \in [0; 1]$ represents the portion of the first period devoted to human capital accumulation; that is, the investment in human capital is considered to be time{consuming. The fraction of the first period spent at work is, therefore, $1 - K$.

Finally, we assume that any saving or borrowing is done at a known interest rate, r. And we expect the earnings{investment relation to have a positive sign: $\frac{@w_2}{@K} > 0$.

The reason why human capital decision is not trivial lies in that it involves a trade{off: human capital accumulation increases the value of time devoted to work during the second period via a higher wage, but the investment process takes time, which might otherwise have been allocated to work during the first period (the opportunity cost is the foregone first{period wage which leads to reduced first{period savings). This trade{off is considered by the individual when allocating first{period time between earning and producing human capital.

Utility $U(c_1; c_2)$ is assumed to be an increasing, monotone and concave function of consumption, and additive with respect to time:

$$E\{U(c_1; c_2)\} = u(c_1) + (1 + \pm)^{-1}E\{u(c_2)\} \tag{2.1}$$

where $\pm$ is a fixed subjective discount rate for future utility. The choice variables, first{period consumption (c_1) and the fraction (K) of the first period devoted to human capital accumulation, are decided in the first period, while consumption in

period 2 in case of employment (c_2^E) and in case of unemployment (c_2^U) are decided upon after the income of period 2 is observed (given that utility depends only on present and future consumption, investment in human capital in the last period is identically zero).

The agent's problem is to maximize the expected value of utility from consumption, or:

$$\max_{c_1;K;c_2^E;c_2^U} Z = u(c_1) + (1+\rho)^{-1}\left[\pi u(c_2^U) + (1-\pi)\,u(c_2^E)\right] \tag{2.2}$$

subject to the budget constraints:

$$c_1 + \frac{c_2^U}{1+r} = (1-K)w_1 + \frac{b}{1+r} \tag{2.3}$$

$$c_1 + \frac{c_2^E}{1+r} = (1-K)w_1 + \frac{w_2(K)}{1+r} \tag{2.4}$$

Therefore, the maximization problem reduces to the following:

$$\max_{c_1;K} \quad Z = u(c_1) + (1+\rho)^{-1}\pi u\left[(1+r)((1-K)w_1 - c_1) + b\right] +$$
$$+ (1-\pi)(1+\rho)^{-1}u\left[(1+r)((1-K)w_1 - c_1) + w_2(K)\right] \tag{2.5}$$

First–order conditions are:

$$\frac{\partial Z}{\partial c_1} = \frac{\partial u(c_1)}{\partial c} - (1+\rho)^{-1}(1+r)\left[\pi\frac{\partial u(c_2^U)}{\partial c} + (1-\pi)\frac{\partial u(c_2^E)}{\partial c}\right] = 0 \tag{2.6}$$

$$\frac{\partial Z}{\partial K} = \pi(1+\rho)^{-1}\frac{\partial u(c_2^U)}{\partial c}\left[(-w_1)(1+r)\right] + (1-\pi)(1+\rho)^{-1}\frac{\partial u(c_2^E)}{\partial c}$$
$$\left[(-w_1)(1+r) + \frac{\partial w_2}{\partial K}\right] = 0 \tag{2.7}$$

Equation (2.6) is a condition of intertemporal optimization: it states that — at the optimum— no gain can be achieved by transferring consumption from period to period; this equation reduces to the requirement that the ratio between marginal utility from first{period consumption and expected marginal utility from second{period consumption equal the discount rate. Note that (2.6) can be rewritten as:

$$\frac{\partial u(c_1)/\partial c}{(1+r)E(\partial u/\partial c)} = \frac{1}{1+\delta} \tag{2.8}$$

where

$$E\left(\frac{\partial u}{\partial c}\right) = \pi \frac{\partial u(c_2^U)}{\partial c} + (1-\pi)\frac{\partial u(c_2^E)}{\partial c} \tag{2.9}$$

Equation (2.7) is a condition of portfolio optimization: it states that — at the optimum— no gain can be achieved by dedicating a small fraction of first{period to investment in the risky asset (i.e., human capital) rather than to work in order to marginally increase savings or \physical" capital (i.e., the safe asset). It can be rewritten as:

$$(1-\pi)\frac{\partial u(c_2^E)}{\partial c}\frac{\partial w_2}{\partial K} = w_1(1+r)E\left(\frac{\partial u}{\partial c}\right) \tag{2.10}$$

where the left and the right hand sides are, respectively, the marginal benefit (expected increase in second{period consumption) and the marginal loss in expected utility terms (reduction in second{period consumption due to reduced first{period savings) from investment in human capital. From (2.10), note that, at the optimum, risk aversion is enough to assure that the expected marginal rate of return from the risky asset is above the rate of return of physical capital: $\frac{(1-\pi)\partial w_2/\partial K}{w_1} > 1 + r$.

Conditions (2.8) and (2.10) determine the optimal values of present consumption and investment in human capital which we denote by c_1^{π} and K^{π}, respectively[4] ; future consumption levels c_2^U and c_2^E depend on $w_2(K)$, and on the choice of c_1 and K (according to restrictions (2.3) and (2.4)).

2.2.2 Investment behavior

In this section we study which are the e®ects of uncertainty on human capital decisions, and analyze some comparative static results of investment in human capital.

Given that human capital decisions are subject to substantial uncertainty due to the randomness in the returns to human capital investment, it is natural to ask how this decision is a®ected in the hypothetical case of certainty. We consider certainty to be the case where the individual is insured in such a way that her earnings for each level of human capital are independent of the state of the world that will be obtained (e.g., when insurance is such that for each level of investment in human capital the worker is assured of the expected value income associated with that level)[5] .

> **Proposition 1** The existence of insurance against the risk associated with investment in human capital raises the level of optimal investment, K^{π}.

Since the risk associated with investment in human capital is neither insurable nor diversi¯able, an increase in risk from zero to a positive level reduces the level of investment for a maximizing individual. That is why we now focus on the response of human capital investment to the earnings uncertainty which intermediation of ETTs

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[4] Our assumptions on utility function $U(c_1; c_2)$ ensure that Z is concave in K and c_1; therefore, conditions (2.8) and (2.10) are su±cient for maximum and their solution must be unique.
[5] This hypothetical case of certainty is only introduced for expositional reasons: it is unlikely that a market for such an insurance may be established, due to moral hazard considerations.

are intuitively considered to in°uence: the probability distribution of the returns to human capital.

Proposition 2 The optimal level of human capital investment, K^π, nonincreases with the unemployment probability ¼.

A lower unemployment probability raises the expected return from human capital investment (while foregone earnings from investment remain the same), implying that human capital stocks should be higher. In addition, when ¯rst{period consumption is also allowed to adjust to changes in unemployment probability[6] , lower prospective unemployment will increase expected earnings and induce more current consumption: the reason is that savings are reduced because they are not so necessary to protect oneself against low levels of future consumption (part of savings is precautionary: they act as a bu®er to provide a guarantee that future consumption will not fall below some minimum level). But if ¯rst{period consumption increases, expected second{period income falls. Although unemployment probability is lower, it is faced at lower second{period consumption levels, and risk aversion may imply that this reduction in expected income makes the worker less willing to bear risk. Proposition 2 establishes that the net result of a reduction in ¼ is a non{decrease in human capital investment. Indeed, it can be proved that if the unemployment probability were too high, it could be the case that the worker did not invest in human capital, and decided instead to increase savings by dedicating the entire ¯rst period to work

Therefore, maximizing workers consider future unemployment prospects in their decision of investment in human capital. This fact is relevant given the uninsurability

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[6] In the proof in the appendix, we ¯rst consider ¯rst period consumption c_1 to be ¯xed, in order to focus only on the human capital decision and avoid its interaction with the consumption decision.

of most investments in human capital.

2.3   T{period model

This section generalizes previous two{period model to a T{period model of human capital accumulation. We focus on providing predictions on an individual decision{making related to sequential human capital accumulation, which a two{period framework is less suited to explain.

In this more general model, the individual's decision{making is divided in two stages, out of which we focus on the ¯rst one. First, the individual allocates the given periods of time between earning and producing human capital, and ¯nds the corresponding outlays on investment that maximize the discounted value of any time t of earnings from t to T, where T is assumed with certainty to be the individual's time of retirement. Second, given the optimal time path of earnings, the individual decides on the timing of the consumption.

This T{period framework allows to explain phenomena related to sequential accumulation of human capital that are consistent with predictions given by human capital theory. In particular, it is shown that the rate of investment in each period declines with the expected probability of becoming unemployed in the future.

2.3.1   Human capital production

Our intertemporal optimization problem begins by considering than an individual lives for T successive discrete periods of time t = 1; 2; :::T, where at t = T she retires. At t = 1 | where the time span of our optimization problem begins| the individual

is assumed to be employed. As in previous section, $\frac{1}{4}_t$ denotes the probability that the individual becomes (continues) unemployed at the beginning of period t, given that she is (un)employed at the end of t ¡ 1.

We assume that the individual is endowed with a given stock of capital K_t at the beginning of period t, and that she can dedicate a fraction s_t of the available stock of human capital to the production of human capital. Since we also assume that there is no joint production of earnings and of human capital, then s_t is also the proportion of the period t devoted to the production of human capital. The fraction s_t is constrained by the condition $0 \cdot s_t \cdot 1$.

The °ow of investment in human capital produced at any period is our choice variable I_t for $t = 1; 2; ::::; T$, which we consider a function of the product of s_t and K_t in the following way:

$$I_t = F(s_t K_t) \tag{2.11}$$

where $F^0 > 0; F^{00} < 0$. That is, $s_t K_t$, the amount of capital services that the individual concentrates on learning a®ects the individual's °ow of human capital produced (I_t) at a declining rate. Equation (2.11) is our production function of human capital re°ecting that an individual's rate of capital accumulation positively depends on the amount of capital services, $s_t K_t$, that she concentrates on learning.

The rate of change of the capital stock is given by equation (2.12):

$$K_{t+1} = I_t + K_t \tag{2.12}$$

where, in order to focus on ¯nding an optimal investment path over time, we do not consider depreciation of human capital.

Let w^i denote the wage price or the rental price per unit of capital services delivered by the worker. The superscript $i = E(= U)$ indicates that she is employed (unemployed); w^i is assumed to be constant. In case of unemployment, the individual is assumed to receive a fraction ½ $(0 < ½ < 1)$ of the wage price w^E paid as unemployment insurance bene¯t ($w^U = ½w^E$).

Earning capacity at time t, Y_t^i, is the maximum services of human capital the individual can o®er in the market valued by its wage price:

$$Y_t^i = w^i K_t \tag{2.13}$$

Therefore, her disposable earnings during the period t (y_t^i) | i.e., the portion of current earnings disposable for consumption or the purchase of non{human assets| may be smaller than earning capacity if the individual engages in production of human capital. Disposable earnings will be given by (2.14):

$$y_t^i = w^i \left[(1 ¡ s_t) K_t\right] \qquad i = E ; U \tag{2.14}$$

From (2.14) investment costs consist of foregone{earnings in the case of employment periods (i.e., the value of the production services withdrawn from the market), or of direct costs of learning in case of unemployment[7].

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[7] When unemployed, the individual may also invest in human capital given that it is likely that she becomes employed in next period with probability $(1 ¡ ¼_{t+1})$. Whether she will invest or not while unemployed hinges on a marginal bene¯t{cost comparison from acquiring a unit of human capital. In case of investment, disposable earnings equal the di®erence between unemployment insurance bene¯ts ($w^U K_t$) and costs of learning ($w^U s_t K_t$), where s_t indicates the fraction of the

Note that equation (2.14) along with (2.11) incorporate the neutrality assumption often used in the literature. This hypothesis states that as the individual accumulates human capital and the price of her time rises, investment costs do not increase because she also becomes more productive in acquiring human capital: by having $s_t K_t$ as the input in the production function of human capital, when K is higher the higher costs of an hour diverted away from earnings are matched by the greater productivity of time in the production of human capital. This allows us to gain analytical simplicity because the optimal investments in a given period are not affected by investments in earlier periods[8] .

Hence, we can take the inverse function $s_t K_t = F^{-1}(I_t) = f(I_t)$ into (2.14):

$$y_t^i = w^i [K_t - f(I_t)] \tag{2.15}$$

where $f' > 0; f'' > 0$ due to $F' > 0, F'' < 0$.

2.3.2   Investment behavior

It is assumed that the individual determines his human capital investments I_t in order to maximize the present value of disposable earnings:

$$\max_{I_t} \quad \sum_{t=1}^{T} y_t^i (1+r)^{-t} \qquad i = U, E; t = 1, ..., T \tag{2.16}$$

$$s.t: \quad y_t^i = w^i [K_t - f(I_t)] \tag{2.17}$$

$$K_{t+1} = I_t + K_t \tag{2.18}$$

unemployment period dedicated to learning, $s_t K_t$ is the quantity of human capital allocated for the production of human capital, and $w^U s_t$ can be interpreted as the price of direct \purchase of learning" (assumed to be proportional to the length of time devoted to learning).
[8] See Ben{Porath (1967).

where r is the constant rate of interest at which the assumed risk neutral worker is able to borrow. Therefore, the spread of future income does not matter for her investment decisions, only the expected present value of the incomes.

There are several possible income paths that can be realized for a certain individual depending on whether she gets unemployed or not and the time when that happens (if it happens). For instance, a worker can become unemployed at earliest at the beginning of period 2, implying that she can receive two possible di®erent income streams from that period on depending on whether she is again employed at the beginning of period 3 or, on the contrary, remains still unemployed.

The problem for the individual at any moment of time t can be summarized as follows. Let V_t^i denote the expected present value at t of all income streams that are possible for her (i = E; U). This worker will receive a disposable income y_t during period t, and at the beginning of period t + 1 she will receive either the present value V_{t+1}^U times the probability $\frac{1}{4}_{t+1}$ or the present value V_{t+1}^E times the probability $(1_{\,¡\,} \frac{1}{4}_{t+1})$:

$$V_t^i = \frac{1}{4}_{t+1} \, V_{t+1}^U + (1_{\,¡\,} \frac{1}{4}_{t+1})V_{t+1}^E \tag{2.19}$$

Maximization of (2.19) subject to (2.17) and (2.18) gives the optimality conditions:

$$w^i \frac{@f}{@l_t} = (1 + r)^{i\,1} \left[\frac{1}{4}_{t+1} \frac{@V_{t+1}^U}{@l_t} + (1_{\,¡\,} \frac{1}{4}_{t+1})\frac{@V_{t+1}^E}{@l_t}\right]^{\#} \tag{2.20}$$

Given that the initial stock of human capital is predetermined at the start of the career of the individual, condition (2.20) will determine her investments for all

possible states from period 1 until retirement.

From (2.20) it is clear that the investment rate decreases as the worker becomes older, that is, as the remaining number of employment periods become shorter. Similarly, her investments in all periods, except the last one, are positively influenced by a decreased discount rate.

Proposition 3 The optimal rates of investments I_t^π increase with lower r or higher T $(t = 1, ..., T - 1)$.

Finally, it can also be proved that investments in human capital reduce with the probability of being unemployed. As in section 2.2, maximizing workers consider future unemployment prospects in their decision of investment in human capital at the current period.

Proposition 4 The optimal rates of investment I_t^π in each period t reduce with the unemployment probabilities μ_{t+1} $(t = 1, ..., T - 1)$.

2.4   Conclusion

Following the standard human capital approach we have established that workers consider future (un)employment prospects in their decision of human capital accumulation. In particular, a reduction in future unemployment probability can raise actual human capital investment.

This result can be applied to the intermediation role developed by ETTs: when those agencies link assignments along time for their employees, the optimal level of human capital accumulation should increase. This way, temporary work may give opportunities to begin and maintain the process of practical human capital develop-

ment. The application of this hypothesis to the Spanish case is empirically explored in Chapter 4.

2.5 Appendix. Proofs of propositions

2.5.1 Proof of Proposition 1

The future earnings function of the insured individual is: $y_2(K; \frac{1}{4}) = E(y_2) = \frac{1}{4}b + (1 - \frac{1}{4})w_2(K)$. Given $E(y_2)$, the worker will invest in K to maximize utility from consumption given by:

$$u(c_1) + (1 + \pm)^{-1}u(c_2) = u(c_1) + (1 + \pm)^{-1}u[((1 - K)w_1 - c_1)(1 + r) + E(y_2)]$$

up to the point where:

$$(1 + \pm)^{-1}\frac{@u(c_2)}{@c}\left[- w_1(1 + r) + (1 - \frac{1}{4})\frac{@w_2}{@K} \right] = 0$$

which can be rewritten as :

$$\left(\frac{@w_2}{@K} \right)_{In} = \frac{w_1(1 + r)}{1 - \frac{1}{4}}$$

First{order condition for K for an uninsured individual can be rewritten as:

$$\left(\frac{@w_2}{@K} \right)_{Un} = \frac{w_1(1 + r)}{1 - \frac{1}{4}}\frac{\frac{1}{4}\frac{@u(c_2^U)}{@c} + (1 - \frac{1}{4})\frac{@u(c_2^E)}{@c}}{@u(c_2^E) = @c}$$

Since $c_2^U < c_2^E$, then $(@w_2 = @K)_{In} < (@w_2 = @K)_{Un}$. ∎

2.5.2 Proof of Proposition 2

Let's consider ¯rst the single{choice{variable problem of choosing a human capital stock when c_1 is ¯xed. A decrease in $\frac{1}{4}$ will lead to an increase in human capital accumulation if ¯rst{order condition with respect to K is concave in $\frac{1}{4}$. Since:

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$$\frac{\partial^2 Z}{\partial K \partial \tau} = (1 + \rho)^{-1} \left[\frac{\partial u(c_2^U)}{\partial c} \left[- w_1(1 + r)\right] - \frac{\partial u(c_2^E)}{\partial c} - w_1(1 + r) + \frac{\partial w_2}{\partial K} \right]^{\#\#} < 0$$

a reduction in τ increases $K^{\ast}$ for the case of c_1 fixed.

Let's now relax the assumption that c_1 is exogenous. Given that, in order for second{order conditions for the maximization problem to hold, the hessian matrix must be a negative semi{de¯nite matrix with negative determinant, we have that:

$$\text{sign}\left(\frac{\partial K^{\ast}}{\partial \tau}\right) = - \text{sign}\left|\begin{array}{cc} \frac{\partial^2 Z}{\partial c_1^2} & \frac{\partial^2 Z}{\partial c_1 \partial \tau} \\ \frac{\partial^2 Z}{\partial K \partial c_1} & \frac{\partial^2 Z}{\partial K \partial \tau} \end{array}\right|$$

Then,

$$\frac{\partial^2 Z}{\partial c_1^2} = \frac{\partial^2 u(c_1)}{\partial c^2} - (1 + \rho)^{-1}(1 + r) \left[\tau \frac{\partial^2 u(c_2^U)}{\partial c^2}\frac{\partial c_2^U}{\partial c_1} + \frac{\partial^2 u(c_2^E)}{\partial c^2}\frac{\partial c_2^E}{\partial c_1}\right] =$$

$$= \frac{\partial^2 u(c_1)}{\partial c^2} + (1 + \rho)^{-1}(1 + r)^2 \left[\tau \frac{\partial^2 u(c_2^U)}{\partial c^2} + (1 - \tau)\frac{\partial^2 u(c_2^E)}{\partial c^2}\right] < 0$$

given assumption about concavity of utility function $u(.)$.

$$\frac{\partial^2 Z}{\partial c_1 \partial \tau} = - (1 + \rho)^{-1}\frac{\partial u(c_2^U)}{\partial c}(1 + r) + (1 + \rho)^{-1}\frac{\partial u(c_2^E)}{\partial c}(1 + r)$$

From assumption (in page 39) that $b < w_2(K)$, we have that $c_2^U < c_2^E$. Then, from concavity of utility function $u(.)$, we have that $\frac{\partial^2 Z}{\partial c_1 \partial \tau} < 0$.

$$\frac{\partial^2 Z}{\partial K \partial \tau} = (1 + \rho)^{-1} \left[\frac{\partial u(c_2^U)}{\partial c}\left[- w_1(1 + r)\right] - \left[\frac{\partial u(c_2^E)}{\partial c} - w_1(1 + r) + \frac{\partial w_2}{\partial K}\right]\right]$$

The sign of $\frac{@^2 Z}{@K @\frac{1}{4}}$ depends on the sign of $_i w_1 (1 + r) + \frac{@w_2}{@K}^3$. But from F.O.C.

(2.7) we should have that $\frac{@w_2}{@K} > w_1 (1 + r)$; hence, $\frac{@^2 Z}{@K @\frac{1}{4}} < 0$.

Finally, in order to obtain the sign of $\frac{@^2 Z}{@K @c_1}$, note that ¯rst{order condition (2.7)

can be rewritten using ¯rst{order condition (2.6) as:

$$\frac{@Z}{@K} = _i w_1 \frac{@u(c_1)}{@c} + \frac{@w_2}{@K} (1 _i \frac{1}{4})(1 + \pm)^{i\ 1} \frac{@u(c_2^E)}{@c} = 0$$

Then,

$$\frac{@^2 Z}{@K @c_1} = _i w_1 \frac{@^2 u(c_1)}{@c^2} + \frac{@w_2}{@K} (1 _i \frac{1}{4})(1 + \pm)^{i\ 1} \frac{@^2 u(c_2^E)}{@c^2} [_i\ (1 + r)] > 0;$$

given assumption about decreasing returns, and concavity of utility function $u(:)$.

Hence, this would lead us to establish that $\frac{@K^\alpha}{@\frac{1}{4}} < 0$. However, note that this

sign has been obtained under the assumption that ¯rst{order condition (2.7) holds.

If w_1 is big enough, then $K^\alpha = 0$ (a corner solution would be obtained even when

$\frac{1}{4} _i !\ 0$). Therefore, ¯nally, $\frac{@K^\alpha}{@\frac{1}{4}} \cdot 0$:

Additionally, it can be proved that there exists a $\frac{1}{4}^0$ such that if $\frac{1}{4} _, \frac{1}{4}^0$, then

$K^\alpha = 0$: evaluating ¯rst{order condition. (2.7) for $K = 0$, we have:

$$\frac{@Z}{@K} [K = 0] = (1 + \pm)^{i\ 1} \left[_i w_1 (1 + r) E \left(\frac{@u}{@c} \right) + (1 _i \frac{1}{4}) \frac{@u(c_2^E)}{@c} \frac{@w_2(0)}{@K} \right]^{\#}$$

If $\frac{1}{4} < 1$; then $\frac{@Z}{@K} [K = 0] > 0$ only for $\frac{1}{4}$ small enough; $\frac{1}{4}^0$ is such that $\frac{@Z}{@K} [K = 0] = $

0: $\frac{1}{4}^0 = 1 _i \left[\frac{w_1(1+r)\ E(@u=@c)}{(@u(c_2^E)=@c)(@w_2(0)=@K)} \right]^3 . \blacksquare$

2.5.3   Proof of Proposition 3

Given that the maximization problem consists of maximizing the worker's expected

present value at t of future disposable earnings, and from (2.12) and (2.14), we have

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that the worker will maximize the present value function::

$$V_t^i = w^i(K_t _i f(I_t)) +$$

$$+ \sum_{l=t+1}^{\overline{T}} (1 + r)^{i (l_i t)} \left[\frac{1}{4}_l w^U + (1_i \frac{1}{4}_l) w^E \right]$$

$$\times \left[K_t + \sum_{j=t}^{l_i 1} I_j _i f(I_l) \right] \tag{2.21}$$

where K_t is given.

First{order condition with respect to I_t gives the conditions:

$$w^i \frac{@f}{@I_t} = \sum_{l=t+1}^{\overline{T}} (1 + r)^{i (l_i t)} \left[\frac{1}{4}_l w^U + (1_i \frac{1}{4}_l) w^E \right] \tag{2.22}$$

$$t = 1; ::::; T_i 1; \quad i = U; E$$

Since the left hand side of (2.22) is the marginal cost of acquiring an additional unit of K, and the right hand side is the present value of the earnings stream generated by an additional unit of K, this equation is the usual requirement that marginal cost equal marginal return. For given t, the marginal return is constant. The time path of investments is then determined by the horizontal marginal return function sliding downward and intersecting the marginal cost function at lower investment levels (see Fig. 1).

From (2.22) it follows that a decrease in r or an increase in T will increase marginal return, so that every I_t will increase due to the assumption that $\frac{@^2 f}{@I_t^2} > 0.$ ∎

Figure 1

Determination of optimal investments
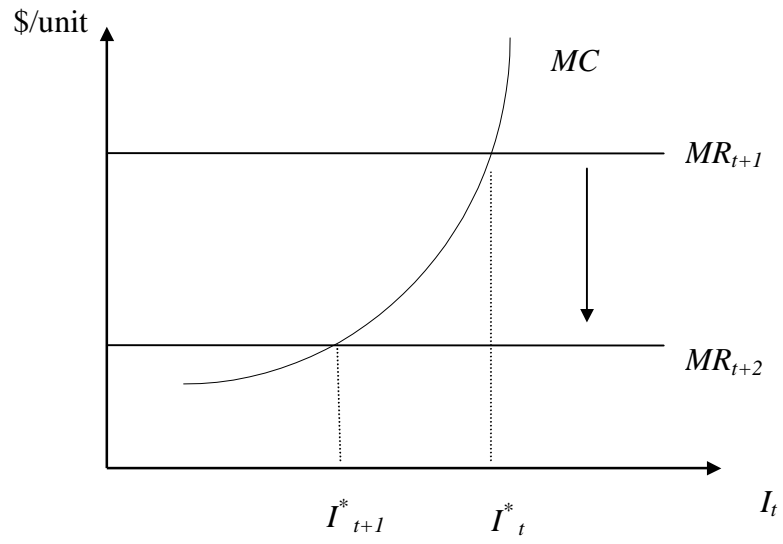
2.5.4   Proof of Proposition 4

From previous proof, an increase in $\frac{1}{4}_l$ for any $l = t + 1; ::::; T$ will reduce the marginal

return (because, by assumption, $w^U < w^E$), so that every l_t will reduce due to the

assumption that $\frac{@^2 f}{@ l_t^2} > 0.$ ∎

Chapter 3

Screening

3.1 Introduction

This chapter provides a rationale for ETTs as labor market intermediaries in the labor contract by presenting a theoretical model of job assignment signalling.

In the last years, temporary or fixed{term labor contracts with low firing costs have been introduced in labor legislation to mitigate high levels of unemployment and lack of flexibility in the workplace. As established in Chapter 1, in the European context, ETTs have become major players in this environment because they are actually managing an important share of temporary employment.

What explains the need for intermediaries such as ETTs? In this chapter we establish that ETTs not only provide \just{in{time" workers to client firms under unplanned circumstances: they also give quality (ability) assurance of the workforce assigned to those firms. Therefore, those intermediaries are also functioning as permanent work placement services.

The model of job assignment signalling that we develop in this chapter shows that a temporary worker assigned by an ETT to a client firm increases her chances

of achieving a permanent job. The intuition of this class of models is simple: if a ¯rm promotes a temporary worker to a permanent position, it signals that the worker has high ability and, therefore, needs to pay a high wage to the promoted worker. Therefore | by taking advantage of its superior speci¯c information about its own worker ability| the ¯rm may have incentives to behave opportunistically and underpromote the worker, pay lower wages and avoid other ¯rms free{riding e®orts. However, in doing so, the ¯rm ine±ciently assigns capable workers to low productivity temporary positions (Waldman, 1984).

The importance of this screening or selection role of ETTs will be assessed in the empirical analysis developed in Chapter 5. Especially in the Spanish case, the extension of this certi¯cation role by ETTs and its e®ects in terms of e±ciency has been bene¯ted from the employers' need of circumventing the lack of manpower °exibility due to high ¯ring costs and stringent labor regulations (see Chapter 1). A role in this direction has additionally been played by the limits to the probationary period during which ¯rms evaluate workers' productivity: for instance, in Spain, this probationary period can not exceed the length of six months for skilled technicians, or three months for the remainder of workers[1] . By linking temporary assignments subsequently along time, ETTs have more time to screen workers who, in turn, have more time to recover their own investment e®ort in training (see previous chapter).

We hope that tackling this microeconomic aspect will shed light on the value

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[1] The function of probation in screening workers' productivity has been incorporated in numerous economic models such as speci¯c training and within{¯rm wage growth (Hashimoto, 1981; Carmichael, 1983; Haltiwanger, 1983), adverse selection models (Guasch and Weiss, 1980), internal labor markets (Barron and Loewenstein, 1985), labor turnover (Jovanovic, 1979) and up{or{out rules of promotion (O'Flaherty and Siow, 1990).

that ETTs may be adding to labor market transactions and, therefore, on the role that ETTs are playing in the labor market. This analysis is relevant due to the fact that, even though ETT intermediation is becoming a growing part of labor market transactions, we know very little about it, either in terms of theoretical or empirical analyses. From a more general perspective, middlemen in labor markets have been analyzed using search models (e.g., Yavas, 1994; Bull et al., 1987) underlying the fact that intermediaries can help to reduce trading frictions in a context of costly search for trading partners. However, none of this research tackles the question of finding out what is the major output of the private temporary placement service: placements. We argue that one of the most significant impacts of intermediation may be on the increased labor market efficiency attained through ETTs' certification role: by providing information to the market, ETTs can attenuate information asymmetry and they may allow to reduce the missasignment problem first analyzed by Waldman (1984)[2] .

3.2   The model

3.2.1   Assumptions

We consider a two–period world where the interest rate is equal to zero. Firms produce only one type of good, using only one worker each period, and the price of this good is normalized to one. Workers' ability is randomly distributed with support in $[0, 1]$. Its realization is unknown to the worker, the ETT and all the firms in the

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[2] Waldman's 1984 model and its successors — Ricart i Costa (1987) and Bernhardt (1995)— have been very powerful in order to replicate some personnel economics empirical regularities (like promotion–based compensation, the positive effect of education in promotion, fast–tracks, inexistence of demotions, etc).

economy at the beginning of the game.

In the first period, there is an initial stage where the applicant approaches an ETT which runs a test to verify if this candidate has at least a | minimum| level of ability a_l. There exists a fixed cost c of running the test.

If the candidate passess the test, the ETT assigns her to a temporary mission in a client firm, guaranteeing that the applicant's ability a is greater than a_l; this information is publicly revealed to all the firms in the market. If, on the contrary, the applicant fails the test, then she directly approaches the firm | i.e., without resorting to the intermediary step constituted by the ETT| which assumes, therefore, that her ability is below the ETT{certifiable level.

Alternatively, we also analyze the benchmark case where the applicant approaches the firm directly, a case where the minimum level of ability is zero (i.e., there is no certification involved).

Firms employ every worker temporarily during the first period. Every worker is placed in a job position where there is some firm{specific training acquisition denoted by s. At the end of the first period, the firm learns the exact ability level a of the temporary worker, pays either the corresponding fee to the ETT or the wage to the worker | if she is a worker without certification| and, subsequently, makes a rehiring offer. This offer is a pair consisting (i) of a temporary job assignment for the worker (either through the ETT once again or directly to the \uncertified" worker), or (ii) of a permanent job assignment directly to the worker, in either case with the corresponding fee or wage. This pair offer | composed of the job assignment plus the wage or fee| is observed by all the firms in the economy, which make competing

countero®ers to either the ETT or the worker. The worker and the ETT accept the highest fee/wage o®er.

In the second period, the worker is placed either in a high{productivity job or \permanent position" (with productivity y_p), or is kept as \temporary" in a low{ productivity job (with productivity y_t). At the end of the second period, the corresponding fee or wage is paid.

A ¯nal assumption is that high ability workers have a comparative advantage in permanent positions, that is, $(y_p \text{ i } y_t)$ increases in a. Productivity is also assumed to be increasing in s.

3.2.2   Equilibrium

We are interested in the following perfect Bayesian equilibrium outcomes with ETT{ intermediation:

² The worker always approaches the ETT to get the ability certi¯cation, and works for the ETT unless she fails to pass the test or a permanent position is o®ered by the ¯rm.

² The ETT always recommends workers who pass the test, charges a fee for assigning the temporary worker to the ¯rm and deducts the ¯xed cost c of testing from the worker's ¯rst period wage. All the fees paid in equilibrium must be consistent with the ability of the worker being greater than a_l.

² Finally, from the ¯rm's perspective, there is an ability level $a^{\\alpha}$ such that workers with higher ability are promoted to permanent jobs and o®ered a wage equal

to $E_{[a=a_l, a^u]}[y_p(a; 0)]$; otherwise, the worker is rehired as temporary. In this rehiring offer at the end of the first period, on the one hand, a worker who did not succesfully pass the ETT test is offered a wage equal to $E_{[a=a, a_l]}[y_t(a; 0)]$, and, on the other hand, the ETT is offered — in pay for, in this case, the certified workers' services— a fee consistent with a worker ability $a \in [a_l; a^u)$. In this latter case, the wage paid to the worker by the ETT must be equal to the expected productivity in a temporary position, since there is no need to certify her once again, and the fact that she is not being promoted signals her as having an intermediate level of ability. If the firm tries to offer a fee inconsistent with the minimum level of ability a_l — i.e., off the equilibrium path— then the ETT can reassign the worker to another firm or receive a higher offer from another firm.

On the other hand, in equilibrium outcomes without ETT intermediation — where there is no certification— the minimum level of ability is zero and workers contract directly with firms; strategies are similarly defined.

We then obtain the following result:

Proposition 5 In an equilibrium outcome with ETT intermediation, the probability of promotion is higher than without an intermediary ETT.

3.3 The uniform–linear case

In this section, we specialize previous model using Waldman's (1984) specification: a linear technology and ability distributed uniformly in $[0; 1]$. The productivity in the training slot is equal to β. Let's define

$$y_p(a;s) = (1+s)a \tag{3.1}$$

$$y_t(a;s) = (1+s)(\alpha + \beta a) \tag{3.2}$$

where $\alpha + \beta < 1$ and $\beta \in [0,1)$. With these restrictions, there are always incentives to put the most able workers into permanent jobs, and $a^* < 1$. Assume also that $c < \alpha$.

Proposition 6 When there is no certification (or no ETT intermediation), there exists a perfect Bayesian equilibrium with the following characteristics:

1. All workers are paid α in the first period.

2. For every realization of a worker's ability level, the worker remains with her first{period employer.

3. If the realization of a worker's ability is below $a^0 (= \dfrac{1 + 2\alpha s}{(1-\beta)(2s+1)})$; then the worker is rehired as \temporary" and is offered a wage equal to $\alpha + \beta\, a^0/2$, which is accepted; other firms offer the same wage.

4. If the realization of a worker's ability is above a^0, then the worker is promoted to a permanent position, and is offered a wage equal to $(a^0 + 1)/2$, which is accepted; other firms offer the same wage.

For the case where an ETT can certify that the ability level is above a_l, then there are two types of equilibria: (i) the full information efficient equilibrium (which occurs in the case where the certified level of ability is sufficiently high; that is, when $a_l \geq a^*$); (ii) the inefficient one, which resembles the one without ETT but in this case we obtain higher promotion rates for temporary workers.

Proposition 7 For a positive a_l small enough there exists a perfect Bayesian equilibrium with ETT certi¯cation with the following characteristics:

1. The ETT receives a fee equal to ®. All workers contracted through the ETT are paid ® ¡ c in the ¯rst period. Temporary workers hired directly by the ¯rm are paid ®.

2. If the realization of a worker's ability is above $a^e (= \dfrac{1 \ ¡ \ \bar{}a_l + 2®s}{(1 \ ¡ \ \bar{})(2s + 1)})$, then the worker is promoted to a permanent position and is o®ered a wage equal to $(a^e + 1)/2$ which is accepted; other ¯rms o®er the same wage.

3. If the realization of a worker's ability is below a^e and above a_l, then the worker is rehired by the ¯rm from the ETT to perform a temporary job, and is o®ered a wage equal to $® + \bar{}(a_l + a^e)/2$, which is accepted; other ¯rms o®er the same wage.

4. Workers with ability less than a_l receive a renewal o®er equal to $® + \bar{}a_l/2$, which is accepted by the worker; other ¯rms o®er the same wage.

In proposition 6, for those workers with ability level such that they are slightly more productive in the permanent than in the temporary position, the increase in production is not enough to compensate the ¯rm for the wage increase, as pointed out by Waldman (1984).

Proposition 7 provides a new insight: with an ETT, it is no longer possible to reduce wages by bunching those slightly more able workers with the group of lower ability workers. This is not credible with certi¯ed temporary workers.

3.4   Conclusion

In this chapter we establish that ETTs may play a beneficial role in terms of enhacing labor market efficiency. They can reduce the misassignment problem first analyzed by Waldman (1984) which consists of hiding capable employees from competing firms. ETTs are expected to limit this possibility thanks to their selection or screening role by attenuating information asymmetry among employers in the economy.

The empirical analysis developed in Chapter 5 will help us to validate the main hypothesis of this chapter.

3.5   Appendix. Proofs of propositions

3.5.1   Proof of Proposition 5

In order to maximize pro¯ts, there exists a minimum ability level a^0 required for a promotion which comes from the following equation:

$$y_p(a^0; s) \; ¡ \; W_p \; _, \; y_t(a^0; s) \; ¡ \; W_t \tag{3.3}$$

where W_p and W_t are the wages that the market would be willing to pay the worker once the job assignment by her actual employer has been observed. That is, those wages must equal the expected productivity of the worker in other ¯rms di®erent from her actual employer, given the observed job assignment (temporary or permanent). Hence:

$$W_p \;\; = \;\; E_{[a_, a^0]} [y_p(a; 0)] \tag{3.4}$$

$$W_t \;\; = \;\; E_{[a < a^0]} [y_t(a; 0)] \tag{3.5}$$

Pro¯t maximizing implies that (3.3) must be satis¯ed with equality, yielding a^0 as the minimum ability level required for a promotion.

If ETT intermediation exists, then the new optimal promotion level will be set lower than a^0 because, by assumption, the ETT guarantees that the worker's ability level is greater than a_l:

$$E_{[a_l < a < a^0]}[y_t(a;0)] > E_{[a < a^0]}[y_t(a;0)] \qquad (3.6)$$

and the propositon follows. ∎

3.5.2   Proof of Proposition 6

Given ¯rst{period employer's strategy (3) and (4), all other ¯rms will o®er wages equal to ® + ¯ a^0=2 and $(a^0 + 1)$=2, respectively, because for each observed job assignment those wages equal the expected productivity of the worker in the same position (temporary or permanent) of a ¯rm other than the ¯rst{period employer.

And given this market strategy, the ¯rst{period employer strategy described by (3) and (4) is also optimal. First, the ¯rm will never pay less than the competing wage o®ered by the other ¯rms because, otherwise, would forego productivity due to the existence of speci¯c human capital acquisition in the ¯rst period. Second, there are no returns to paying wages above those o®ered by other ¯rms. Hence, the ¯rm will always o®er the worker her expected productivity in the same position of outside competing ¯rms, and the worker accepts (in case of indi®erence, we assume that she remains with the ¯rst{period employer). Third, the worker will be promoted if and only if the increase in productivity exceeds the increase in wages. That is, the

promotion level a^0 comes from solving the following equation:

$$(1 + s)a^0 \; _{\mathrm{i}} \; \frac{a^0 + 1}{2} = (1 + s)(® + {}^-a^0) \; _{\mathrm{i}} \; (® + {}^-\frac{a^0}{2}) \tag{3.7}$$

and the proposition follows. ∎

3.5.3 Proof of Proposition 7

Given ¯rst{period employer's strategies (2) and (3) when a ¸ a$_l$, and (4) when a <
a$_l$, the market will o®er the expected productivity of the worker: $\frac{a^e+1}{2}$, $® + {}^-\frac{a_l+a^e}{2}$
and $® + {}^-\frac{a_l}{2}$, respectively.

Given this market strategy:

(a) When a ¸ a$_l$, the equilibrium is obtained similarly to proposition 5; a^e
comes from: $(1 + s)a^e \; _{\mathrm{i}} \; \frac{a^e+1}{2} = (1 + s)(® + {}^-a^e) \; _{\mathrm{i}} \; ® + {}^-\frac{a^e+a_l}{2}$

(b) When a < a$_l$, the ¯rm will o®er the worker her expected productivity in
outside competing ¯rms, $® + {}^-a_l=2$, and the worker accepts. Note that not
renewing this worker is not optimal, since this worker has acquired speci¯c
human capital which will then be lost and another subsequent worker from
the ETT has only productivity equal to ® (speci¯c human capital needs
to be acquired)

and the proposition follows. ∎

Chapter 4

Employment in°ows and out°ows and Training

4.1 Introduction

This chapter tackles the empirical testing of three speci¯c theoretical hypothesis related to employment opportunities provided by ETTs to their workers. Its main focus is on providing evidence on the predictions obtained from the model of human capital accumulation developed in Chapter 2.

In the ¯rst place, we analyze the impact that intermediation in the labor contract | undertaken by ETTs| has on worker's probability of leaving (un)employment. We hypothesize that ETTs are likely to reduce workers' (employers') expected job (applicant) search costs, so that unemployment spells of ETT workers may be expected to be shorter than those of non{ETT workers. For the Spanish context, results con¯rm this hypothesis, although, at the same time, it is found that being employed through an ETT appears as a signi¯cant predictor of the length of employment spells: in addition to leaving unemployment sooner than non{ETT workers, individuals employed through those intermediaries also present higher estimated hazard rates from

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employment.

Given that ETT workers present higher hazard rates both from employment and from unemployment, ambiguity arises over the net e®ect that ETT{employment opportunities may have for workers' incentives towards investing in training: on the one hand, ETT workers face a higher risk of not reaping the bene¯ts of training investments in a determined assignment due to the relatively high probability of unemployment which those workers would be likely to expect; however, on the other hand, unemployment duration is shorter with ETT{intermediated work.

In order to provide further insights into the issue being analyzed, in a second step we focus on studying the impact that ETT{intermediated work may have on the workers' probability of occupational upgrading: if, as hypothesized, ETT{work encourages workers' investment in general training, part of the return of this investment must be in the form of a higher probability of occupational upgrading. Results, as we will see, con¯rm this hypothesis for some groups of individuals in our data set; in particular, for workers in jobs requiring medium{high and medium{low quali¯cation levels.

Two main contributions of the empirical research in this chapter are worth emphasizing.

First, we provide a new data source for studying intermediation in the labor contract in Spain, by making use of the records of the Spanish Social Security: in Spain, as established in Chapter 1, the lack of studies on labor market intermediation is largely due to the absence of accurate employment histories for workers.

Second, we focus on the major output of the private temporary placement sector

(i.e., placements) in order to hypothesize relevant employment implications of ETT intermediation in the labor contract for workers.

4.2 Hypotheses

4.2.1 Matching

It is generally the case that applicants | when searching for jobs| may choose a longer and more expensive search method for a job in preference to accepting the ¯rst job available. In so doing, the applicant is trading{o® a longer period without work | and the earnings thereby foregone| for the advantages of a better job, if one can be found. In many instances, the length of time which employees are unemployed results from the applicant waiting for better jobs to become available, so that the period of unemployment involves waiting for better jobs to open up, as well as the time consumed in the search itself. The applicant will maximize her long{term advantages if she continues searching for a job until the expected (discounted) bene¯ts of the search (i.e., of the job attained) exceed the expected (discounted) costs of the search.[1]

In the absence of intermediaries like ETTs, individual job applicants on their own would probably have fewer opportunities to obtain a range of choice in potential jobs: a potential scenario would be composed by the applicant wandering from ¯rm to ¯rm, asking if job openings exist. Then, few ¯rms could be visited, and potential search costs would be high. In consequence, applicants will normally resort to ETTs to determine what job openings exist now and in the future, and to reduce the expected

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[1] See Mortensen (1986).

costs of the search.

Similarly, when an employer decides to proceed with the hiring of new employees, its problem is to pick and train workers so that they can generate the desired additional production at the least investment in compensation, training and hiring costs by the employer[2] . In order to minimize training costs, employers may extend the period over which they search for applicants, and thereby incur additional costs in the search and hiring process. Theoretically, an employer will continue the search for applicants until the costs of the continued search approximate the expected value of the product of the sought{after workers. Employers which do not use intermediaries heavily depend for job applicants upon those persons who make direct application to the ¯rm. For many ¯rms, this may not provide an adequate number or a su±cient quality of applicants. The ¯rm is able, however, to expand its range of possible applicants substantially by resorting to intermediaries: a longer and more expensive search process is likely to involve the employer in the use of a variety of intermediaries in the attempt to locate the best quali¯ed applicants for jobs.

Therefore, in order to undertake the placement of job applicants in employment through referral of applicants to job opportunities in an e±cient way, ETTs will be expected to lower the expected costs of matching and searching both to applicants and client ¯rms. In fact, this function should, perhaps, be treated as the sine qua non for the survival along time of ETTs in the labor market.

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[2] Employers do not automatically convert production increases (or even employee terminations) into job vacancies. They have alternatives to hiring additional employees, and may use them. Among those alternatives are the redesign of jobs or of production, so that existing personnel cover the increased production, or the reduced workforce. The hiring of additional employees involves costs, so that, in general, a long and complex decision process intervenes between an opportunity to seek new employees and a decision to do so.

Thus, we predict:

Hypothesis 1a: Unemployment spells of ETT workers will be shorter than those of non{ETT workers.

Although ETT workers may be expected to abandon unemployment more quickly than non{ETT workers, they are typically hired with the explicit understanding that their employment will be for a limited duration. Therefore, while they can easily be added to the workforce, they can also be easily dropped from it. Indeed, past research has provided evidence that unstable employment levels increase the use of temporary workers. For instance, Mangum et al. (1985) reported that both growing and declining ⁻rms were more likely to use temporary workers than ⁻rms with stable employment levels. Gordon and Thal{Larsen (1969) found that workload variations were the second most common reason, after sta® emergencies, for using temporary workers in the U.S. Indeed, for the Spanish context, task accumulation due to out{ of{the{ordinary work and realization of determined work and services concentrated most of assignment contracts in the last four years (Table 1). In so far as these are the prevalent reasons why employers address to ETTs, we predict:

Hypothesis 1b: Employment spells of ETT workers will be shorter than those of non{ETT workers.

4.2.2   Training

As established in Chapter 2 above, human capital decisions are usually taken by individuals under uncertainty with respect to future job opportunities and the returns

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on the investment. Indeed, in Spanish Labor Law, contracts of indefinite duration (permanent contracts) are not allowed for temps sent to assignments in client firms; in Spain, until mid–1999 the assignment contract — i.e., the contract through which the worker is assigned to a temporary assignment in a client firm— could only be established in the following cases:

- for realization of determined work or services (uncertain duration)

- because of circumstances of production, task accumulation, out–of–the–ordinary work or eventual increases in demand (maximum duration of six months)

- for replacement of workers with job reserve (the duration depends on the period of time during which the right to the job reserve of the substituted worker persists) and, finally,

- to temporarily cover a permanent job while the selection mechanism is being done (maximum duration of three months).

That is, it was required that there was a specific cause in order for employers to sign assignment contracts with ETTs, where, in every possible situation its applicability had to be materialized through fixed–term contracts.

From mid–1999, even though these cases have been eliminated — so that labor contracting though ETTs is not subject to a certain classification of causality— only temporary contracts are permitted.[3]

This legal environment implies that the risk of unemployment makes marketable human capital subject to uncertain returns. Given that this risk associated with

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[3] See Law 29/99 of July the 16th, whereby the 14/94 Law is modified (B.O.E. July the 17th).

investment in human capital is neither insurable nor diversi‾able, the incentive to invest in general training is dependent, therefore, on future (un)employment spells. As explained in Chapter 2 | where the relationship between employment prospects and the worker's incentive towards acquiring general human capital was modelled | the fact that maximizing workers consider future unemployment prospects in their decision of investment in human capital implies that the incentive to invest in human capital should reduce with the probability of being unemployed, given other things constant along the employment spell, since the expected return from human capital investment reduces with the likelihood of unemployment. Therefore, the larger the likelihood that the individual is unemployed, the less strong this incentive should be expected.

In this context, ETTs can insure the investment in market skills by linking temporary assignments in client ‾rms subsequently along time. This behavior might be expected due to two related reasons.

First, regulation of the sector has imposed a set of prescriptions to be complied with by the agencies; for the sake of illustration, among the most important, there exist training duties for those companies, and collective agreements through which temps are actually being guaranteed 100 per cent of the wage corresponding to the agreement of the sector to which the client ‾rm belongs[4] . As a consequence, in order to attract both temporary workers and client ‾rms, the agencies have been obliged to compete relatively more in the added value provided to user ‾rms by their services, rather than in the cost advantages o®ered (as had been the current norm in the past)[5]

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[4] Vid., art. 12 of the Law 14/94, and art. 30.2 of the II Collective Agreement.

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Second, competition in the Spanish temporary placement sector has dramatically increased in the last years; a rough indicator is represented by the evolution along time of the number of ETTs, which has passed from around seventy in June 1994 to more than four hundred in 1999[6] . As a consequence, competition of ETTs for applicants has exploded.

In this context, ETTs, in order to collect as much in mark{ups as possible, have incentives to implicitly promise ex ante to their workers | or, at least, the \best" ones| a continuum of missions in client ¯rms along time. Especially, when the ETT has invested in the training of those workers and when it is necessary to achieve a positive rate of return on the training o®ered by avoiding the loss of the worker to the client ¯rm at the end of the temporary mission. Indeed, partnerships are reached with client ¯rms whereby the latter renounce to incorporate the worker into its own sta® unles the assignment is su±ciently long[7] . Both implicit contracts with temps and collaboration agreements with client ¯rms avoid the loss of the worker to the latter at the end of the temporary assignment.

This linking of assignments along time may o®er applicants work assignments that are more advantageous with regard to duration or other working conditions than they could obtain themselves by directly bargaining as a potential or actual employee of the client ¯rm: the ETT is the de iure employer and is acting as the agent of the

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[5] Historically, one of the reasons for the address by employers to ETTs in Spain was the elusion of the contractual duties for the latter, so that workers' rights could rarely be satis¯ed (vid., for details, Rodriguez{Piñero, 1992).

[6] According to Ministerio de Trabajo y Asuntos Sociales.

[7] See Muñoz{Bullón, 1999.

applicant with respect to the client ¯rm. In so far as temporary placement occupations are usually generic and transferable across ¯rms, the linking of temporary assignments along time may allow the applicant to trade{o® the costs of investment in general human capital with the earnings increase derived from its application in a better job to be located through the ETT.

That is, the implication of temporary employment through ETTs for skill acquisition may be bene¯cial for workers. ETTs provide a way to acquire skills: they enable workers to obtain a measure of work experience, to raise their skill level and to use the acquired skills in di®erent types of jobs and workplaces over time. Each time ETT workers move to a new assignment, the extent and applicability of their skills are being tested and may be expanded. If this is the case, workers add to their stock of skills and, because they have had experience in applying them in various settings, they may gain a more realistic view of the value of their skills and, thereby, be better able to maximize the returns to their acquisition.

Based on the preceding discussion, we predict:

Hypothesis 2: ETT{intermediated work encourages individual investment in training.

4.3   Data and variables

The data used in this chapter is constituted by two representative random samples of workers from the Social Security Records | Fichero de Vida Laboral| provided by the Spanish Ministry of Labor in February 2000. They contain the work history from 1990 until 1999 of, respectively, 10.000 a±liated individuals who were working

for an ETT at the 31st of December of 1995 and 10.000 a±liated individuals who were unemployed at that same date; this latter sample is taken as a control group. It must be underlined that this control group is not composed by long{term unemployed individuals, who were, from the beginning, left out of the sample. That is, unemployed conforming our control group are individuals who also have several employment spells along the observed time period (otherwise, they obviously would not appear in the Social Security records).

The total number of records is 301.277. Each record corresponds to the a±liation of an individual to a particular Social Security account and therefore represents a spell of employment in a particular ¯rm (i.e., a matching). Unfortunately, the data do not contain information on the situation of the worker in the periods between employment spells (unemployment, inactivity or employment in a non{registered work). Except for this, the information allows to analyze the determinants of the duration of those periods between two succesive employments (which we address to as \unemployment").

The data provided includes information about age and sex of the workers, professional category of the contribution of the worker to the Social Security, dates when the employment spell starts and ends | which allows to determine with great precision their duration by taking the di®erence between both| type of Social Security system for the worker (Régimen General, Régimen Agrario, etc.), the reasons for the termination of the spell (voluntary quit, dismissal or retirement), the Spanish region and sector of activity (agriculture, manufacturing, construction or service sector) where the employment spell took place, and an identi¯er indicating whether or not each

employment spell is accomplished through an ETT.

It must underlined that the eleven professional categories of the contribution of the worker to the Social Security in the database do not collect the workers' level of qualiˉcation, but the required level of qualiˉcation for the job. For instance, an individual working as \peˋn" (whose contribution category is equal to ten) may well be in possession of an academic degree. In any case, we will refer to contribution categories from here onwards as \qualiˉcation", although this remark should be remembered for the subsequent analysis.

As other studies using data from the Social Security records have done[8] , we group those eleven categories in the following four: Qualiˉcation High collects contribution categories 1 (ingenieros y licenciados), 2 (ingenieros teˋcnicos, peritos y ayudantes titulados) and 3 (jefes administrativos y de taller). Qualiˉcation Medium{High collects contribution categories 4 (ayudantes no titulados), 5 (oˉciales administrativos) and 6 (subalternos). Qualiˉcation Medium{Low collects contribution categories 7 (auxiliares administrativos) and 8 (oˉciales de primera y segunda). Finally, Qualiˉcation Low collects contribution categories 9 (oˉciales de tercera y especialistas), 10 (peones) and 11 (trabajadores menores de 18 años).

We eliminate incomplete records and keep only workers a±liated to the General System (Reˋgimen General) in order to avoid the bias in the durations of spells that special systems like Agriculture, Fisheries, and so on would provoke. In addition, in order to achieve greater homogeneity, we also eliminate records destroyed for reasons other than dismissals. The ˉnal database is composed of 179.404 employment records,

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[8] See, for instance, Garcíˋa{Fontes and Hopenhayn (1996), or Garcíˋa{Peˋrez (1997).

corresponding to 15.228 individuals. Sample characteristics are presented in Tables 2 and 3. As can be seen, for both employment and unemployment duration analysis, ETT workers have a substantially higher number of records than non{ETT workers. Given that the samples include both employed and unemployed individuals, there exists a problem of censoring in the observations: for the analysis of employment (unemployment) periods, some individuals continue employed (unemployed) at the moment where the data were downloaded; those observations are right{censored, because their spell is not completed at that moment.

4.3.1   Empirical results: in°ows and out°ows of employment

In order to study the duration of individuals' (un)employment duration, we propose a duration model in order to evaluate the impact of the heterogeneity observed in the database on the length of the employment and unemployment spells. This type of models is used to analyze the factors that impact the duration of the periods in which the studied individuals remain in a determined situation.

As regards the variables used in the estimations, the dependent variable is the duration of the employment or unemployment spells of the individuals.

Explanatory variables can be resumed in the following groups:

² Individual variables: age of the individual when entering a period of employment or unemployment, and sex. In so far as employers take into account those personal characteristics when deciding whether to keep the worker for more time, workers with the most valued features will have larger tenure and/or shorter unemployment spells. Moreover, it is usually the case that some employees

change jobs far more frequently than others: new hires and young people are both prone to high rates of job turnover. In addition, age can provide an idea of individual labor experience: in so far as experience is valuable for the ¯rm, we would expect a positive (negative) relationship of age with tenure in the ¯rm (unemployment duration).

² Variables related to the job position: required quali¯cation level for the job, economic sector of activity, and a dummy variable with value 1 if the record corresponds to an ETT. A higher level of quali¯cation can be associated to larger tenure in the ¯rm if employers consider that workers complying with higher quali¯cation levels are more °exible and have a higher ability of adaptation; however, it can also be the case that those workers will change jobs more frequently due to their higher possibility of ¯nding alternative o®ers.

² Variables collecting the in°uence of the geographic zone and the economic cycle: those are seventeen dummy variables for the Spanish regions, and ten (four) dummies for the year (quarter) when the spell of employment or unemployment ¯nishes.

Average monthly Kaplan{Meier estimates are plotted in Figures 1 and 2. For the duration of employment (unemployment) spells, this descriptive statistic collects the proportion of individuals leaving employment (unemployment) at each moment in time given that they have been employed (unemployed) until that moment.

As can be observed, hazard rates from employment (Fig. 1) are larger for employment records through ETTs; it can be noted that the hazard is signi¯cantly higher

at durations around six, twelve, eighteen, twenty{four and thirty{six months, which correspond to time limits of usual temporary contracts; moreover, those spikes are more pronounced for non{ETT employment spells. Except for those spikes, average hazard rates from employment decrease very quickly for the ¯rst six months of employment, and keep more or less constant at around 0.6 percent from this moment onwards.

Hazard rates from unemployment (Fig. 2) are decreasing with unemployment duration and larger for employment records through ETTs until a duration of six months; from here onwards, both hazards tend to be the same.

Given this, an appropriate model is the model of Cox (1972), a proportional hazards model that is used to estimate in a semi{parametric way the e®ect of explanatory variables on the survival time in duration models. This survival time is constituted in our case by the duration of the spells of (un)employment in the database. The formal speci¯cation of the model is the following. Let T be a non{negative random variable that represents the duration of the observation of an individual (T is known as failure time). The hazard rate h(t) de¯nes the risk of failure of that observation, i.e., the hazard that the duration of that observation fails inmediately after t; given that it has survived beyond t:

$$h(t) = \lim_{\text{4! 0}} \frac{\Pr(t \cdot T < t + \text{¢}t)}{\text{¢}t} = \frac{f(t)}{S(t)} \qquad (4.1)$$

where f(t) is the density function of T and S(t) = Pr(T > t) is the survivor function, i.e., the probability that the duration survives beyond t.

If we made the analysis conditional on a set of regressors, then we would have:

$$h(t|z_i) = h_0(t)e^{z_i'\beta} \tag{4.2}$$

where $h_0(t)$ is a non–specified baseline hazard function, z_i is a vector of explanatory variables for observation i, and β is a vector of unknown regression parameters associated to the explanatory variables and common to all the observations. Cox's partial likelihood estimator provides a method of estimating β — taking into account the censored observations— without requiring estimation of $h_0(t)$.

Hazard rate from employment

In Table 4 we have the estimation results of the hazard rate for the duration of employment spells. The first result emerging from this Table is the large and significant effect of the variable Ett, a dummy variable taking the value one if the record is through an ETT (and zero otherwise): as predicted in section 4.2.1 above — hypothesis H1b— those individuals for whom their employment record is through an ETT are much more likely to finish their employment spells: their hazard rate from employment is 52.33 percent higher. This result is reflecting previous descriptive comparisons between average Kaplan–Meier hazard rates of ETT and non–ETT employment spells.

With respect to the remainder explanatory variables, the higher the age the lower the probability that the employment spell finishes. Men are less likely than women to terminate their employment spells. And individuals in jobs requiring High, Medium–High and Medium–Low qualification levels are less likely to end their employment spells, in this order.

In any case, in interpreting the estimated coe±cients on quali¯cation, it is important to allow for interaction e®ects, so as not to force measured di®erences in employment duration between quali¯cation levels to be the same for ETT and non{ETT workers. This is done in model 2 of Table 4, where we have introduced dummy variables indicating whether or not each observation corresponds to both ETT workers and determined quali¯cation levels, and where the dummy variable $D_{L;NETT}$ | i.e., that indicating non{ETT and Low{quali¯ed workers| has been left out as a basis for comparison. We can therefore observe how High quali¯ed ETT workers are less likely to exit from employment than this comparison group; the di®erence becomes non{signi¯cant when considering Medium{high quali¯ed ETT workers, while Medium{low and Low quali¯ed are still more likely to exit from employment if they have worked through an ETT when compared to Low quali¯ed non{ETT workers. When comparing di®erent quali¯cation levels between non{ETT workers, we then ¯nd that Medium{high, High and Medium{low quali¯ed workers are | in this order| less likely to exit from employment than the lowest quali¯ed ones.

Hazard rate from unemployment

The estimation for the hazard rate of leaving unemployment is showed in Table 5. As predicted (Hypothesis H1a), the estimated hazard is much larger for ETT workers: their hazard rate from unemployment is 45.94 percent higher. Younger individuals increase the likelihood of exiting from unemployment, men are less likely to abandon unemployment than women, and high and medium{high quali¯ed individuals present a lower likelihood of exiting from unemploment than low{quali¯ed ones.

When allowing for interaction e®ects between quali¯cation and the variable Ett (model 2 in Table 5), we observe that High{quali¯ed ETT workers are less likely to exit from unemployment than low{quali¯ed non{ETT ones, while the remainder quali¯cation `types' of ETT workers are, on the contrary, more likely to abandon unemployment. On the other hand, non{ETT individuals with High and Medium{ Low quali¯cation levels are more likely to exit from unemployment than Low quali¯ed ones, while the direction of the e®ect has the contrary sign for Medium{High quali¯ed non{ETT workers.

4.3.2   Empirical results: training

In sum, ETT workers are more likely to experience reduced employment spells, although being employed through an ETT is also a signi¯cant predictor of the length of unemployment spells: ETT individuals present substantially higher estimated exit rates from unemployment.

Therefore, in order to test hypothesis H2 put forward in Section 4.2.2 above | and given that, unfortunately, no data on training are available| we focus on studying the dynamics of the professional category of workers' contribution to Social Security. If, as hypothesized, ETT{work encourages workers' investment in training, part of the return of this investment must be in the form of a higher probability of occupational upgrading, within or across ¯rms: individuals will invest in training in so far as they can trade{o® the costs of the investment with the earnings increase derived from its application in a better job to be located in the future. Therefore, according to hypothesis H2, given an occupation of origin, ETT work should be expected to

increase the likelihood of occupational upgrading.

Analyzing the change along time in the category of contribution to Social Security, we are able to capture the expected positive impact of training through ETT{ intermediated work on:

² individuals' wage prospects and

² workers' occupational mobility.

First, each of the eleven professional contribution categories in the database have, as an associated element, a certain range of base de cotización or `contribution base'. This constitutes the base for a proportional tax on wages | the payroll tax| whose maximum and minimum levels for each category in the General Regime of the Social Security are yearly established in Spain by the Ley de Presupuestos Generales del Estado. The higher the contribution category, the higher the individual qualī¯cation level required for the job and, correspondingly, the higher the contribution base associated with the job.

Second, we de¯ne occupational change to occur when the contribution category in two succesive employment records is di®erent. This way, an occupational change is being observed when there is a change in the professional category of contribution to the Social Security. Since within each category a combination of occupational titles can coexist, it is possible that some individuals move between relatively di®erent occupations in the same category with no change observed, while others move between relatively similar occupations that fall into di®erent categories and a change will be

observed. We assume that, on average, workers who move across categories experience a bigger change in tasks than those who move across occupations within a category.

According to our hypothesis, occupational mobility that is due to training invest- ments undertaken by ETT{leavers is expected to be mobility towards a higher{level occupation and not towards a lower{level occupation. However, it must be taken into account that the extent to which the occupation can be improved is also likely to be a®ected by the extent of human capital lost during unemployment spells. Those who face more rapid skill depreciation while unemployed, might be more likely to accept a job requiring a quali¯cation level below the ones of previously{held jobs. Therefore, the duration of unemployment spells might be a relevant variable in this sense. This fact is con¯rmed in Table 6, which reports contribution category transi- tion probabilites across employment records by individuals' unemployment duration: as unemployment duration lengthens, the contribution category is less likely to remain the same both for non{ETT and ETT records.

Apart from studying which probability of occupational upgrading ETT work may be inducing relative to non{ETT employment, it is also interesting to analyze the intensity of such a change in occupation. The reason being that incentives to invest in training today are a®ected by expectations about future employment spells; among the latter, not only is the likelihood of occupational upgrading relevant, but also the vertical distance between occupations. For instance, the consequences for human capital development today may be di®erent if an individual actually working through an ETT as auxiliar administrativo expects to be assigned in the following mission to work as subalterno (which is the inmediate upper category) than if she expects

to work as o¯cial administrativo (i.e., two categories up from the actual one). A higher expected magnitude in the transition across occupations is associated to both a higher expected income and a better improvement in the career path; therefore, we might expect the implications of employment through ETTs for skill acquisition to be directly related to the vertical distance between succesive occupations. This issue is tackled empirically after ¯rstly analyzing the dynamics in the professional category contributions.

We model the change in contribution categories by an unordered categorical dependent variable which records three possible outcomes between succesive employment records of the same individual: the quali¯cation required for the job either remains the same (value 0), reduces (value 1) or increases (value 2). We can then describe the change in the contribution category across individual employment records by means of a multinomial logit, where the base alternative outcome is that the contribution category keeps constant. The probabilities for observation i are:

$$P_{ij} = Pr(Y = j) = \frac{e^{\beta_j' x_i}}{1 + \sum_{k=1}^{2} e^{\beta_k' x_i}} \text{ for } j = 1, 2 \qquad (4.3)$$

$$P_{i0} = Pr(Y = 0) = \frac{1}{1 + \sum_{k=1}^{2} e^{\beta_k' x_i}} \qquad (4.4)$$

where among the independent variables we include (appart from the ones of previous section 4.3.1) the starting contribution category of the individual | which allows us to condition the change in the category on the initial category held by the individual | the duration of unemployment spells, and its interaction with the dummy variable Ett so as to take into account the di®erential impact between ETT and non{

ETT employment records on the likelihood of category change depending on the days the individual has been unemployed.

The estimation for each qualiﬁcation group (Qualiﬁcation High, Medium{High, Medium{Low, Low) is shown in Tables 7a and 7b. For each of the four possible groups, two equations are estimated having each as dependent variable the relative probability of outcome 1 and 2 (respectively) to the base category:

$$\ln \left[\frac{P_{ij}}{P_{i0}} \right] = \beta_j' x_i \qquad (4.5)$$

Since the fact that for each group two equations are estimated implies that the interpretation of results is not straightforward | the ﬁ coeﬃcients of each equation represent the diﬀerence between the impact of regressors on the probability of outcome 1 and 2 (respectively) relative to the probability of remaining with the same professional category| we can address to prediction to aid interpretation. Given that our focus is on describing the model's prediction by the variable Ett, Table 8b present predicted probabilities for each group at the sample means (Table 8a reports unadjusted probabilities). Holding individual characteristics constant, there is basically no diﬀerence in adjusted probabilities of changing contribution category between ETT and non{ETT work for the highest{qualiﬁed groups of individuals; for medium{high and medium{low qualiﬁed individuals, ETT work substantially increases (diminishes) the likelihood of maintaining constant (reducing) the category; ﬁnally low qualiﬁed workers are slightly less likely to enjoy occupational upgrading if they work through an ETT.

In any case, our dependent variable in this multinomial logit model can only capture three possible outcomes. This implies that, due to the level of aggregation, the intensity of the changes in the contribution category are not being described, as explained before: not only is the likelihood of occupational upgrading relevant, but also the vertical distance between occupations. Indeed, for each qualification group there are four possible outcomes in the change of the contribution category; e.g., for qualification High, there can either be no change, or that the contribution category changes to Medium{high, Medium{low or Low. In order to take into account those different levels of changes, we order from 0 to 3 these results, where 0 represents the worst outcome (maximum possible reduction in qualification) and 3 the better outcome (maximum possible increase in qualification). We then use this categorical and ordered variable as the dependent variable in an ordered probit model describing the vertical distance between contribution categories in two succesive occupations of the same individual.

If our dependent variable y_i takes the values $0, 1, 2, ..., m$, the ordered probit usually takes the general form:

$$P(y = j|X; c; \beta) = F_{ij}(c_{j+1} - \beta'x) - F_{ij}(c_j - \beta'x) \qquad (4.6)$$

where $j = 0, ..., m$ and $i = 1, 2, , ...N$.

$F(.)$ is the normal distribution function, m is the number of choices, N is the number of observations, and the c_j's are the cutpoints estimated for each outcome (c_0 is taken as -1). This equation (4.6) determines the outcome of $y = j$ if and only

if $c_j < y < c_{j+1}$. This model is a direct generalization of the two–outcome probit model.

Estimation results are showed in Table 9, and predicted probabilites in Tables 10a and 10b. For the group Qualiﬁcation High, predicted probabilities of intensities of change do not roughly depend on whether the employment has been through an ETT or not. However, for the following two groups (Qualiﬁcation Medium–High and Medium–Low), ETT–intermediated work has, for any possible magnitude in the change that we may consider, a diﬀerential positive inﬂuence on the likelihood of occupational upgrading and, moreover, reduces the probability of qualiﬁcation reduction. Finally, the lowest qualiﬁed individuals working through ETTs are slightly more likely to keep on with the same occupational category between two succesive employments spells, meaning that their likelihood of occupational upgrading is lower compared to non–ETT equally qualiﬁed individuals for the job.

In sum, ETT work appears to be especially beneﬁcial in terms of increasing earnings prospects and improving the career path for individuals in the two middle qualiﬁcation groups. For the rest, ETT work does not aﬀect high–qualiﬁed employment prospects in terms of occupational category, while it slightly reduces the probability of occupational upgrading for the lowest–qualiﬁed ones.

4.4   Conclusions and possible extensions

This chapter has examined the inﬂuence of working through ETTs on individuals' employment opportunities as regards exit rates from employment and unemployment,

and chances of occupational upgrading. Two major conclusions can be drawn from the overall pattern of results.

First, our results are consistent with the idea that applicants may ¯nd those intermediaries useful to minimize the length of time that they are waiting for a job to open up while unemployed, which implies a reduction in job search costs. By contrast, our results also show that individuals initially employed through an ETT are more likely to exit from employment than non{ETT workers | even though their total number of matchings during the same observed time period is higher.

Second, support is found to our theoretical suspicion that the implications of temporary employment through ETTs for the acquisition of human capital may be bene¯cial for some workers: Medium{high and Medium{low quali¯ed individuals working through ETTs enjoy an increased likelihood of improving their career path by attaining occupational upgrading from the ETT{intermediated employment spell to the succesive one.

Future research on those issues will be directed towards analyzing whether or not those results are biased due to the possible existence of self{selection: individuals make their own choices as to whether or not to work for an ETT, and it is only after this decision has been made when we are able to observe whether the individual exists from (un)employment or increases her level of contribution category[9] . This possibility requires further exploration in order to test whether selection into ETT{intermediated work matters, which will be tackled in future extensions of this empirical work.

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[9] This issue is currently being analyzed in Garc´ıa{P´erez and Mu˜noz{Bull´on, 2000.

4.5 Appendix A. Tables

Table 1

Contracts registered in INEM by ETTs

(percentages in parentheses)

	1995		1996		1997		1998	
	No.	%	No.	%	No.	%	No.	%
Permanent	183	0.05	322	0.04	1889	0.15	3008	0.17
Works	140738	38.90	243521	32.52	310459	24.63	427435	25.03
Task accum.	94503	26.12	223919	29.89	469634	37.26	653678	38.27
Substitution	18165	5.02	41741	5.57	70719	5.61	86576	5.07
Part{time	103262	28.54	235436	31.43	405334	32.16	534925	31.32
Other	4965	1.37	3984	0.55	2489	0.19	2220	0.13

Table 2: Sample Characteristics for Employment Duration Analysis

	ETT sample		Non{ETT Sample	
	Number	Percentage	Number	Percentage
Total	107455		71949	
Censored	3180	2.96	3413	4.74
Male	58438	54.38	45709	63.53
Female	49017	45.62	26240	36.47
Qual. High	3020	2.81	4424	6.15
Qual. Med{High	10381	9.66	7715	10.72
Qual. Med{Low	40795	37.96	25055	34.82
Qual. Low	53259	49.56	34755	48.31
Age 16{25	44767	41.66	13527	18.80
Age 25{30	25224	23.47	12600	17.51
Age 30{45	35699	33.22	45822	63.69
Age >45	1765	1.64		
Duration (months)				
· 1	49734	46.28	19908	27.67
1{3	20366	18.95	14244	19.80
3{6	14809	13.78	12771	17.75
6{12	10784	10.04	12810	17.80
¸ 12	11762	10.95	12216	16.98

Table 3: Sample Characteristics for Unemployment Duration Analysis

	ETT sample		Non{ETT Sample	
	Number	Percentage	Number	Percentage
Total	94825		55700	
Censored	8410	8.87	6626	11.90
Male	51741	54.56	35326	63.42
Female	43084	45.44	20374	36.58
Qual. High	2318	2.44	3431	6.16
Qual. Med{High	8677	9.15	5876	10.55
Qual. Med{Low	36087	38.06	19379	34.79
Qual. Low	47743	50.35	27014	48.50
Age 16{25	38844	40.96	9844	17.67
Age 25{30	21883	23.08	9156	16.44
Age 30{45	32525	34.30	36700	65.88
Age >45	1573	1.66				
Duration (months)				
· 1	58560	61.76	27501	49.37
1{3	13144	13.86	9044	16.24
3{6	6703	7.07	6631	11.90
6{12	7073	7.46	5931	10.65
¸ 12	9345	9.85	6593	11.84

Table 4

Estimation of the Employment Hazard Rate

Parameter	Model 1		Model 2	
	Coe±c.	t-ratio	Coe±c.	t-ratio
Sex	-0.1159	22.949	-0.1252	24.60
Age	-0.0286	9.804	-0.0289	9.863
Age ^2	0.0006	13.179	0.0006	13.178
Qualif. High	-0.3196	24.891	{	{
Qualif. Med{High	-0.2566	29.515	{	{
Qualif. Medi{Low	-0.0704	12.969	{	{
Ett	0.4209	37.136	{	{
Manufacturing	0.1679	18.530	0.1572	17.321
Construction	0.3356	28.905	0.3448	29.572
Services	0.1239	17.539	0.1344	18.997
$D_{H;ETT}$	{	{	-0.6746	19.837
$D_{M_i H;ETT}$	{	{	-0.0065	0.344
$D_{M_i L;ETT}$	{	{	0.3839	30.317
$D_{L;ETT}$	{	{	0.5419	43.898

Table 4 (cont.)

Estimation of the Employment Hazard Rate

Parameter	Model 1		Model 2	
	Coeffic.	t-ratio	Coeffic.	t-ratio
$D_{H;NETT}$	{	{	-0.0487	3.492
$D_{M_i H;NETT}$	{	{	-0.1365	13.515
$D_{M_i L;NETT}$	{	{	-0.0238	3.522
$D_{L;NETT}$	{	{	{	{
Log Liklh.	-1,912,056.3		-1,911,215.1	
Size	179,404			

Estimation also includes 10 (4) dummies for the year (quarter) when the spell finishes, and 17 dummies for Spanish regions. Reference category: female, low-qualified, non-ett worker, agriculture, 1991 ending year of spell, fourth ending quarter of spell.

Table 5

Estimation of the Unemployment Hazard Rate

	Model 1		Model 2	
Parameter	Coe±c.	t-ratio	Coe±c.	t-ratio
Sex	-0.0676	11.846	-0.069	12.005
Age	0.0105	3.128	0.0097	2.906
Age ^2	-0.0001	1.860	-0.0001	1.639
Qualif. High	-0.0575	3.802	{	{
Qualif. Med{High	-0.0944	9.482	{	{
Qualif. Medi{Low	-0.0074	1.221	{	{
Ett	0.3780	30.644	{	{
Manufacturing	0.0827	7.904	0.0786	7.505
Construction	0.1472	11.488	0.1503	11.700
Services	0.1385	17.153	0.1413	17.482
$D_{H;ETT}$	{	{	-0.2430	5.514
$D_{M_i H;ETT}$	{	{	0.2160	10.144
$D_{M_i L;ETT}$	{	{	0.3876	27.862
$D_{L;ETT}$	{	{	0.4214	31.350

Table 5 (cont.)

Estimation of the Unemployment Hazard Rate

Parameter	Model 1		Model 2	
	Coe±c.	t-ratio	Coe±c.	t-ratio
$D_{H;NETT}$	{	{	0.0682	4.182
$D_{M_i H;NETT}$	{	{	-0.0464	3.976
$D_{M_i L;NETT}$	{	{	0.0099	1.278
$D_{L;NETT}$	{	{	{	{
Log Liklh.	-1,494,348.5		-1,494,178.8	
Size	150,525			

Estimation also includes 10 (4) dummies for the year (quarter) when the spell ¯nishes, and 17 dummies for Spanish regions. Reference category: female, low{quali¯ed, non{ett worker, agriculture, 1991 ending year of spell, fourth ending quarter of spell.

Table 6

Contribution category transitions across employment records.

	All		· 30 days unem.		30{90 days unem.		90{180 days unem.		180{
	No ETT	ETT	No ETT	ETT	No ETT	ETT	No ETT	ETT	No ET
= Qual.	75.32	85.15	80.99	88.14	73.65	79.64	70.97	72.78	68.4
¢ Qual.	12.34	8.40	9.76	6.57	12.85	11.68	14.24	15.80	15.6
⌐ Qual.	12.34	6.45	9.25	5.29	13.51	8.68	14.79	11.42	15.8

Transition rates are computed according to the distribution of contribution cate-

gories at employment record $t + 1$, conditional on the category at record t.

Table 7a

Estimation of contribution category transitions

(t{ratios in parentheses)

EQUATION 1: ¢ Quali‾cation

Parameter	Med{High		Med{Low		Low	
Ett	-0.2702	(1.17)	-0.5122	(5.278)	-0.2717	(5.68)
Unempl. dur.	0.0022	(11.11)	0.0015	(17.92)	0.0008	(17.12)
Contr.categ.	-0.7289	(9.47)	-1.0551	(19.20)	-0.1511	(6.96)
Ett*Un.dur.	0.0017	(2.77)	0.0021	(9.13)	0.0017	(10.87)
Sex	0.3278	(3.03)	0.1651	(3.44)	-0.0082	(0.36)
Age	0.5640	(5.65)	0.2566	(8.98)	0.0880	(6.53)
Age ^2	0.0091	(5.62)	-0.0041	(8.74)	-0.0014	(6.37)
Manufactur.	-0.4678	(2.97)	-0.1439	(2.25)	0.1459	(3.38)
Construct.	-0.0987	(0.47)	-0.1688	(1.74)	-0.3323	(6.86)
Services	-0.0477	(0.34)	-0.1228	(2.10)	0.2570	(8.70)
Constant	-7.7474	(4.89)	1.5262	(2.63)	-1.2788	(4.05)
Size	12625		49916		68119	

Table 7b

Estimation of contribution category transitions

(t{ratios in parentheses)

EQUATION 2: r Quali‾cation

Parameter	High		Med{High		Med{Low	
Ett	0.0275	(0.10)	-0.3097	(3.76)	-0.5921	(8.79)
Unempl. dur.	0.0187	(10.61)	0.0023	(20.04)	0.0014	(22.66)
Contr.categ.	0.2360	(4.82)	-0.0557	(1.79)	0.4785	(13.53)
Ett*Un.dur.	-0.0002	(0.26)	0.0006	(1.56)	0.0016	(7.43)
Sex	0.3628	(4.60)	0.0120	(0.29)	0.4719	(14.46)
Age	-0.3802	(4.91)	-0.1515	(5.11)	-0.0618	(3.58)
Age ^2	0.0052	(4.29)	0.0019	(4.09)	0.0003	(1.09)
Manufactur.	-0.4689	(3.83)	-0.3439	(5.86)	-0.0403	(0.87)
Construction	0.1240	(0.49)	-0.2036	(2.61)	0.0592	(0.87)
Services	-0.4822	(5.21)	-0.1138	(0.06)	-0.1081	(3.07)
Constant	4.5981	(3.73)	1.9030	(3.95)	-4.4358	(12.18)
Size	4829		12625		49916	

Equations 7a and 7b also include 10 (4) dummies for the year (quarter) when the employment spell ‾nishes, and 17 dummies for Spanish regions. Reference category: non{ett worker, female, ending year 1991, ending quarter: the fourth, agriculture, Madrid.

Table 8a

Unadjusted probabilities of contribution category transitions by quali¯cation group

	High		Medium{High		Medium{Low		Low	
	No ETT	ETT	No ETT	ETT	No ETT	ETT	No ETT	ETT
= Qual.	77.27	65.95	58.66	66.47	74.00	83.75	79.99	88.69
¢ Qual.	{	{	3.42	2.89	6.56	5.48	20.01	11.31
r Qual.	22.73	34.05	37.92	30.64	19.44	10.77	{	{

Transition rates are computed according to the distribution of contribution

categories at employment record t + 1, conditional on the category at record t.

Table 8b

Adjusted probabilities of contribution category transitions by quali¯cation group

	High		Med.{High		Med.{Low		Low	
	No ETT	ETT	No ETT	ETT	No ETT	ETT	No ETT	ETT
= Qual.	76.02	75.58	58.92	65.49	74.39	83.36	82.34	85.85
¢ Qual.	{	{	3.39	2.96	7.14	4.89	17.66	14.14
r Qual.	23.98	24.41	37.68	31.54	18.46	11.74	{	{

Adjusted probabilities are calculated by holding all variables at their sample mean.

Table 9

Estimation of the magnitude of the change in contribution category

(t{ratios in parentheses)

Parameter	High		Med{High		Med{Low		Low	
Ett	0.006	(0.04)	0.156	(3.63)	0.090	(3.06)	-0.153	(6.08)
Unem.dur.	-0.000	(10.11)	-0.007	(15.71)	-0.000	(8.15)	0.000	(16.45)
Contr.categ.	-0.121	(4.60)	-0.095	(5.85)	-0.385	(24.66)	-0.070	(5.98)
Ett*Un.dur.	0.000	(0.11)	-0.000	(0.34)	0.000	(3.61)	0.001	(11.37)
Sex	-0.231	(5.41)	-0.074	(3.50)	-0.135	(9.53)	-0.016	(1.38)
Age	0.219	(5.28)	0.121	(7.38)	0.065	(8.53)	0.057	(7.96)
Age ^2	-0.002	(4.57)	-0.001	(6.74)	-0.000	(6.34)	-0.000	(7.96)
Manufactur.	0.241	(2.09)	0.126	(4.10)	-0.001	(0.07)	0.095	(4.02)
Construct.	-0.017	(0.12)	0.071	(1.72)	-0.001	(0.04)	-0.164	(6.35)
Services	0.240	(4.83)	0.068	(2.23)	0.013	(0.77)	0.143	(8.78)
LogLiklh.	-3666.11		-12693.01		-33366.77		-36307.79	
Size	4829		12625		49916		68119	

Table 10a: Unadjusted probabilities of the magnitude of the change in

contribution category

	High		Med{High		Med.{Low		Low	
	No ETT	ETT	No ETT	ETT	No ETT	ETT	No ETT	ETT
¢ Qual=3	{	{	{	{	{	{	0.63	0.39
¢ Qual=2	{	{	-	{	1.21	1.09	3.87	2.12
¢ Qual=1	{	{	3.42	2.89	5.36	4.40	15.50	8.80
= Qual.	77.27	65.95	58.66	66.47	74.00	83.75	79.99	88.69
r Qual=1	7.02	14.16	19.17	17.63	19.44	10.77	{	{
r Qual=2	8.38	13.26	18.75	13.01	{	{	{	{
r Qual=3	7.33	6.63	{	{	{	{	{	{

Transition rates are computed according to the distribution of contribution

categories at employment record t + 1, conditional on the category at record t.

Table 10b: Adjusted probabilities of the magnitude of the change in contribution category

	High		Med{High		Med{Low		Low	
	No ETT	ETT	No ETT	ETT	No ETT	ETT	No ETT	ETT
¢ Qual=3	{	{	{	{	{	{	0.62	0.41
¢ Qual=2	{	{	-	{	1.08	1.36	3.44	2.52
¢ Qual=1	{	{	3.09	4.32	4.61	5.42	13.63	11.16
= Qual.	76.30	76.48	59.36	63.69	77.57	78.60	82.31	85.91
r Qual=1	7.80	7.76	19.42	17.54	16.72	14.61	{	{
r Qual=2	8.58	8.52	18.13	14.44	{	{	{	{
r Qual=3	7.30	7.22	{	{	{	{	{	{

Adjusted probabilities are calculated by holding all variables at their sample mean.

4.6 Appendix B. Figures

Figure 1

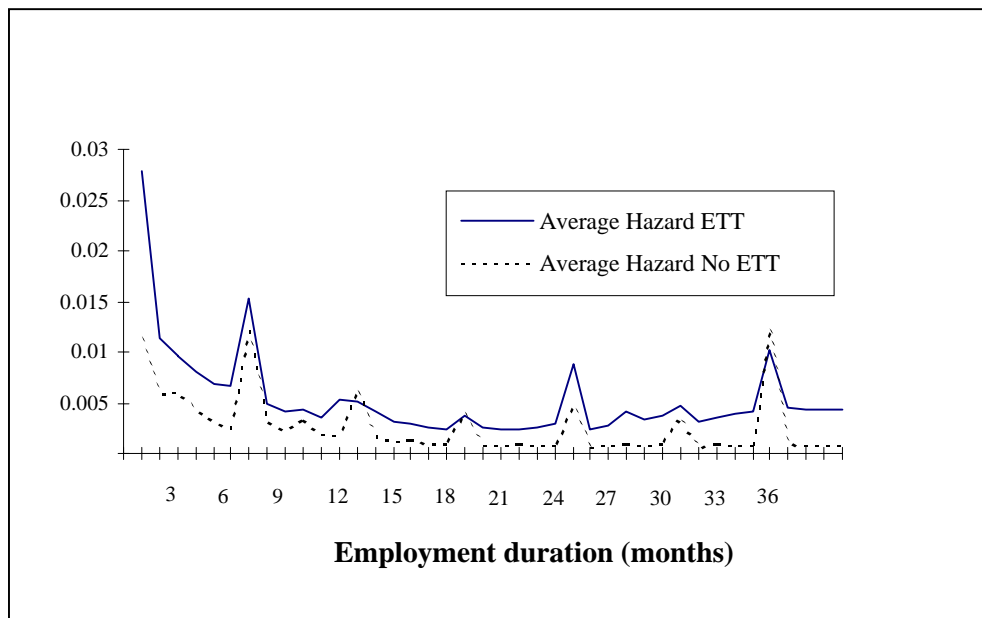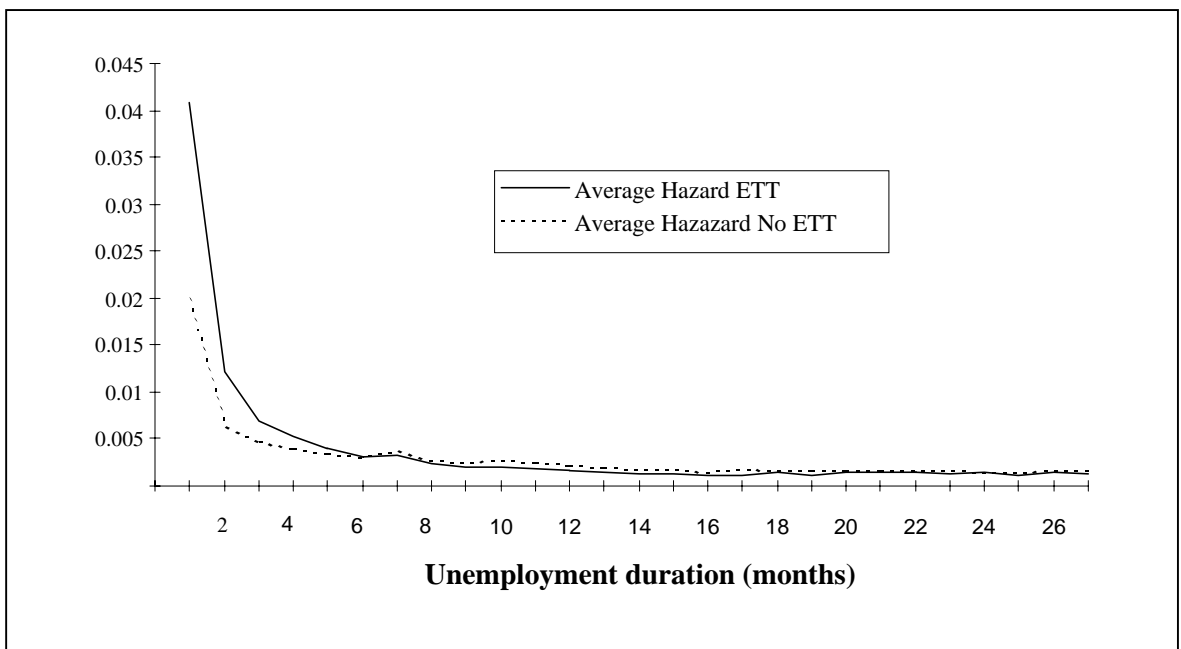Average Kaplan−Meier hazard rates of employment for ETT and non−ETT records

Figure 2

Average Kaplan–Meier hazard rates of unemployment for ETT and non–ETT records

Chapter 5

ETT workers' promotion chances

5.1   Introduction

This chapter tackles the empirical testing of the main hypothesis established in the theoretical model developed in Chapter 3. For this purpose, it is analyzed the impact of ETT{intermediated work on individual's promotion chances to permanent job positions. By making use of the information on the contract type recorded in the Social Security records, and by accounting for self{selection, results in this chapter con¯rm that ETT workers are more likely to attain a permanent contract during the observed period of time than in case they had not worked through an ETT, once we control for individual characteristics.

5.2   Hypothesis: Screening

As established in Chapter 1, ETTs develop several functions among which a fundamental one is that referred to as screening. Those intermediaries invest in informational technologies in order to screen applicants prior to referral to employers, given that recruitment must be done with considerable care because matching of workers with jobs is no mean task. Among the techniques are interviews, testing and job

analysis[1] . As can be seen in Figure 1, the ETT ¯rstly undertakes screening among potential candidates in its data base, taking into account personal history and work experience, and it usually submits workers through tests of ability.

Information on the worker is also produced by her non{speci¯c human capital investments made during the di®erent previous assignments (if existing), so that knowledge is created about her working aptitudes in doing tasks outside the client ¯rm she has worked in during those assignments. This feed{back on the performance of the worker is collected by the ETT: at the end of the assignment, the ETT feeds its selection processes with information obtained from the performance level of its temporary employees in previous missions; this is accomplished through appraisals on the performance of the worker submitted by the client ¯rm to the ETT[2] . Thus, a part of the information which can be useful for future labor contracts is generated as a by{product of previous assignments.

This information on workers is costly because of the need by the potential employer to undertake procedures in order to achieve some \proxy" of those worker's ex ante unknown skills. Moreover, those information{based costs (including opportunity costs, actual expenses and exposure to risk) are highly dependent on the temporary dimension, which is especially relevant in temporary contracting due to the criterion of urgency which very often determines the recourse by user ¯rms to ETTs. Those costs are expected to rise the less time the potential employer is willing to wait for this information. Therefore, a relevant consequence from the demand{side of the

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[1] Alternatively, ETTs in many instances screen ¯rms for applicants by using the applicant to visit one employer and not another.
[2] Apart from this, ETTs usually collect information on worker satisfaction levels about the placement services o®ered.

market is that a ¯rm that wishes to hire labor can search for the worker with the required characteristics, but this process is generally more expensive in time, e®ort and information gathering than having an ETT through which this transaction can be accomplished: the ETT pre{screens applicants for certain qualities which the company may desire.

Employers, anticipating that some job applicants will be better able to perform on the job than others, will seek to obtain these applicants. Therefore, the fact that they are able to obtain certi¯ed workforce through ETTs implies that other costs can be minimized. Among these costs are those of training workers to perform tasks, and the costs of recruitment, hiring and termination, where rapid employee turnover results from a poor match of employees and jobs. The client ¯rm, by use of ETTs, thus expands its range of applicants, obtains certain pre{hire services, and may thereby obtain a better quality, and conversely, more pro¯table, labor force than otherwise available to it.

Moreover, employers are often unable to discover exactly how job applicants will perform on the job in advance of a trial period. In consequence, they depend upon characteristics of the individual which are thought to be associated with good job performance; among these characteristics are, for instance, the education level, job experience, age, and previous performance levels. However, it is usually the case that individual employees are less bound to reputational e®ects than ETTs; this additionally explains why inexpensive information on a speci¯c individual is unlikely to be readily available to any potential employer, and reputationally enforced reliability is correspondingly less powerful. In this context, ETT intermediation is useful to

enhance reliability on the appraisals about previous employee performance levels.

Indeed, due to this selection process, ETTs not only provide \just{in{time" or contingent workers to ¯rms under unplanned circumstances, but also serve as permanent work placement services: some ¯rms directly outsource all the screening processes of some categories of permanent workers to ETTs, so that all permanent workers must start working temporarily through the ETT.

In those cases, we may expect a temporary worker assigned by the ETT to increase her chances of obtaining a permanent job. The intuition is the following[3] . In general, whenever a ¯rm promotes a temporary worker to a permanent position, it provides a signal to other ¯rms that the worker is of high ability. The ¯rm employing the worker, when attempting to rehire her, at the end of the temporary contract, has to match what other ¯rms are willing to pay the workers; i.e., this ¯rm must pay a wage according to her expected ability. Since when the worker is promoted, she is signalled to be of high ability, it is necessary to pay her a correspondingly high wage. On the contrary, if the ¯rm | taking advantage of its superior information about its own worker ability| decided to set a higher promotion level, the ¯rm would be bunching high ability workers with a group of workers among which a high proportion of them are low ability workers and, therefore, would be reducing total labor costs: this way, the ¯rm behaves opportunistically by underpromoting the worker and paying lower wages. However, in doing so, the ¯rm is ine±ciently assigning capable workers to low productivity temporary positions.[4]

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[3] This intuition was formally modelled in previous Chapter 3.
[4] See Waldman, 1984.

On the contrary, if an ETT intermediates in the labor contract, given that it plays a certi¯cation role | by determining and guaranteeing a minimum level of ability| this ine±ciency can be limited (as was seen in Chapter 3) due to the fact that ETT{ intermediation will raise the minimum ability level that client ¯rms expect from potential candidates. This information is public knowledge in the market, so that ¯rms can not credibly reduce wages by bunching those slightly more able workers with the group of lower ability workers: if so, the ETT will have incentives to reassign its temporary worker to another ¯rm.

Therefore, we predict:

Hypothesis: ETT{intermediated work increases individuals' chances of promotion to permanent job positions.

5.3 Method

5.3.1 Data and variables

The data used in the empirical analysis of this chapter is constituted by two representative random samples of workers from the Social Security Records | Fichero de Vida Laboral| provided by the Spanish Ministry of Labor. They contain the work history from December 1995 until October 1999 (when the data were downloaded)[5] of, respectively, 10.000 a±liated individuals who were working for an ETT at the 31st of December of 1995 | which we address as the \ETT sample"| and 10.000 a±liated individuals who were unemployed at that same date | which we address as the \non{ETT sample"; this latter sample is taken as a control group.

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[5] However, only employment records that begin before the 31st of December, 1997, are included in the database.

The use of this database is especially convenient for the empirical method developed in next section[6] | based on tracking job histories per individual along time| since it permits us to compare the di®erential probability of promotion of both groups of workers starting from the same point in time. Therefore, the use of these two samples allows us to use a dummy variable indicating whether the observed individual belongs to the ETT{sample or the non{ETT sample (see below) in order to account for the di®erential probability of promotion, such that observed promotions occur after individuals either have (or not) worked through an ETT.

The total number of records is 188.761; they include information about employment and out{of{employment periods. Each record corresponds to the a±liation of an individual to a particular Social Security account; except for some cases, di®erent account codes correspond to di®erent ¯rms, so that each record can be interpreted as a spell of employment in a particular ¯rm (i.e., a matching).

The relevant information for our hypothesis testing in this chapter relates to information on age and sex of workers, professional category of the contribution of the worker to the Social Security, the type of contract the worker is holding (temporary or permanent), and a dummy variable indicating whether the individual belongs to the ETT{sample or the non{ETT sample. As in the previous chapter, we group the existing eleven contribution categories to the Social Security system in the following four: Quali¯cation High collects contribution categories 1 (ingenieros y licenciados), 2 (ingenieros técnicos, peritos y ayudantes titulados) and 3 (jefes administrativos y de

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[6] This database was provided by Ministerio de Trabajo y Asuntos Sociales in a moment before the database used in previous chapter. Therefore, the empirical analysis of present chapter has been done previously to the one of Chapter 4.

taller). Qualiˉcation Medium{High collects contribution categories 4 (ayudantes no titulados), 5 (oˉciales administrativos) and 6 (subalternos). Qualiˉcation Medium{ Low collects contribution categories 7 (auxiliares administrativos) and 8 (oˉciales de primera y segunda). Finally, Qualiˉcation Low collects contribution categories 9 (oˉciales de tercera y especialistas), 10 (peones) and 11 (trabajadores menores de 18 aˉnos).

We follow a cleaning strategy as follows. We eliminate incomplete records and keep only workers a±liated to the General System (Rˉegimen General) to avoid the bias in promotion probabilities that special systems like Agriculture, Fisheries, and so on would provoke. In order to achieve greater homogeneity, we also eliminate records destroyed for reasons other than dismissals. Finally, we also erase the work history of the individuals who belong to the non{ETT sample and have had an employment spell through an ETT, so as to make sure that the control group is composed of individuals actually di®erent from the ones in the ETT{sample. The ˉnal database is composed of 73.162 employment records, corresponding to 13.290 individuals. Sample characteristics are presented in Table 1.

5.3.2 Empirical results: promotion chances

According to the Hypothesis in previous section 5.2 derived from the model in Chapter 3, ETT workers should be expected to enjoy enhaced promotion chances due to ETT's certiˉcation role of the workforce assigned to client ˉrms.

For our purposes, the term \promotion" may involve intraˉrm mobility as well as interˉrm mobility. Even though we are interested in the impact of ETT{work on

promotion chances — which will mainly imply inter¯rm mobility, given that the temp assigned to a client ¯rm formally belongs to the payroll of the ETT — we do not constrain our de¯nition of promotion to refer exclusively to inter¯rm mobility. The reason is that ETT certi¯cation may also imply that workers assigned to client ¯rms are promoted to permanent positions with the ETT continuing as the employer.

In a ¯rst approximation to the empirical testing, we estimate a probit model explaining whether a worker achieves a contract of inde¯nite duration (i.e., a permanent contract) based on her personal characteristics and on whether or not she belongs to the ETT{sample (i.e., on whether or not she has worked in the past in an ETT). The dummy variable Sample indicates whether the observation corresponds to the ETT sample (1) or to the non{ETT sample (0). As can be seen in Table 2, ETT workers are less likely to attain a permanent contract during the observed time period, at least holding the remainder explanatory variables constant. If we allow for interaction e®ects, in order not to force measured di®erences in promotion chances between quali¯cation levels to be the same for both samples of individuals, having worked for an ETT has a negative impact on the probability of attaining a permanent contract when comparing equally quali¯ed individuals, except for the highest quali-¯cation level (models 2{5); for this latter quali¯cation level, the impact of belonging to the ETT sample appears positive, though non{signi¯cant.

In principle, one could think that this result may be due to the fact that ETT individuals may have employment periods of short duration[7] and that, therefore,

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[7] As established in previous Chapter, the hazard rate from employment is, in general, higher for ETT workers when compared to non{ETT workers.

those individuals may not have equal chances, to enjoy an open{ended contract when compared to non{ETT workers.

Nonetheless, this ¯nding that ETT workers do not signi¯cantly enjoy higher chances of promotion to permanent positions is somehow surprising, given that past research (see literature revision in Chapter 1) has underlined the demand for high quality, prescreened labor as one of the principal determinants of the growth in the ETT sector. A problem that may be present | and which may account for this disonnance by introducing bias in the estimates obtained in Table 2| is the possibility of selection bias when estimating the impact of ETT{intermediated work on the di®erential probability of promotion. This problem is tackled in next section.

5.3.3   Does self{selection matter?

Measured di®erences in promotion chances between ETT and non{ETT workers may misrepresent the \true" di®erential probability of promotion because the individuals make their own choices as to whether or not to work for an ETT. It is only after this decision has been made when we are able to observe whether the individual achieves or not an inde¯nite contract along her work history. Therefore, it is necessary to test whether selection into ETT intermediated work matters.

In order to analyse this issue, we propose an empirical model which describes the choice of intermediated work along with promotion chances through a discrete choice model. As can be seen in Figure 2, the model consists of two types of equations: a \selection" equation (dependent variable S^{π}) and a \contract" equation (dependent variable C^{π}). The indices in the latter equation refer to whether the individual has

worked or not for an ETT (E denotes ETT and NE denotes no ETT). Figure 2 shows that, conditional on the individual's choice of intermediated versus non{intermediated job, she may later achieve or not a permanent contract. Her initial choice enters endogenously into the contract equations.

Since in the selection equation the observed dependent variable S assumes two values (it is discrete and unordered), we can describe it by means of a probit model. That is, the selection equation becomes:

$$S^\alpha = \bar{}^0_S x_S + u_S \qquad (5.1)$$

with

$$ETT \;:\; S = \;1 \;i^® \; S^\alpha > 0$$

$$Non\{ETT \;:\; S = \;0 \;i^® \; S^\alpha \cdot \; 0$$

$$u_S \quad \gg \quad N(0; 1)$$

S denotes whether the individual works (value 1) or not (value 0) for an ETT. S^α is a latent variable. The vector x_S contains information on personal characteristics of the individual. u_S is normally distributed with mean zero and variance one.

The contract equation is described for each possible selection choice separately. Each equation for ETT and non{ETT workers can be described by a probit model given by:

$$C^\alpha_i = \bar{}^0_{ci} x_{ci} + u_i \qquad (5.2)$$

with

$$\text{Permanent contract} \quad : C_i = 1 \text{ if } C_i^* > 0$$

$$\text{No permanent contract} \quad : C_i = 0 \text{ if } C_i^* \leq 0$$

$$u_{ci} \sim N(0,1)$$

$$i = E, NE$$

Again, C_i^* is a latent variable, E refers to ETT and NE to Non–ETT. The level of promotion actually observed is C_i; 1 is assigned to a permanent contract being achieved along the observed time period, and 0 is assigned to no permanent contract. Personal characteristics of individuals are included in x_{ci}.

In this switching model, the selection equation serves as the indicator function and selects the individuals into either ETT–intermediated work or not. The model can be rewritten as:

$$\text{ETT} \qquad : C^* = C_E^* \text{ if } S^* > 0$$

$$\text{Non–ETT} \qquad : C^* = C_{NE}^* \text{ if } S^* \leq 0$$

$$(u_E, u_{NE}, u_S) \sim N(0, \Sigma)$$

where S^*, C_E^* and C_{NE}^* are given by equations 5.1 and 5.2. The model consists of two states for ETT individuals (permanent contract, non–permanent contract) and two states for non–ETT individuals (permanent contract, non–permanent contract). The sum of the four likelihood contributions (one for each state) constitutes the

loglikelihood function $L^{\ast}$ of the entire system: $L^{\ast} = \sum_{i=1}^{4} \ln(L_i)$.

Table 3 illustrates the e®ect of personal characteristic variables on the decision of whether to work for an ETT or not. The percentage of young individuals (under 25 years old) increase with ETT{intermediated work, while the percentage of men decreases. As for quali¯cation levels, a fewer proportion of high quali¯ed individuals works for ETTs.

Table 4 provides evidence on the impact of personal charateristic variables on whether attaining or not a permanent contract; the proportion of young workers and of low{quali¯ed individuals who attain an inde¯nite contract is lower, while the proportion of high and medium{high quali¯ed individuals with a permanent contract is higher. As can be seen, di®erences attributed to sex are smaller than the ones attributed to age or quali¯cation levels.

The estimation of the model provides further evidence on the relationship between individual characteristics and ETT{intermediated work. Table 5 presents results for two empirical models. The full model accounts for self{selection, while the constrained model imposes exogeneity of ETT{intermediated work in the contract equations and, hence, constrains the correlation coe±cient between the selection and contract equations ($\frac{1}{2}_{\text{sc}}$) to be equal to zero. Young individuals, women and medium{high quali¯ed individuals are very likely to address to an ETT, while high{quali¯ed individuals are less likely (compared to the lowest level of quali¯cation).

Since comparing point estimates in a nonlinear model can be misleading, the magnitude of the e®ects is illustrated by calculating the predicted transition probabilities conditional on the respective individual characteristics. These calculations are

showed in table 7. The full model predicts that increasing the level of qualiﬁcation from medium{high to high reduces the probability of working for an ETT by 0.05 for an individual having age and sex corresponding to the ones of the sample mean. The individuals with a level of qualiﬁcation medium{high are the most likely to address to an ETT. This conﬁrms the impression derived from descriptive statistics as regards to qualiﬁcation levels in Table 3.

In Table 6, the results of the contract equation for the speciﬁcation with endogeneity (full model) and without endogeneity (constrained model) are presented[8]. Comparing both models, it can be seen that the diﬀerence in the model assumptions is reﬂected in the estimates: coeﬃcients are generally smaller in the full model compared to the constrained model. Hence, not accounting for endogeneity implies an upward bias in the estimates.

Predicted transition probabilities conditional on the respective individual variables and evaluated at the sample mean are separately presented for each group of workers in Tables 8a and 8b. For ETT workers, the probability of attaining a permanent contract increases with the qualiﬁcation level. Not accounting for self{selection reveals smaller promotion probabilities in the predictions for ETT workers, while the predictions are larger for non{ETT workers.

Finally, it is interesting to wonder which promotion probability a non{ETT worker would have had in case she had worked through an ETT (and conversely). According

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[8] In order to identify the model, we have left out the explanatory variable Sex from the estimation. First, from an economic point of view, there is no special reason, a priori, why we would expect promotion chances to signiﬁcantly depend on this variable. Moreover, from Table 4, the diﬀerences attributed to Sex were smaller than the ones attributed to Age or Qualiﬁcation when calculating the frequencies of each contract type conditional on individual characteristics.

to our Hypothesis in previous Section 5.2, ETTs should increase the chances of promotion to permanent job positions. This intuition is con¯rmed in simulation results presented in Tables 9a and 9b. The values on the diagonal of those tables are the predictions derived from the estimation for the typical ETT and non{ETT worker; e.g., in Table 9a, 0.219 indicates for the full model, the probability that a typical ETT worker achieves promotion. O®{diagonal elements answer what the promotion probability would have been if a worker | either actually working for the ETT or not| would have taken exactly the contrary decision; e.g., an actual ETT worker would have had only a promotion probability of 0.067 along the observed period of time if she had not worked through the ETT. On the contrary, the promotion probability increases up to 0.24 for actual non{ETT workers had they decided to address to an ETT to work from the start. Comparing the two tables, it can be seen that the model with exogenous switching underpredicts the probability of promotion for ETT workers and overpredicts this probability for non{ETT workers.

5.4   Conclusion

This chapter has empirically analyzed the di®erential promotion chances that workers who have worked through an ETT present when compared to workers who (by contrast) have not. This analysis is based on tracking job histories per individual along time.

Results obtained con¯rm that self{selection into ETT{intermediated work matters: not accounting for self{selection leads to bias, since exactly the contrary predictions are obtained. When self{selection is taken into account, ETT workers are

more likely to attain an open-ended contract during the observed period than in case they had not worked through an ETT. Moreover, non-ETT workers would also have obtained a permanent contract more easily if they had worked through an ETT.

5.5 Appendix A. Tables

Table 1

Descriptive statistics

	Total	ETT workers		Non{ETT workers	
		Perman	Non{Perman	Perman	Non{Perman
Size	13290	951	7086	789	4464
Age	31.17	30.23	29.69	33.56	33.29
Sex: Male	0.59	0.53	0.56	0.61	0.53
Qual. High	0.06	0.12	0.04	0.10	0.06
Qual. Med{High	0.12	0.20	0.11	0.17	0.10
Qual. Med{Low	0.34	0.36	0.36	0.34	0.38
Qual. Low	0.46	0.32	0.48	0.39	0.46

All values are means

Table 2: Probability of achieving a permanent contract

Maximum Likelihood Estimation

(t{ratios in parentheses)

Parameter	Model 1	Model 2	Model 3
Age	0.002 (0.89)	-0.032 (1.11)	-0.032 (1.11)
Sex: Male	-0.041 (1.42)	0.002 (0.86)	0.002 (0.86)
Qual. High	0.632 (11.56)			
Qual. Med{High	0.449 (10.57)			
Qual. Med{Low	0.123 (3.84)			
Sample: ETT	-0.145 (4.987)			
$D_{H;ETT}$		0.127 (1.27)	0.191 (2.17)
$D_{M_i H;ETT}$		-0.159 (1.81)	-0.095 (1.29)
$D_{M_i L;ETT}$		-0.489 (6.01)	-0.424 (6.48)
$D_{L;ETT}$		-0.676 (8.34)	-0.611 (9.32)
$D_{H;NETT}$			0.064 (0.68)
$D_{M_i H;NETT}$		-0.064 (0.68)	
$D_{M_i L;NETT}$		-0.382 (4.63)	-0.32 (4.70)
$D_{L;NETT}$		-0.426 (5.22)	-0.361 (5.45)
Constant	-1.22 (16.71)	-0.744 (7.09)	-0.808 (8.89)
Size	13290	13290	13290
Likelihood Ratio	243.33	257.50	257.50

Table 2 (cont.): Probability of achieving a permanent contract

Maximum Likelihood Estimation

(t{ratios in parentheses)

Parameter	Model 4	Model 5
Age	-0.032 (1.11)	-0.032 (1.11)
Sex: Male	0.002 (0.86)	0.002 (0.86)
Qual. High		
Qual. Med{High		
Qual. Med.{Low		
Sample: ETT		
$D_{H;ETT}$	0.509 (6.74)	0.552 (7.45)
$D_{M_i H;ETT}$	0.222 (3.8)	0.266 (4.69)
$D_{M_i L;ETT}$	-0.106 (2.24)	-0.063 (1.39)
$D_{L;ETT}$	-0.294 (6.22)	-0.25 (5.59)
$D_{H;NETT}$	0.382 (4.63)	0.426 (5.21)
$D_{M_i H;NETT}$	0.317 (4.70)	0.361 (5.455)
$D_{M_i L;NETT}$		0.043 (0.90)
$D_{L;NETT}$	-0.043 (0.9)	
Constant	-1.126 (14.23)	-1.169 (15.54)
Size	13290	13290
Likelihood Ratio	257.50	257.50

Table 3

ETT{intermediated work conditional on individual characteristics

	ETT workers	Non{ETT workers
% Age < 25	35.14	11.80
% Males	55.78	63.90
% Qualif. High	4.22	7.63
% Qualif. Medi{High	12.25	11.23
% Qualif. Medi{Low	36.29	37.12
% Qualif. Low	46.46	45.19

Number of observations: 13290.

Table 4

Contract type conditional on individual characteristics

	Permanent	Non{Permanent
% Age < 25	19.71	26.84
% Males	56.67	59.34
% Qualif. High	11.21	4.72
% Qualif. Medi{High	18.50	10.84
% Qualif. Medi{Low	35.06	36.86
% Qualif. Low	35.23	47.57

Number of observations: 13290.

Table 5

Selection equation: Estimation results

(t{ratios in parentheses)

	Full Model	Constrained Model
Constant	1.704 (74.99)	1.701 (32.094)
Age	-0.043 (50.57)	-0.043 (26.912)
Sex	-0.129 (7.66)	-0.133 (5.727)
Qualif. High	-0.061 (2.685)	-0.063 (1.240)
Qualif. Medi{High	0.080 (3.803)	0.079 (2.199)
Qualif. Medi{Low	0.013 (0.528)	0.013 (0.476)
Log Likelihood	-1.01739	-1.01752
Size	13290	13290

Full Model imposes no constraints on $\rlap{/}{h}_{sc}$. Constrained Model imposes that $\rlap{/}{h}_{sc} = 0$.

Table 6

Contract equation: Estimation results

(t{ratios in parentheses)

	Full Model	Constrained Model
ETT workers		
Constant	-1.436 (58.57)	-1.432 (18.19)
Age	0.017 (13.06)	0.001 (0.58)
Qual. High	0.737 (29.92)	0.808 (11.05)
Qual. Med{High	0.430 (16.41)	0.524 (9.59)
Qual. Med{Low	0.159 (7.47)	0.196 (4.66)
$\frac{1}{2}_{sc}$	-0.546 (21.81)	|
Non{ETT workers		
Constant	-2.073 (80.67)	-1.182 (9.18)
Age	0.017 (16.40)	0.002 (0.401)
Qual. High	0.405 (16.38)	0.427 (5.21)
Qual. Med{High	0.300 (12.54)	0.364 (5.52)
Qual. Med{Low	0.035 (1.49)	0.042 (0.87)
$\frac{1}{2}_{sc}$	-0.535 (20.69)	|
Log Likelihood	-1.01739	-1.01752
Size	13290	13290

Full Model imposes no constraints on $\frac{1}{2}_{sc}$. Constrained Model imposes that $\frac{1}{2}_{sc} = 0$.

Table 7

Selection equation: predictions

	Full Model	Constrained Model
Sample mean		
ETT	0.612	0.612
No ETT	0.388	0.388
Qualiﬁcation High		
ETT	0.585	0.583
No ETT	0.415	0.416
Qualiﬁcation Medium{High		
ETT	0.638	0.638
No ETT	0.362	0.362
Qualiﬁcation Medium{Low		
ETT	0.613	0.612
No ETT	0.387	0.387
Qualiﬁcation Low		
ETT	0.607	0.608
No ETT	0.393	0.392

Full Model imposes no constraints on $\frac{1}{2}_{sc}$. Constrained Model imposes that $\frac{1}{2}_{sc} = 0$:

Table 8a:

Contract equation for ETT workers: Predictions

	Full Model	Constrained Model
Sample mean		
Permanent	0.219	0.113
Non{Permanent	0.780	0.887
Quali¯cation High		
Permanent	0.426	0.281
Non{Permanent	0.574	0.719
Quali¯cation Medium{High		
Permanent	0.311	0.194
Non{Permanent	0.689	0.806
Quali¯cation Medium{Low		
Permanent	0.223	0.117
Non{Permanent	0.777	0.883
Quali¯cation Low		
Permanent	0.178	0.083
Non{Permanent	0.822	0.917

Full Model imposes no constraints on $\frac{1}{2}_{sc}$. Constrained Model imposes that $\frac{1}{2}_{sc} = 0$:

Table 8b:

Contract equation for Non{ETT workers: Predictions

	Full Model	Constrained Model
Sample mean		
Permanent	0.076	0.148
Non{Permanent	0.924	0.852
Quali¯cation High		
Permanent	0.135	0.241
Non{Permanent	0.865	0.758
Quali¯cation Medium{High		
Permanent	0.113	0.222
Non{Permanent	0.886	0.778
Quali¯cation Medium{Low		
Permanent	0.070	0.138
Non{Permanent	0.929	0.861
Quali¯cation Low		
Permanent	0.066	0.129
Non{Permanent	0.934	0.870

Full Model imposes no constraints on $\frac{1}{2}_{sc}$. Constrained Model imposes that $\frac{1}{2}_{sc} = 0$:

Table 9a

Simulation results: Promotion probability

Full Model (endogenous switching)

	Actual sample	
	ETT	Non{ETT
	Permanent Contract	Permanent Contract
ETT	0.219	0.240
Non{ETT	0.067	0.076

0.067 is the probability with which an ETT worker would have attained a permanent contract if she had not worked through an ETT. Transition probabilities are calculated holding all variables at their sample means.

Table 9b

Simulation results: Promotion probability

Constrained Model (exogenous switching)

	Actual sample	
	ETT	Non{ETT
	Permanent Contract	Permanent Contract
ETT	0.113	0.115
Non{ETT	0.146	0.148

0.146 is the probability with which an ETT worker would have attained a permanent contract if she had not worked through an ETT. Transition probabilities are calculated holding all variables at their sample means.

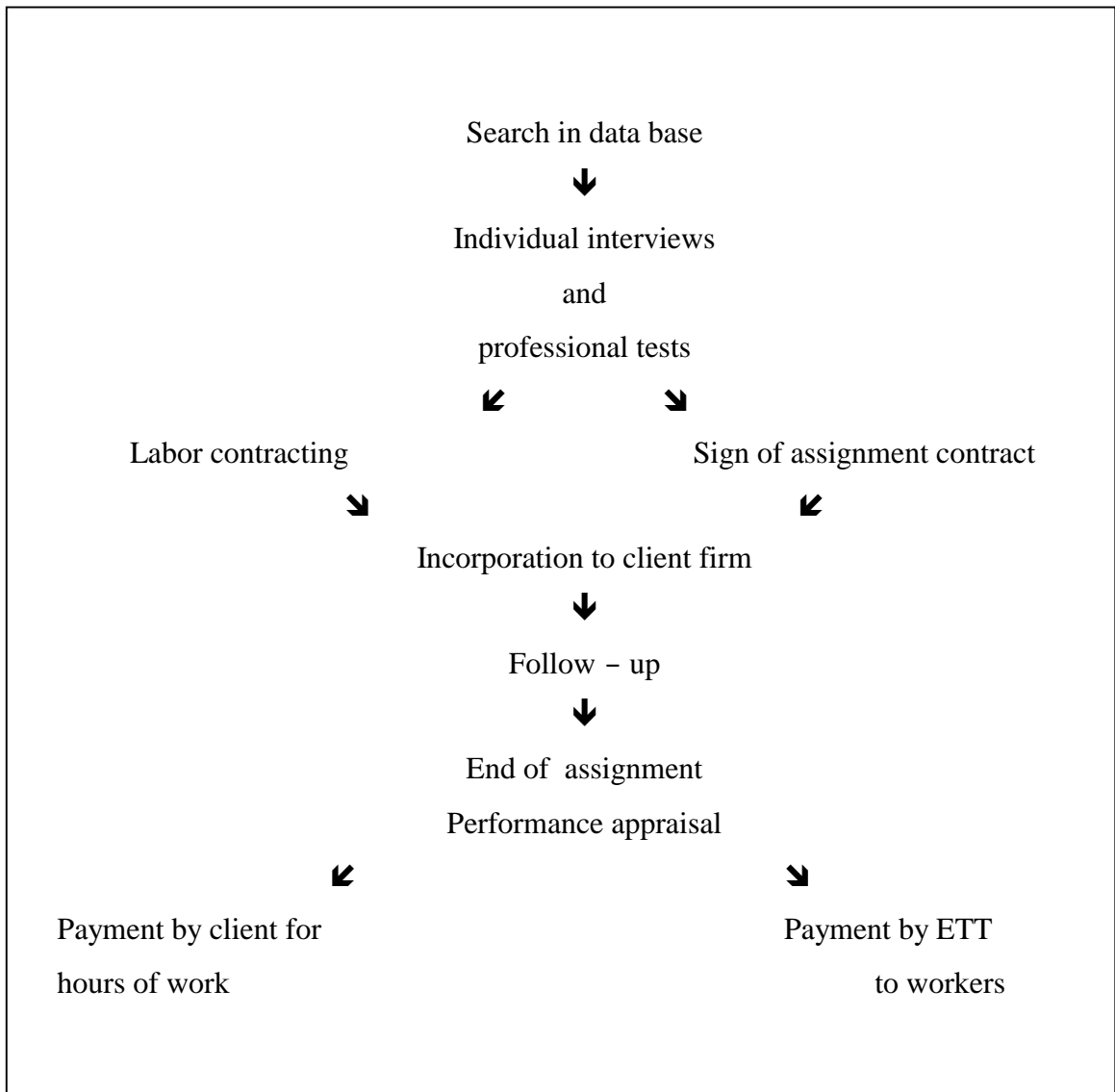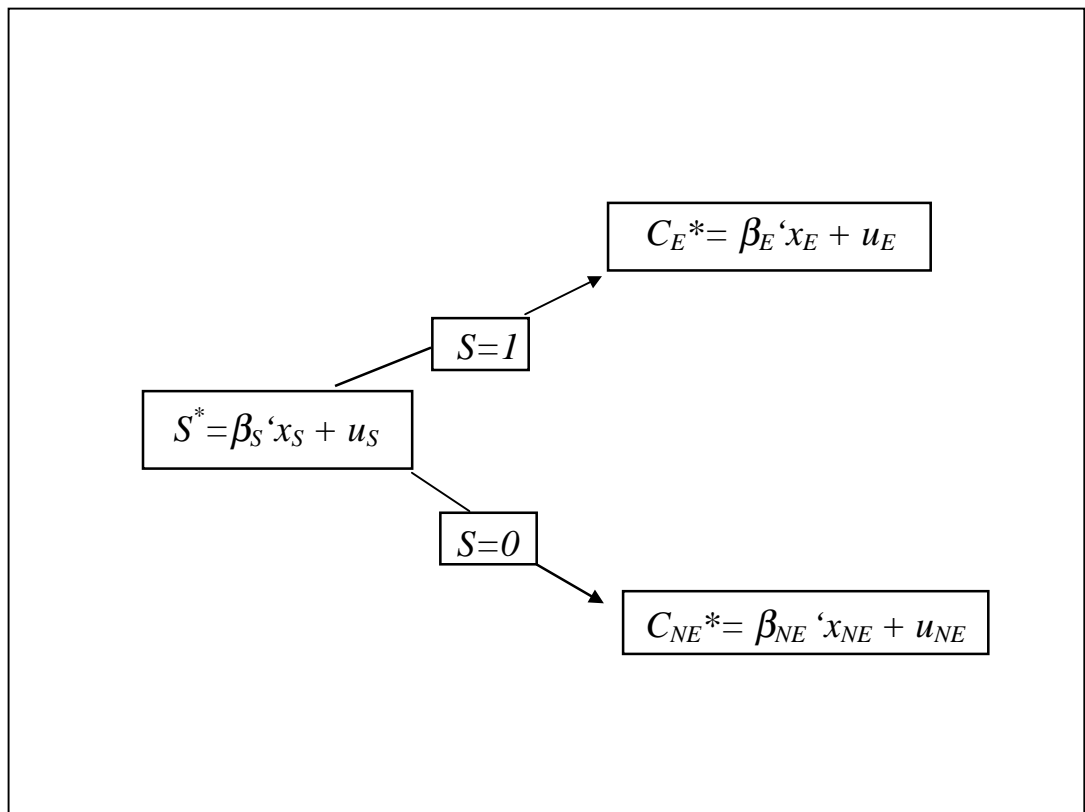## 5.6   Appendix B. Figures

Figure 1

The screening process

Search in data base

↓

Individual interviews

and

professional tests

↙　　　　　↘

Labor contracting　　　　　　　　　　Sign of assignment contract

↘　　　　　　　　　　↙

Incorporation to client firm

↓

Follow – up

↓

End of assignment

Performance appraisal

↙　　　　　　　　　　↘

Payment by client for　　　　　　　　　　Payment by ETT

hours of work　　　　　　　　　　　　　to workers

Figure 2

Switching Model

$$C_E^* = \beta_E\,{}'x_E + u_E$$

$$S=1$$

$$S^* = \beta_S\,{}'x_S + u_S$$

$$S=0$$

$$C_{NE}^* = \beta_{NE}\,{}'x_{NE} + u_{NE}$$

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