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## The role of temporary help agencies in facilitating temp-to-perm transitions

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## The Role of Temporary Help Agencies in Facilitating Temp-to-Perm Transitions

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## ABSTRACT

### **The Role of Temporary Help Agencies in Facilitating Temp-to-Perm Transitions<sup>\*</sup>**

This paper evaluates the impact of agency work on temporary workers' posterior likelihood of being hired on a permanent basis. We use administrative data on two groups of temporary workers for whom we have complete work histories since they are first observed in 1998 until the year 2004. One group consists of workers employed through a temporary help agency (THA) at some point during the seven year period under examination (treated group). The other group is composed of individuals employed as direct-hire temps at some point between 1998 and the year 2004, but never via a THA (control group). Using propensity score matching methods, we find that agency workers endure a lower likelihood of being hired on a permanent basis following their temporary assignment than their direct-hire counterparts.

JEL Classification: J2, J4

Keywords: temporary help agency, temporary employment, permanent employment, Spain

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## 1. Introduction

The growth of work in the European temporary agency industry has caught the attention of policymakers and academic researchers alike. In every member state of the European Union, temporary agency work has at least doubled during the 1990s. In Scandinavia, Spain, Italy and Austria, temporary help agency employment has increased at least five-fold, accounting for 1.3 percent of the agency employment in the European Union by the end of the decade (see Storrie, 2002). As indicated by Table 1, sixteen percent of all temporary work contracts in Spain – a country where about one third of wage and salary workers have temporary contracts and approximately 90 percent of new employment contracts are temporary, are finalized by temporary help agencies (THAs).

THAs play a crucial role in sustaining labour market flexibility via their intermediation in finalizing fixed-term, on-call, and other work arrangements of short-duration that we will refer to as temporary contracts. However, while valuable in fulfilling firms' needs, temporary employment imposes some costs on workers, as is the case of reduced job stability and limited advancement opportunities (Bentolila and Dolado, 1994; Alba-Ramírez, 1998; Amuedo-Dorantes, 2000). In this paper, we analyze the extent to which agency work aids temporary employees in their transition into indefinite-term or permanent employment by comparing the future labour market outcomes of two groups of temporary workers: direct-hire *temps* and THA workers. The analysis is of special interest given the growth experienced by THAs and the concern regarding their ability to serve as springboards into stable employment in a country with an already high temporary work incidence. Yet, with some minor exceptions,<sup>1</sup> very little is known about the employment prospects of agency workers in Spain.

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<sup>1</sup> See Malo and Muñoz-Bullón (2002) and García-Pérez and Muñoz-Bullón (2005).

The structure of the paper is as follows. In section 2, we provide an overview of the THA industry. Section 3 describes the data and section 4 details the econometric approach employed in the analysis. The regression results, sensitivity and heterogeneity checks are discussed in section 5. Section 6 summarizes our findings.

## **2. Overview of the Temporary Help Agency Industry**

THAs provide temporary workers to client companies on a contract basis. Their key feature is that workers remain on the THA's payroll while working for the client company: i.e., workers engaged by THAs and placed at the disposal of client companies become a part of the triadic relationship between the worker, the THA and the firm in which the work is performed. This means that temporary workers are under the client company's direct supervision but receive a pay-check from the temporary help agency. The agency bills the client company for the worker's wages, along with a fee for providing the worker placement services.

For some *temps*, agency work may make it easier to shape their careers if they are able to gain an expertise. A 1994 survey by the National Association of Temporary and Staffing Services found that 66 percent of temporary workers in the U.S. acquired new skills on their assignments (Melchionno, 1999). Workers interested in advancing their career goals might accept short-term assignments as a way to learn a variety of skills. Additionally, the mobility associated to short-term assignments enhances workers' networking possibilities and provides them with valuable leads and recommendations in getting a permanent job in the near future. In the aforementioned instances, agency work can serve as a stepping stone into a new career. This is particularly true when temporary work arrangements are used as a screening device by firms and THAs enjoy a comparative advantage in selecting workers (Houseman and Polivka, 2000). In this respect, Christensen (1995) finds that over half of her respondents from a sample of large

corporations indicated hiring on a temporary basis as a means to screen workers for regular full-time jobs. Houseman (1997, 2001) further finds that managers in 21 percent of the establishments in her sample use THAs to screen prospective employees. Furthermore, workers hired via the intermediation of a THA enjoy a higher transition rate into permanent employment than other temporary employees. Abraham (1990) also reports similar findings, as do Gordon and Thal-Larsen (1969) for both part-time and temporary help agency employees, and Ichino, Mealli and Nannicini (2004) in two Italian regions.<sup>2</sup>

Despite the aforementioned advantages, agency work is typically characterized by short lasting work arrangements, often shorter than those characteristic of direct-hire temporary jobs. Agency *temps* are constantly starting new jobs where they have to carry out their duties with limited knowledge of the client company. Consequently, only a minority of workers expresses interest in agency work (Cohany, 1998). Furthermore, the short span of their work arrangement inhibits workers and THAs from investing in the acquisition of specific human capital and, instead, promotes a cyclical pattern of unstable and primarily low-skilled employment (Parker, 1994; Pawasarat, 1997; Jorgenson and Riemer, 2000; Autor and Houseman, 2005).

### **3. The Data**

#### **3.1. Dataset and Sample Extraction**

The data used in this study come from the Official Register of Contracts of the Spanish Public Employment Service, which collects information on all contracts signed in Spain. Due to the large size of this database, we work with a sub-sample of registered contracts. Specifically, we select employees according to the type of work contract they held when first observed in

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<sup>2</sup> A recent literature remarks that THAs enjoy economies of scale in the screening and training of temporary workers, e.g. Abraham and Taylor, 1996; Polivka, 1996; Houseman and Polivka, 2000; Autor, 2001; Houseman, Kalleberg and Ericcek, 2001; Muñoz-Bullón, 2004b; Muñoz-Bullón and Rodes, 2004; García-Pérez and Muñoz-Bullón, 2005. Therefore, firms might find it optimal to hire agency workers when using temporary work contracts as a screening device for future permanent positions within the firm.

1998 and then follow them up until the year 2004. The extracted sample includes all individuals holding a permanent work contract, twenty percent of individuals holding a casual, work-experience (practice) or per task contract, and 50 percent of individuals with training or interim contracts when first observed in 1998.<sup>3</sup>

The Official Register of Contracts presents some advantages and disadvantages for evaluating the impact of agency contracting on temporary workers' career progress. According to Heckman et al. (1998), the quality of any quasi-experimental evaluation study using matching methods is likely to depend on three key features: (a) whether data for the treatment and control groups are collected using the same survey instrument; (b) whether it is possible to control for local labour market conditions; and (c) whether it is possible to match treatment and control observations using their labour market histories. The Official Register of Contracts performs rather well with respect to each of these criteria. First, data on agency workers (treatment group) and non-agency workers (control group) are drawn from the same data source. Second, we have data on the region of residence and, as such, on local labour market conditions as captured by regional unemployment rates. Third, the Official Register of Contracts includes information on individuals' personal and work related characteristics since the time when they were first observed in 1998 until the end of 2004.<sup>4</sup>

The main limitation of the dataset (which, fortunately, has no influence on our main objective) is that it lacks information on contract tenure and on unemployment spells in between contracts. Additionally, some agency workers cannot be differentiated from the administrative personnel working at the THA; although this is unlikely to be of major practical importance as noted by other studies on THAs (see: Muñoz-Bullón and Rodes, 2004; Kvasnicka, 2005).

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<sup>3</sup> See the Appendix for a description of the various types of temporary work contracts.

<sup>4</sup> These characteristics include, for instance, the type of contract, the level of education, and the type of occupation held by workers at each point in time during their recorded work histories.

Finally, the Official Register of Contracts does not include civil servants as their contracts differ from the type of indefinite-term contract being examined herein despite their also permanent nature. As such, we cannot compare direct-hire *temps* to agency *temps* in terms of their likelihood to transit into these work arrangements.<sup>5</sup>

### **3.2. Treatment and Control Groups**

Since our focus is to find out the extent to which agency work may affect the transition from temporary into permanent employment relative to direct-hire temporary work, we exclude every individual with an indefinite-term contract in 1998. In addition, we exclude individuals with a THA contract when first observed in 1998 as we lack any pre-treatment information on them. Finally, due to the large size of the dataset, we work with a random sample of the remaining individuals.<sup>6</sup> Nonetheless, we make sure that the sample is large enough to enable a high matching quality. The final set used for the empirical analysis consists of 29,398 individuals holding temporary contracts when first observed in 1998 and with a complete contract history through the end of 2004.

We use a quasi-experimental matching method to estimate the effect of agency contracting on temporary workers' posterior likelihood of being hired on a permanent basis. Fundamentally, the analysis involves comparing the labour market outcomes for a group of individuals hired through a THA (treatment group) to the labour market outcomes of a matched group of direct-hire temporary workers who have never been hired through a THA (control group). In our sample, treatment can begin at any point after workers are first observed in 1998. As such, we define the treatment group as composed of individuals hired by a THA at any point

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<sup>5</sup> In Spain, the Public Administration can hire individuals as civil servants, who are selected on the basis of an entry exam and cannot be dismissed. Additionally, the Public Administration can hire workers on a temporary or permanent basis using fixed-term and indefinite-term contracts of the type recorded in the Official Register of Contracts. Unlike civil servants, these workers can be dismissed following the rules of the Workers' Charter.

<sup>6</sup> Otherwise, computations of average effects would have been prohibitively time-consuming.

in time between 1998 and the end of 2004. Treatment is thus defined as the first time the individual contracts with a THA. There are 3,673 individuals in the treatment group. In contrast, the control group is defined as composed of temporary workers who have never been hired by a THA during the sample period being examined. There are a total of 25,725 individuals in the control group.

Our outcome consists in being hired on a permanent basis at any point in time after 1998. Thus, the effect being measured is captured by the difference in the probability of signing an indefinite-term contract for individuals in the treatment and control groups. Pre-treatment variables refer to the personal characteristics and type of temporary contract held by workers when first observed in 1998. As such, pre-treatment variables are unaffected by agency participation status. Post-treatment variables include respondents' personal and work related characteristics at the time they first sign a permanent contract or, otherwise, at the time when they are last observed.

### **3.3. Some Descriptive Evidence**

Before proceeding any further, it is helpful to review some aspects of the Spanish labour market and the performance of the THA industry in Spain. Spain has the highest temporary employment rate in the group of OECD countries. The temporary employment rate has also remained rather stable, nearing 30 percent since the first 1990s despite various labour market measures implemented in 1994 and 1997 to curb it down.<sup>7</sup> THAs were first recognized by the Spanish legislator in 1994. Therefore, temporary employment was already a prominent form of employment prior to the regulation of THAs. As noted by Cebrián et al. (2001) and Muñoz-

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<sup>7</sup> Some authors (as Dolado et al., 2002) remark that, after the passage of the 1997 reform, the proportion of temporary workers has slightly declined in the private sector. However, recent re-estimations using the Labour Force Survey, which provides a better representation of the immigrant population, question that finding. See Toharia and Malo (2002) and Toharia (2005) for a detailed discussion on the usage of temporary contracts in Spain.

Bullón (2004a), the operation of THAs is severely regulated in Spain relative to other countries. Cebrián et al. (2001) provide a detailed description of THAs in Spain using a smaller sample from the Official Register of Contracts.<sup>8</sup>

According to the figures in Table 1, the number of THA rapidly increased until 1998, decreasing thereafter. The most probable cause behind such a decline may have been the changes introduced by the labour market reform of 1997. Up to that point, the Spanish law allowed for the possibility that agency workers earned lower wages than similar skilled counterparts at the client firms. In addition, the decline in the number of THAs coincided with a restructuring of the THA industry from which only the most efficient agencies survived. Overall, approximately 15 percent of all temporary work contracts in Spain are finalized via a THA.

Table 2 shows some descriptive statistics for the treatment (agency *temps*) and control (direct-hire *temps*) groups. Both sets of temporary workers have similar percentages of men (approximately 65 percent), yet there are some noticeable differences between the two groups. For instance, agency *temps* are younger. Specifically, sixty-five percent of THA workers are 25 years old or younger relative to 38.6 percent in the control group. Education-wise, temporary workers without any studies as well as those with a primary education constitute the vast majority in both groups of temporary workers. Yet, vocational training and secondary schooling are most common among agency *temps* than among direct-hire temporary workers. Similarly, while the casual contract is the most frequent contract category among both agency and direct-hire temporary workers, the training contract is more widespread among agency *temps* while the per-task contracts is less than among direct-hire *temps*. Non-qualified workers in the mining and

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<sup>8</sup> Our sample ends in December 2004, while Cebrián et al. (2001) work with a sample that expands until 2001. Nevertheless, they only provide descriptive evidence on their sample of contracts as of 1998.

service industries are the most prominent occupational category within the THA group, whereas qualified industry employees constitute the largest group among direct-hire *temps*. Some differences are also noticeable regarding the concentration of agency *temps* by region. Catalonia has the highest incidence of THA employment (with 26.1 percent of temporary workers being agency *temps*), whereas Andalusia has the highest concentration of direct-hire *temps* (25.9 percent of temporary workers are direct-hires). As such, lower rates of temporary employment seem to go along with higher incidence rates of agency work and vice versa. Finally, direct-hire temporary workers display a higher concentration in the construction industry, whereas agency temporary workers seem to cluster to a greater extent in financial services.

To sum up, there are relevant differences between both types of temporary workers and, therefore, any evaluation of the effects of being a THA-temp on the likelihood of holding a permanent work contract in the near future has to account for these differences to properly isolate the effect of agency work. The matching methodology applied in the following sections provides a suitable framework for addressing this problem.

## **4. Methodology**

### **4.1. Background**

Our objective is to measure the “causal” impact of agency work on temporary workers’ posterior likelihood of being hired on a permanent basis. Ideally, we would like to observe the same individual both as an agency worker and as a non-agency worker; however, this is not feasible.

Moreover, agency contracting does not allow for a natural experiment. Specifically, the decision to go through a THA (i.e. receive treatment) is likely to be correlated with the likelihood of being employed on a permanent basis (i.e. outcome) as agency work is voluntary. Those

individuals most likely to benefit from agency work will be the ones most likely to address these labour market intermediaries. The selection into agency work implies that a simple comparison of labour market outcomes for agency and non-agency temporary workers would confound the impact of agency work with that of workers' unobservable characteristics, such as motivation or success in finding employment on their own.

Therefore, there are two approaches that may be used to estimate agency effects.<sup>9</sup> One approach is a parametric method based on a more or less complete modelling of both the selection into treatment and the process determining the outcome. A disadvantage of parametric methods is that they require a relatively strict set of assumptions regarding error terms and functional forms. These assumptions could bias the results if proven invalid. A second approach consists of non-parametric evaluation methods that exploit the information on treatment and control groups, as is the case with matching methods (Heckman et al., 1998). As noted by Rosenbaum and Rubin (1983: 48): "Matched sampling is a method for selecting units from a large reservoir of potential comparisons to produce a comparison group of modest size in which the distribution of covariates is similar to the distribution in the treated group."

#### **4.2. Estimation Method**

The main purpose of our analysis is to assess the causal effect of agency work on the likelihood of signing an indefinite-term contract by a temporary worker in the near future. The concept of causal effect was formulated by Rubin (1974), who argued that: "The causal effect of a measure for a specific person is the difference between the likely outcome of a person's participation in a measure and the likely outcome of a person's non-participation" (Rubin, 1974: 689). Formally, let  $Y_i$  denote the outcome if the individual was an agency worker at some point

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<sup>9</sup> For an excellent overview of these two and other econometric approaches to the evaluation problem, see Heckman, Lalonde and Smith (1999).

in time during the period under analysis, and  $Y_0$  is the outcome otherwise. Hence, for a given individual  $i$ , the impact of agency participation,  $\Delta_i$ , is defined as:

$$\Delta_i = Y_{1i} - Y_{0i} \quad (1)$$

Suppose  $D$  is an indicator variable that equals 1 for individuals who participate in agency work and 0 for individuals who do not participate. Additionally, the vector  $X$  includes variables that affect both whether an individual chooses to contact with a THA as well as the employment outcome under analysis. A variety of agency impact measures can be estimated. Our analysis focuses on two impact measures. First, we compute the average treatment effect (ATE):

$$E(\Delta) = E(Y_1 - Y_0) \quad (2)$$

which is of interest in deciding whether THA contracting should be mandatory for all temporary work. However, we are mostly interested in our second impact measure: the average treatment effect on the treated (ATT):

$$E(\Delta|D=1) = E(Y_1 - Y_0|D=1) = E(Y_1|D=1) - E(Y_0|D=1) \quad (3)$$

which is helpful in deciding whether THA contracting should be continued as it currently operates. The major difficulty in assessing the ATT originates in the complexity of evaluating  $E(Y_0|D=1)$  as  $Y_0$  cannot be observed for agency workers. Therefore, we rely on the conditional independence assumption (CIA), which implies that, conditional on a set of observable variables ( $X$ ), assignment between the treatment and control groups is random:

$$Y_1, Y_0 \perp D|X \quad (4)$$

When is the CIA likely to hold? In two circumstances: (a) when there is randomness in the assignment of treatment (a non-valid argument in our case), or (b) when treatment and control group observations can be matched using a relatively rich set of covariates. In our view, the dataset used in this analysis contains sufficient information to ensure that the CIA holds. In

particular, the dataset allows us to match individuals in the treatment and control groups on the basis of local labour market characteristics and initial employment conditions. These two sets of variables have been identified as particularly important in evaluations of matching estimators (for example, Card and Sullivan, 1988, Heckman et al., 1999, and Kluve et al., 2001). If the CIA holds, the equality:  $E(Y_0/D=1, X) = E(Y_0/D=0, X)$  holds. Therefore,  $E(Y_0/D=1)$  and the average causal effect of agency work can be consistently estimated using a group of non-agency workers with a distribution of exogenous variables similar to the distribution of agency workers.

In addition to the CIA, the common support assumption must hold for the matching method to provide valid estimates of the impact of agency work (Rubin, 1979). The common support assumption requires that, for each THA worker, there is another non-THA worker who can be used as a matched comparison observation. While there is no formal test for the CIA, the validity of the common support assumption can be tested. Figure 1 presents the propensity score histogram by treatment status. While treatment observations are more concentrated at higher predicted scores, it is apparent that the common support assumption is satisfied given the high degree of overlap between the two distributions.

### **4.3. Implementation**

As noted earlier, we need a large number of exogenous variables to ensure the validity of the CIA. The large number of observations makes it much more difficult to obtain a non-parametric estimate of  $E(Y_0/D=1)$ . To circumvent this problem, the vector  $X$  is condensed to a scalar: the propensity score. The propensity score is defined as the probability of agency work conditional on  $X$ , that is:  $p(x)=P(D=1|X=x)$ . Rosenbaum and Rubin (1983) show that, if the CIA is valid, conditioning on the propensity score is sufficient to guarantee the statistical independence of the potential outcome from the treatment. Therefore, the first stage in the

matching is to model the probability of being hired as an agency *temp*. With that purpose, we only need to include those variables that influence the likelihood of contracting with a THA as well as the outcome under consideration. The rationale behind this is that, if a variable influences participation but not the outcome, there is no need to control for differences with respect to this variable in the treatment versus the control groups since the outcome remains unaffected by the variable in question. Likewise, if the variable influences the outcome but not the treatment likelihood, there is no need to control for that variable since the outcome will not significantly differ in the treatment versus the control groups. Variables that affect neither treatment nor the outcome are also clearly unimportant. Therefore, only those variables that influence both the treatment and the outcome are needed for the matching and are included in the probit model from which we derive the propensity score.

After deriving the propensity score, we need to ensure that there is enough common support. This is done discarding treated individuals with a propensity score laying outside the range of propensity scores for individuals in the control group. Consequently, treated individuals lacking a pair wise control group observation are eliminated.

Once the common support requirement is fulfilled, we can carry out the matching for all pair wise combinations. Various propensity score matching methods have been proposed in the literature as a means to identify a comparison group. Each of these methods implies a trade-off between quality and quantity of the matches. Therefore, we use a number of of them as a robustness check.<sup>10</sup> The most intuitive matching method is the *nearest-neighbour* (or *one-to-one*) matching, which matches each treated observation to a control observation with the closest propensity score. This procedure is usually implemented with replacement; that is, each treated individual has one match, but a control group individual may be matched to more than one

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<sup>10</sup> We use the publicly available Stata command developed by Leuven and Sianesi (2003).

treated individual.<sup>11</sup> Once each treated observation is matched to a control group observation, the difference between the outcomes for the treated versus the control observations is computed. The ATT is then obtained by averaging these differences. Dehejia and Wahba (1998) found that matching with replacement improves the performance of the match and is less demanding with regards to the common support requirement.

However, some of the matches performed through the nearest-neighbour matching method might be fairly poor. In those instances, the *radius* and *kernel matching* methods offer some alternatives. With radius matching, each treated observation is matched only to one control group observation with a propensity score in a predefined neighbourhood of the treated observation's propensity score. In kernel-based matching, the contribution of each control group observation is weighted so as to attach greater weight to "good" matches. The most common approach is to use the normal distribution (with a mean of zero) as the kernel function. In this manner, exact matches are weighted more heavily than poor matches.

Using the aforementioned matching methods, we estimate the effect of THA work as the mean difference in the likelihood of being hired on a permanent basis for THA workers versus direct-hire temporary workers. Subsequently, we perform a number of diagnostic tests to establish the quality of the matching.

## **5. Evaluation Results**

### **5.1. Selection into Agency Work**

Table 4 displays the results from the probit model of the likelihood of contracting with a THA. The results generally confirm the *t*-statistics in Table 2. Men and younger workers are more likely to resort to a THA when looking for employment relative to women and older

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<sup>11</sup> This may result in individuals being used as a comparison group more than once. Should this happen, such individuals receive a weight that corresponds to the number of times they serve as a comparison.

workers. Additionally, temporary workers with vocational training are more likely to contract with a THA than non-educated workers. Yet, workers with a university degree are less likely to search for work via a THA than non-educated workers. The figures in Table 4 also suggest that temporary workers with ‘casual’ contracts intended to accommodate fluctuations in demand are more commonly employed by THAs. This is not surprising considering that THAs seem to primarily serve the service sector –one of the sectors experiencing greater fluctuations in demand, i.e. tourism. We also find that non-qualified temporary workers –often employed in the service sector– are more likely to use THAs to find employment relative to qualified workers. Finally, THAs appear more popular in Catalonia and Madrid relative to Andalusia, Extremadura, Balearic or Canary Islands, among other Spanish regions.

## **5.2. Average Treatment Effects and Sensitivity Analysis**

Table 5 displays the ATT and ATE estimates of the implications of agency work that result from alternative propensity score matching methods. In all instances, agency work has a significant and negative effect that fluctuates between 15 and 27 percentage points on the probability of being hired on a permanent basis anytime after treatment and until the end of 2004. The range of values for the ATE (i.e. 15 to 21 percentage points) is somewhat narrower than for the ATT (i.e. 15 to 27 percentage points). However, both ATT and ATE estimates remain fairly robust to the choice of matching method. At any rate, it is worth noting a couple of facts helpful in understanding the signs for the ATT and ATE estimates. First, Spanish THAs are unauthorized to act as labour market intermediaries in the hiring of workers for permanent positions. As such, THAs are more likely to be relegated to the management of short-lived jobs less likely to lead to permanent work assignments within the client firms, which could help explain the negative sign on the ATT estimates. Secondly, Spanish policymakers have been

debating whether labour market intermediaries should be made mandatory in the hiring for temporary positions –a proposal envisioned to serve as a safeguard against an excessive use of temporary work contracts by firms.<sup>12</sup> The ATE estimates seem to suggest that this requirement would have a negative impact on temporary workers’ posterior transition to a permanent position.

Our findings differ from those in Malo and Muñoz-Bullón (2002), Muñoz-Bullón and Rodes (2004) and García-Pérez and Muñoz-Bullón (2005). However, the samples and methodologies used by these other studies significantly differ from the ones used herein. First, our control group consists of temporary workers, while the aforementioned studies use unemployed workers as their control group. Additionally, our analysis exploits the longitudinal administrative information we have on these individuals via propensity score matching instead of via fully parametric techniques relying on the exogeneity of one or two instruments to model the selection of workers into agency work.

Our results also differ from those found by Ichino et al. (2004) for Italy using a mix of unemployed and temporary workers as their control group. However, when restricting their control group to only temporary workers in their sensitivity analyses, Ichino et al. (2004) also find that agency work has a negative impact on temporary workers’ future likelihood of securing a permanent job. As such, the composition of the control group seems to play a crucial role in the outcome from the THA evaluation.

Finally, we assess the quality of the matching, which is typically regarded as high if the distribution of the relevant variables in the treatment and control groups does not significantly differ. Table 6 displays the mean values of the variables used in the analysis for the treatment and control groups in each of the matching methods employed. Overall, the figures in Table 6

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<sup>12</sup> As noted earlier, THAs are governed by a relatively strict regulation intended to safeguard workers’ rights.

confirm that the bias is small and often not significantly different from zero when using the nearest-neighbour and kernel matching methods –in the latter case, the Epanechnikov kernel provides an even better matching. The bias is, however, larger when we use the radius matching. As such, the estimates derived from this last method may be less reliable –a reassuring finding since the ATT and ATE estimates in Table 5 are significantly closer to each other when using the other three matching methods.

### **5.3. Heterogeneity in the Treatment Effects**

At this juncture, it is worth noting that if the treatment effect is highly heterogeneous with respect to specific individual or work related characteristics, the causal effect will not be estimated accurately. To account for any potential variability in the magnitude of the THA work effect, we estimate the ATT and ATE of agency work for separate sub-samples of individuals. In particular, we carry out the analysis by gender, as well as by workers' educational attainment, type of work contract held, and region of residence. Given the large number of categories within educational attainment, contract type and region of residence, in addition to carrying the analysis separately for men and women, we focus on the following groups, because they exhibit significant differences between treatment and control groups, as shown in the descriptive analysis: (a) individuals without studies or with primary studies –more likely to be employed on a temporary basis, but less likely to be agency *temps*; (b) individuals with a 'practice' or 'training' contract –special contract categories more likely to lead to a subsequent contract with the client firm; and (c) Andalusia and Catalonia –two regions with opposing incidences of agency work.

The results from this heterogeneity analysis are displayed in Tables B through H in the Appendix. Overall, our initial findings remain robust. For instance, in most instances, the ATT

fluctuates between 24 and 28 percentage points when focusing on the nearest-neighbour or the two kernel matching methods. While smaller in magnitude, the ATE generally varies from 16 to 24 percentage points. Yet, some differences are worth discussing. Specifically, we find that the ATT and ATE are larger in absolute terms for workers with ‘practice’ or ‘training’ contracts, who may enjoy a greater likelihood of being offered a permanent position by the client firm if they are direct-hires. Likewise, the ATT and ATE are larger in absolute terms for workers in Catalonia –the region with the lowest rate of temporality in Spain and where THAs are quite prevalent. In contrast, the ATT and ATE are closer to zero in Andalusia (ATT is not significant), where THAs do not have a strong presence. Consequently, in Andalusia, all temporary workers (independently of whether they are direct-hire or agency *temps*) have a similar probability of obtaining a permanent job.

## **6. Conclusions**

We evaluate the average effect of THA work on the likelihood of being hired on a permanent basis in the near future using propensity score matching methods. Temporary help agencies were first recognized by the Spanish law in 1994 with the intent of facilitating unemployment to work transitions. While THAs may have helped in that regard, they do not seem to have facilitated temporary workers’ posterior transition into permanent employment relative to direct-hire temporary work. Specifically, agency workers endure a 15 to 27 percentage point lower likelihood of securing a permanent job in the near future than their direct-hire counterparts. We also look for and detect relevant heterogeneity in the treatment along several characteristics, such as the type of temporary work contract held or the temporary worker’s region of residence. We find that the negative ATT and ATE are larger for individuals with a ‘practice’ or ‘training’ contract as well as for those residing in Catalonia.

Summarizing, our results do not lend support to the hypothesis that THAs serve as an effective stepping-stone into permanent employment in the near future as direct-hire temporary workers are more likely to transition to a permanent position than their agency counterparts. Consequently, while THAs may play an important role in moving some individuals out of unemployment into employment, they do not necessarily favour the posterior transition to a permanent job relative to direct-hire temporary work. As noted by Ichino et al. (2004) for Italy, using a more relevant comparison group as a control –as is the case with other direct-hire temporary workers– becomes crucial in finding a negative impact of agency work on temporary workers’ posterior transition to a permanent position. Our finding could be partially explained by the unilateral relationship enjoyed by direct-hires with the client firms relative to their agency counterparts. Indeed, the unilateral work relationship between direct-hires and their client firms allows for the development of greater work attachment and a stronger bond between workers and employers; all of which is more likely to result in a contractual agreement of a permanent nature than in the case of agency workers. Additionally, the fact that labour market intermediation in the hiring of workers for permanent positions is forbidden by law implies that client firms exclusively rely on THAs to find just-in-time labour to meet occasional product demand fluctuations. Under such circumstances, it is not surprising to find that THAs do not promote the transition to permanent employment but, rather, facilitate unemployment-to-work or temporary-to-temporary job mobility.

We would like to conclude by noting that, policy-wise, the ATE estimates suggest that the imposition of mandatory labour market intermediation in the hiring for temporary work positions would not necessarily favour workers’ transition to more stable jobs. However, the ATT estimates hint on the possibility that *temp-to-perm* transitions could be facilitated by the

usage of THAs if these agencies could help as labour market intermediaries in the hiring of workers for permanent positions.

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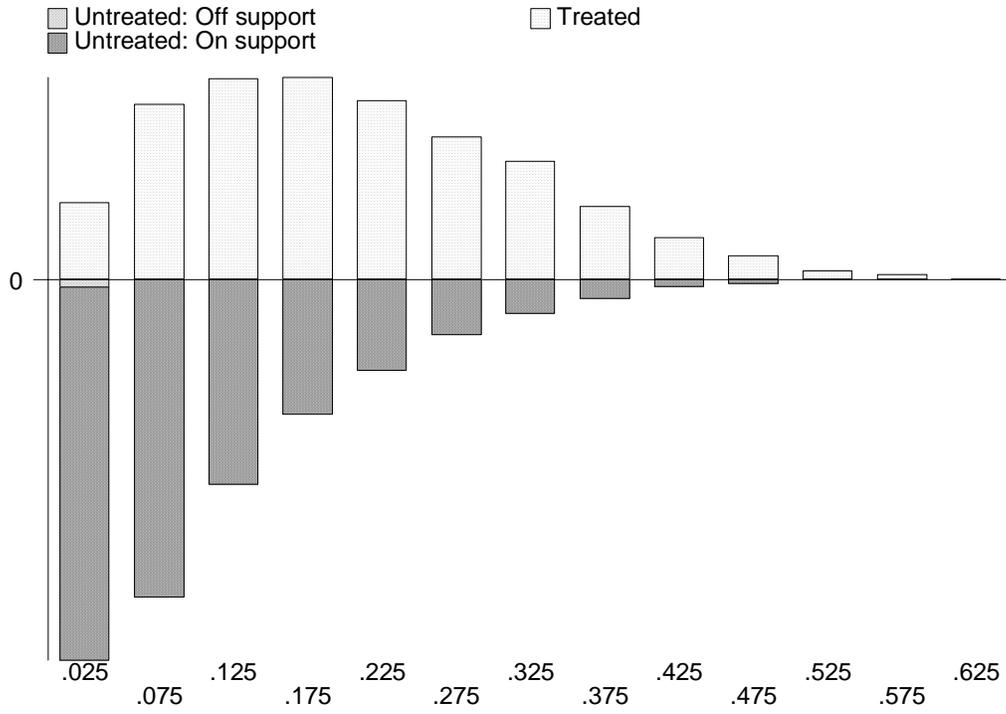
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**Figure 1**  
**Propensity Score Histogram by Treatment Status**



**Table 1**  
**Evolution of the THA sector in Spain**

<b>Absolute Values</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>
Number of THAs	86	316	399	428	435	410	364	346	335	326	342
Agency workers (thousands)	-	301.3	622.7	442.5	587.7	618.9	593.6	552.8	549.5	551.3	636.2
Agency contracts (thousands)	-	378.7	809.1	1309	1803.5	2002	2005.1	1901.3	1849.4	1991.1	2209.4
<b>Variation with Respect to the Previous Year</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>
No. THAs	-	267.44	26.27	7.27	1.64	-5.75	-11.22	-4.95	-3.18	-2.68	4.90
Assigned workers	-	-	106.67	-28.94	32.81	5.31	-4.09	-6.87	-0.60	0.32	-15.39
Assignment contracts	-	-	113.65	61.78	37.78	11.01	0.15	-5.18	-2.73	-7.66	10.96

**Source:** *Anuario de Estadísticas Laborales y Asuntos Sociales (Ministerio de Trabajo y Asuntos Sociales).*

**Notes:** Data as of the last day of each year.

**Table 2**  
**Differences in the Means for Treatment and Control Group Observations**

<b>Group</b>	<b>Treatment</b>	<b>Control</b>	<b>Bias (%)</b>	<b>t-statistic</b>
Male	0.653	0.654	-0.3	-0.15
<i>Age</i>				
Age 16-20	0.338	0.161	42	26.38
Age 21-25	0.312	0.225	19.7	11.6
Age 26-30	0.163	0.184	-5.5	-3.08
Age 31-35	0.082	0.139	-18.3	-9.59
Age 36-40	0.053	0.102	-18.3	-9.4
Age 41-50	0.044	0.129	-30.6	-14.97
Age > 51	0.008	0.061	-29.1	-13.21
<i>Education</i>				
Without studies	0.277	0.386	-23.4	-12.85
Primary education	0.445	0.354	18.7	10.77
Vocational training	0.127	0.094	10.6	6.36
Secondary education	0.105	0.085	6.8	4
College degree	0.047	0.082	-14.4	-7.48
<i>Initial Temporary Contract</i>				
Work-experience contract	0.038	0.044	-3	-1.65
Training contract	0.121	0.067	18.3	11.57
Interim contract	0.106	0.108	-0.6	-0.37
Casual contract	0.449	0.399	10	5.68
Per-task contract	0.287	0.382	-20.1	-11.13
<i>Initial Occupation</i>				
Professional/Manager	0.019	0.055	-18.9	-9.23
Technician	0.030	0.042	-6.4	-3.43
Administrative worker	0.117	0.088	9.7	5.78
Service worker	0.179	0.145	9.1	5.34
Agriculture worker	0.032	0.090	-24.6	-12.05
Qualified industry worker	0.179	0.223	-11	-6.05
Semi-qualified industry worker	0.057	0.064	-2.7	-1.53
Non-qualified service worker	0.097	0.106	-2.9	-1.63
Non-qualified mining worker	0.289	0.187	24.2	14.56
<i>Region</i>				
Andalusia	0.106	0.259	-40.6	-20.56
Aragón	0.037	0.024	7.7	4.78
Asturias	0.015	0.021	-4.3	-2.31
Balearic Islands	0.022	0.031	-5.7	-3.04
Canary Islands	0.044	0.053	-4.4	-2.4
Cantabria	0.011	0.011	0.2	0.09
Castilla- la – Mancha	0.025	0.039	-8.2	-4.29
Castilla y León	0.060	0.044	7.1	4.29
Catalonia	0.261	0.130	33.4	21.12

**Table 2 – Continued**

<b>Group</b>	<b>Treatment</b>	<b>Control</b>	<b>Bias (%)</b>	<b>t-statistic</b>
Valencia	0.101	0.103	-0.6	-0.36
Extremadura	0.013	0.032	-13	-6.44
Galicia	0.050	0.056	-2.6	-1.45
Murcia	0.022	0.031	-5.3	-2.84
Navarra	0.023	0.011	8.7	5.71
Basque Country	0.053	0.038	7.3	4.38
La Rioja	0.008	0.005	3.3	2.02
Madrid	0.151	0.112	11.6	6.91
<i>Sector</i>				
Agriculture & Mining	0.051	0.121	-24.8	-12.46
Manufacturing	0.084	0.065	7.5	4.47
Chemical Industry	0.134	0.081	17.2	10.7
Commerce	0.161	0.131	8.5	4.98
Tourism	0.093	0.071	8	4.78
Transportation and Communications	0.031	0.042	-5.8	-3.11
Financial Services	0.196	0.092	29.9	19.31
Public/Personal Services	0.114	0.172	-16.8	-8.97
Construction	0.136	0.226	-23.6	-12.47
Observations	3,673	25,725	-	-

**Table 3**  
**Transitions to Permanent Employment After 1998**

	<b>Permanent Work</b>	<b>Temporary Work</b>	<b>Total</b>
<b>Treatment Group</b>	1,109 (30.19%)	2,564 (69.81%)	3,673
<b>Control Group</b>	11,464 (44.56%)	14,261 (55.44%)	25,725
<b>Total</b>			29,398

**Table 4**  
**Probit Model of the Likelihood of Becoming a THA Worker**

Variables	Coefficients	z-stat
Constant	<b>-1.367</b>	17.910
Male	<b>0.058</b>	2.390
<i>Age</i>		
Age 16-20	<b>0.620</b>	15.380
Age 21-25	<b>0.373</b>	10.150
Age 26-30	<b>0.190</b>	4.850
Age 31-35	-	-
Age 36-40	-0.043	-0.880
Age 41-50	<b>-0.242</b>	-4.870
Age > 51	<b>-0.596</b>	-7.120
<i>Education</i>		
Without studies	-	-
Primary education	0.021	0.840
Vocational training	<b>0.086</b>	2.210
Secondary education	0.012	0.310
College degree	<b>-0.121</b>	-2.110
<i>Initial Temporary Contract</i>		
Work-experience contract	<b>-0.145</b>	-2.350
Training contract	0.012	0.270
Interim contract	0.071	1.810
Casual contract	<b>0.064</b>	2.460
Per-task contract	-	-
<i>Initial Occupation</i>		
Professional/Manager	<b>-0.634</b>	-8.420
Technician	<b>-0.478</b>	-7.920
Administrative Worker	<b>-0.200</b>	-4.740
Service Worker	<b>-0.230</b>	-5.870
Agriculture Worker	<b>-0.278</b>	-4.250
Qualified industry worker	<b>-0.198</b>	-6.020
Semi-qualified industry worker	<b>-0.233</b>	-4.890
Non-qualified service worker	<b>-0.157</b>	-3.510
Non-qualified mining worker	-	-
<i>Region</i>		
Andalusia	<b>-0.452</b>	-9,150
Aragón	0.102	1,590
Asturias	<b>-0.262</b>	-3,270
Balearic Islands	<b>-0.362</b>	-5,260
Canary Islands	<b>-0.233</b>	-4,350
Cantabria	-0.067	-0,690
Castilla- la – Mancha	<b>-0.373</b>	-5,770
Castilla y León	0.089	1,730
Catalonia	<b>0.203</b>	5,580

**Table 4 – Continued**

<b>Variables</b>	<b>Coefficients</b>	<b>z-stat</b>
Valencia	<b>-0.168</b>	-4,010
Extremadura	<b>-0.412</b>	-4,740
Galicia	<b>-0.153</b>	-2,990
Murcia	<b>-0.293</b>	-4,300
Navarra	<b>0.182</b>	2,190
Basque Country	0.048	0,900
La Rioja	0.094	0,750
Madrid	-	-
<i>Sector</i>		
Agriculture & Mining	0.103	1,710
Manufacturing	<b>0.249</b>	5,310
Chemical Industry	<b>0.323</b>	7,850
Commerce	<b>0.232</b>	5,640
Tourism	<b>0.368</b>	7,040
Transportation and Communications	0.111	1,740
Financial Services	<b>0.628</b>	15,130
Public/Personal Services	<b>0.129</b>	2,960
Construction	-	-
<i>Unemployment rate</i>	-0.002	-0,560
Observations	29398	
LR chi2	2614.27	
Log likelihood	-9765.7461	
Prob>chi2	0.0000	

**Table 5**  
**Average Treatment Effects on the Treated (ATT) and Average Treatment Effects (ATE)**

Matching Method	Treated	Matched Control	ATT	ATE
<b>Nearest-neighbour with Replacement</b>	.3019	.5747	-.2728 (.0154)	-.2059 (.0116)
<b>Kernel Matching:</b>				
<i>Gaussian kernel</i>	.3019	.5434	-.2415 (.0072)	-.1841 (.0102)
<i>Epanechnikov kernel</i>	.3019	.5643	-.2624 (.0081)	-.1959 (.0085)
<b>Radius Matching</b>	.3019	.4476	-.1456 (.0085)	-.1456 (.0086)
Observations	3,673	25,565		

**Note:** Treatment refers to having been employed by a THA after 1998. Matching is always carried out with common support. The entries in brackets refer to bootstrapped standard errors (500 replications).

**Table 6**  
**Imbalance Check**

Matching Method	Nearest-neighbour with Replacement				Gaussian Kernel			Epanechnikov Kernel			Radius		
	Treated	Matched Control	% bias	t-test	Matched Control	% bias	t-test	Matched Control	% bias	t-test	Matched Control	% bias	t-test
<i>Male</i>	0.653	0.653	0.1	0.05	0.653	0	-0.01	0.654	-0.2	-0.21	0.654	-0.3	-0.15
<i>Age</i>													
Age 16-20	0.338	0.346	-1.9	-0.66	0.292	11.1	8.64	0.327	2.6	2.01	0.162	41.8	26.23
Age 21-25	0.312	0.322	-2.2	-0.84	0.296	3.5	2.88	0.309	0.7	0.56	0.226	19.3	11.41
Age 26-30	0.163	0.151	3.2	1.34	0.168	-1.5	-1.26	0.161	0.4	0.35	0.185	-5.8	-3.25
Age 41-50	0.044	0.045	-0.6	-0.32	0.065	-7.7	-8.06	0.051	-2.7	-3.04	0.129	-30.6	-15.02
Age > 51	0.008	0.010	-0.8	-0.57	0.020	-6.2	-8.14	0.013	-2.3	-3.46	0.056	-26.3	-12.45
<i>Education</i>													
Vocational training	0.127	0.123	1.2	0.46	0.120	2.2	1.75	0.126	0.4	0.30	0.094	10.5	6.26
College degree	0.047	0.048	-0.8	-0.36	0.055	-3.5	-3.31	0.049	-0.9	-0.87	0.081	-14.2	-7.41
<i>Initial Temporary Contract</i>													
Work-experience contract	0.038	0.041	-1.5	-0.61	0.040	-1.2	3.02	0.039	-0.5	0.82	0.044	-3.1	-1.71
Casual contract	0.449	0.446	0.6	0.24	0.435	2.7	2.33	0.444	1	0.81	0.401	9.7	5.53
<i>Initial Occupation</i>													
Professional/Manager	0.019	0.022	-1.5	-0.77	0.028	-4.7	-5.00	0.022	-1.7	-1.91	0.054	-18.5	-9.12
Technician	0.030	0.022	4.4	2.03	0.033	-1.4	-1.31	0.031	0	-0.03	0.043	-6.5	-3.46
Administrative Worker	0.117	0.116	0.5	0.20	0.114	1.1	0.90	0.119	-0.6	-0.52	0.088	9.5	5.68
Service Worker	0.179	0.198	-5.2	-1.95	0.174	1.3	1.10	0.177	0.3	0.28	0.146	8.9	5.20
Agriculture Worker	0.032	0.030	0.5	0.25	0.045	-5.5	-5.86	0.035	-1.6	-1.78	0.089	-24.2	-11.91
Qualified industry worker	0.179	0.185	-1.4	-0.56	0.192	-3.1	-2.77	0.184	-1	-0.92	0.222	-10.6	-5.86
Semi-qualified industry worker	0.057	0.050	3.2	1.35	0.057	0.2	0.17	0.054	1.3	1.12	0.064	-2.8	-1.54
Non-qualified service worker	0.097	0.080	5.9	2.49	0.100	-0.8	-0.67	0.098	-0.2	-0.17	0.107	-3.1	-1.75
<i>Region</i>													
Andalusia	0.106	0.107	-0.4	-0.21	0.141	-9.3	-9.21	0.115	-2.6	-2.68	0.256	-39.6	-20.19
Asturias	0.015	0.020	-3.5	-1.41	0.017	-1.2	-1.07	0.016	-0.3	-0.28	0.021	-4.3	-2.33

Table 6 – Continued

Matching Method	Nearest-neighbour with Replacement				Gaussian Kernel			Epanechnikov Kernel			Radius			
	Variables	Treated	Matched Control	% bias	t-test	Matched Control	% bias	t-test	Matched Control	% bias	t-test	Matched Control	% bias	t-test
	Balearic Islands	0.022	0.023	-0.8	-0.36	0.025	-2.1	-1.86	0.024	-1	-0.89	0.031	-5.8	-3.09
	Canary Islands	0.044	0.045	-0.5	-0.21	0.047	-1.5	-1.35	0.045	-0.4	-0.39	0.054	-4.5	-2.49
	Castilla- la – Mancha	0.025	0.020	2.3	1.10	0.028	-1.7	-1.63	0.025	-0.1	-0.09	0.039	-8.2	-4.33
	Catalonia	0.261	0.269	-2.1	-0.74	0.223	9.5	7.43	0.250	2.8	2.12	0.131	33.2	20.98
	Valencia	0.101	0.106	-1.4	-0.57	0.103	-0.6	-0.52	0.101	0	0.02	0.104	-0.8	-0.47
	Extremadura	0.013	0.011	1.5	0.81	0.017	-3.2	-3.27	0.014	-1	-1.10	0.032	-12.8	-6.38
	Galicia	0.050	0.044	2.4	1.03	0.054	-1.8	-1.53	0.052	-1.1	-0.96	0.056	-2.8	-1.54
	Murcia	0.022	0.025	-1.4	-0.57	0.025	-1.8	-1.62	0.024	-0.7	-0.68	0.031	-5.4	-2.90
	Navarra	0.023	0.019	3.2	1.15	0.020	2.3	1.77	0.022	0.7	0.55	0.011	8.7	5.67
<i>Sector</i>														
	Manufacturing	0.084	0.085	-0.2	-0.08	0.079	1.9	1.54	0.082	0.9	0.75	0.065	7.4	4.37
	Chemical Industry	0.134	0.144	-3.3	-1.16	0.122	4	3.17	0.131	1.1	0.87	0.081	17.1	10.59
	Commerce	0.161	0.160	0.3	0.12	0.158	0.9	0.73	0.161	0	-0.01	0.132	8.3	4.84
	Tourism	0.093	0.097	-1.6	-0.59	0.090	1.1	0.86	0.093	-0.1	-0.05	0.071	7.9	4.69
	Financial Services	0.196	0.181	4.2	1.50	0.167	8.3	6.37	0.192	1.2	0.87	0.093	29.7	19.20
	Public/Personal Services	0.114	0.114	-0.2	-0.07	0.126	-3.6	-3.33	0.115	-0.3	-0.26	0.172	-16.8	-19.56

**Note:** Matching is always carried out with common support.

## APPENDIX

**Table A**  
**Description of Work Contract Denominations Used in the Analysis**

<b>Work Contract Name</b>	<b>Description</b>
Work-Experience (Practice) Contract	The purpose of this contract is to enable persons who have completed secondary, vocational training or university education to gain work experience according to their educational level.
Training Contract	This contract is related to the provision of theoretical and practical knowledge required to perform a skilled job. This contract replaced the old apprenticeship contract in 1997.
Interim Contract	This temporary contract is related to interim situations in the firm
Per-task Contract	This contract was introduced for temporary needs of the firms related to specific works or services of unknown duration (but presumably not permanent).
Casual Contract	This contract is related to unusual or seasonal circumstances of the goods markets and excess of work in the firm.

**Table B**  
**ATT and ATE for Men**

Matching Method	Treated	Matched Control	ATT	ATE
<b>Nearest-neighbour with Replacement</b>	.2859	.5298	-.2438 (.0192)	-.2202 (.0131)
<b>Kernel Matching:</b>				
<i>Gaussian kernel</i>	.2859	.5315	-.2456 (.0097)	-.1976 (.0120)
<i>Epanechnikov kernel</i>	.2859	.5506	-.2647 (.0106)	-.2071 (.0105)
<b>Radius Matching</b>	.2859	.4410	-.1550 (.0099)	-.1550 (.0105)
Observations	2,399	16,661		

**Note:** Treatment refers to having been employed by a THA after 1998. Matching is always carried out with common support. The entries in brackets refer to bootstrapped standard errors (500 replications).

**Table C**  
**ATT and ATE for Women**

Matching Method	Treated	Matched Control	ATT	ATE
<b>Nearest-neighbour with Replacement</b>	.3322	.6142	-.2820 (.0240)	-.1855 (.0248)
<b>Kernel Matching:</b>				
<i>Gaussian kernel</i>	.3322	.5704	-.2381 (.0157)	-.1599 (.0175)
<i>Epanechnikov kernel</i>	.3322	.5952	-.2629 (.0151)	-.1725 (.0196)
<b>Radius Matching</b>	.3322	.4596	-.1273 (.0191)	-.1273 (.0165)
Observations	1,273	8,885		

**Note:** Treatment refers to having been employed by a THA after 1998. Matching is always carried out with common support. The entries in brackets refer to bootstrapped standard errors (500 replications).

**Table D**  
**ATT and ATE for Workers without Studies or with a Primary Education**

Matching Method	Treated	Matched Control	ATT	ATE
<b>Nearest-neighbour with Replacement</b>	.2709	.5475	-.2766 (.0178)	-.2108 (.0139)
<b>Kernel Matching:</b>				
<i>Gaussian kernel</i>	.2709	.5078	-.2368 (.0114)	-.1726 (.0090)
<i>Epanechnikov kernel</i>	.2709	.5316	-.2607 (0.008)	-.1873 (.0114)
<b>Radius Matching</b>	.2709	.3945	-.1235 (.0089)	-.1235 (.0101)
Observations	2,650	18,906		

**Note:** Treatment refers to having been employed by a THA after 1998. Matching is always carried out with common support. The entries in brackets refer to bootstrapped standard errors (500 replications).

**Table E**  
**ATT and ATE for Workers with Practice or Training Contracts**

Matching Method	Treated	Matched Control	ATT	ATE
<b>Nearest-neighbour with Replacement</b>	.2965	.6637	-.3672 (.0406)	-.3647 (.0406)
<b>Kernel Matching:</b>				
<i>Gaussian kernel</i>	.2965	.6783	-.3817 (.0234)	-.3724 (.0226)
<i>Epanechnikov kernel</i>	.2965	.6809	-.3843 (.0197)	-.3536 (.0262)
<b>Radius Matching</b>	.2965	.6732	-.3767 (.0208)	-.3767 (.0230)
Observations	580	2828		

**Note:** Treatment refers to having been employed by a THA after 1998. Matching is always carried out with common support. The entries in brackets refer to bootstrapped standard errors (500 replications).

**Table F**  
**ATT and ATE for Non-qualified Workers**

Matching Method	Treated	Matched Control	ATT	ATE
<b>Nearest-neighbour with Replacement</b>	.2973	.5285	-.2311 (.0153)	-.2113 (.0258)
<b>Kernel Matching:</b>				
<i>Gaussian kernel</i>	.2973	.5253	-.2279 (.0149)	-.1779 (.0122)
<i>Epanechnikov kernel</i>	.2973	.5414	-.2440 (.0146)	-.2440 (.0116)
<b>Radius Matching</b>	.2973	.4165	-.1191 (.0132)	-.1191 (.0136)
Observations	1,419	7,238		

**Note:** Treatment refers to having been employed by a THA after 1998. Matching is always carried out with common support. The entries in brackets refer to bootstrapped standard errors (500 replications).

**Table G**  
**ATT and ATE for Workers in Andalusia**

Matching Method	Treated	Matched Control	ATT	ATE
<b>Nearest-neighbour with Replacement</b>	.2448	.2448	-.0412 (.0342)	-.0665 (.0200)
<b>Kernel Matching:</b>				
<i>Gaussian kernel</i>	.2448	.2886	-.0438 (.0236)	-.0253 (.0216)
<i>Epanechnikov kernel</i>	.2448	.3430	-.0981 (.0269)	-.0981 (.0204)
<b>Radius Matching</b>	.2448	.3430	-.0981 (.0269)	-.0981 (.0204)
Observations	1,419	7,238		

**Note:** Treatment refers to having been employed by a THA after 1998. Matching is always carried out with common support. The entries in brackets refer to bootstrapped standard errors (500 replications).

**Table H**  
**ATT and ATE for Workers in Catalonia**

Matching Method	Treated	Matched Control	ATT	ATE
<b>Nearest-neighbour with Replacement</b>	.3743	.7034	-.3291 (.0272)	-.2860 (.0301)
<b>Kernel Matching:</b>				
<i>Gaussian kernel</i>	.3743	.6793	-.3050 (.0174)	-.2825 (.0186)
<i>Epanechnikov kernel</i>	.3743	.3743	-.3092 (.0194)	-.2855 (.0199)
<b>Radius Matching</b>	.3743	.6410	-.2667 (.0155)	-.2667 (.0191)
Observations	1,419	7,238		

**Note:** Treatment refers to having been employed by a THA after 1998. Matching is always carried out with common support. The entries in brackets refer to bootstrapped standard errors (500 replications).