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Do Temporary Help Agencies Help? Temporary Employment Transitions for Low-Skilled Workers*

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Abstract

We investigate how being employed by a Temporary Help Agency (THA) affects transition rates to alternative labor market states for low-skilled workers. Our approach is based on the estimation of competing risk discrete duration models, and reveals the importance of accounting for short duration dependence. We use Spanish administrative data for the period 2005-2017. We find that having a THA contract rather than a direct-hire temporary contract increases the probability of entering into unemployment or another agency job at all durations. Agency workers are more likely to transition to permanent employment than their direct-hire counterparts, but these transitions are very infrequent for both. The positive effect of THA employment on the probability of transitioning to a permanent job is procyclical. By contrast, the positive effect on the probability of entering unemployment (or another agency job) increased during the Great Recession relative to the previous economic expansion, and has remained high during the recovery. In words, agency jobs in Spain are characterized by higher unemployment risk and persistence than regular temporary jobs, and these differences have intensified in recent years. Accouting for unobserved heterogeneity does not alter our main results.

JEL classification: J2, J4, J24, J62, C34.

Keywords: Temporary Help Agency, temporary employment, competing risk duration models, unobserved heterogeneity.

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1 Introduction

The private employment services industry generated revenues of 495 billion euro worldwide in 2019, according to the international association of private employment services providers (World Employment Confederation, 2021). The industry provides a variety of labor intermediation services, including support services related to the direct recruitment process of its client firms. Yet its core activity is agency work.[1] Temporary help agencies (THAs) supply their clients with temporary workers. That is, they sell the labor of the temporary workers they hire to client firms, while they remain liable for all employment obligations. Agency workers mainly concentrate in the services and manufacturing sectors.

THA employment has experienced substantial growth in several developed countries since the 1990s. The number of agency workers placed worldwide increased from 8.9 million (in full-time equivalent) in 2006 to 49 millon in 2019 (World Employment Confederation, 2021). Europe is the largest region in the market for THA services, accounting for a 39% share of worldwide revenues in 2019, and nine European countries rank within the largest fifteen markets worldwide. The growth of THA employment has been particularly steep in countries with historically highly regulated labor markets that have recently been liberalized, and is in part the consequence of deregulation of this form of employment aimed at making labor markets more dynamic (e.g. see Autor, 2009; Fudge and Strauss, 2013; Voss et al., 2013). It is commonly argued that agency work offers greater flexibility to firms in adjusting to fluctuating demand and reduces non-wage labor costs (e.g. benefits, pensions, sickness and holiday pay entitlements,...), among other things. It is important to note that, while THA employment constitutes a relatively small share of total employment, its share in terms of jobs created (new contracts)[2] is much higher in most European countries (see Figure 1).

The recent surge of agency work and the fact that the industry has become an increasingly important employer of low-skilled workers over the last two decades has generated an intense academic and policy debate as to how agency jobs affect worker labor market outcomes. It has also been argued that, regardless of its employment share, the THA industry may be shaping the labor market in important ways (e.g. see Fudge and Strauss, 2013). Theodore and Peck (2002)

[1] Agency work accounted for 79% of the industry's total revenue in 2019, while the corresponding share was 13% for direct recruitment services. The industry provides other services associated to the recruitment and management of its client firms' workforce, but the associated revenue shares are small.

[2] We indistinctly use the term "job" and "contract" to refer to a contractual relationship between a worker and an employer.

stress that THAs are "active institutional agents in the remodeling of labor market norms and conventions" and play a particularly important role in shaping conditions at the bottom end of the labor market. Harrington and Velluzzi (2008) argue that THA employment contracts shift risk from the firm to the worker. In this study, we find that the use of THAs contributes to the surge of jobs with very short-term duration in Spain.

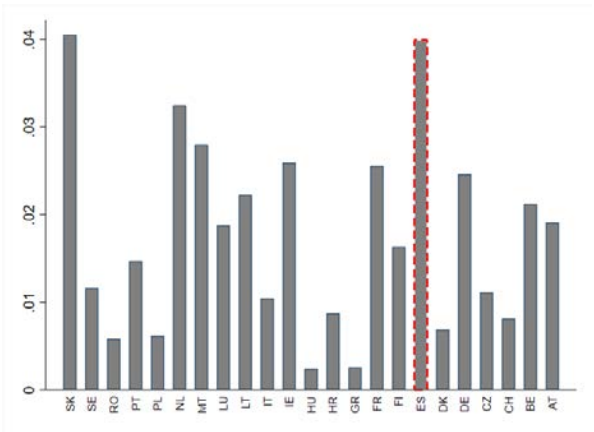
This paper presents an empirical analysis of the effect of holding a THA contract rather than a direct-hire contract on temporary employment duration. Our approach is based on the estimation of competing risk discrete duration models that allow us to study the effect of THA employment on the probability of transitioning to different labor market states: permanent or temporary jobs, or unemployment. We control for personal characteristics and business cycle effects and also consider an extended version of the model allowing for individual unobserved heterogeneity. We use Spanish administrative data (the Continuous Sample of Working Lives). Our sample period covers the economic expansion (2004-2007), the economic crisis (2008-2012) and the recovery period (2013-2017), allowing us to assess the effect of THA employment in three different phases of the business cycle.

Spain is a particularly interesting case, given its chronically high rates of unemployment and temporary employment. The Spanish agency work market ranked 12th worldwide in 2019, generating 5.6 billion euros in revenues (World Employment Confederation, 2021). In terms of its share of total employment, it was 4% in 2019, though it accounted for 10% of all new jobs (see Figure 1). These shares are substantially higher among low-skilled workers. For this reason, our empirical analysis focuses on a relatively homogenous sample of male high school dropouts. Due to the prevalence of temporary jobs in Spain with increasingly shorter durations (Felgueroso et al., 2018), our model also accounts for this characteristic of temporary contracts.

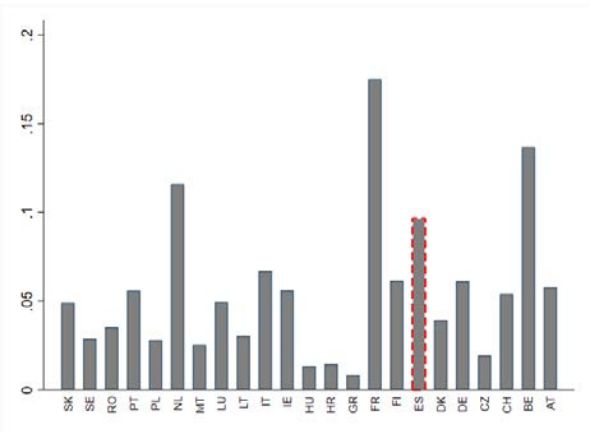
We find that having a THA contract rather than a direct-hire temporary contract increases the probability of entering to unemployment at all durations. Our results indicate that agency workers are also more likely to transition to permanent employment than their direct-hire counterparts, although these transitions are very infrequent for both. On the other hand, agency workers are very likely to transition to another agency job, while this type of transition is almost nonexistent among direct-hire temps. In turn, the latter are more prone to take up another regular temporary job than agency workers. We also find that the positive effect of THA employment on the probability of transitioning to permanent employment is procyclical. By contrast, the positive effect on the probability of entering unemployment increased during

Figure 1: THA employment in Europe, 2019

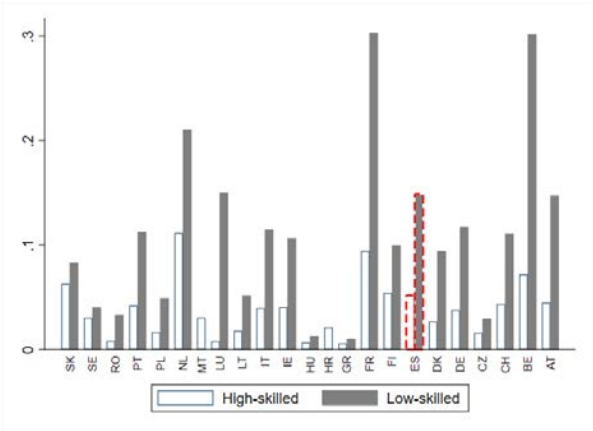
Share in total employment



Share in total number of contracts



Share in total number of contracts, by skill



Notes: EU-LFS, 2019.

the recession relative to the previous expansion, but it has remained high during the recovery. A similar result holds for transitions to another agency job, so part of the increase in both transitions in recent years seems to be structural rather than cyclical. In summary, agency jobs in Spain are characterized by higher unemployment risk and persistence than regular temporary jobs, and these differences have intensified in recent years. The estimates of the model with unobserved heterogeneity do not significantly alter our main conclusions.

The rest of the paper is organized as follows. Section 2 provides a summary of the related literature. Section 3 presents some relevant features of the Spanish agency market and Section 4 describes the data. Section 5 formulates the econometric models and estimation procedure. Section 6 discusses the estimation results, and Section 7 concludes.

2 Related Literature

Measuring the effect of THA employment on the individual labor market outcomes of agency workers is challenging. As Autor (2009) emphasizes in a literature survey, "it is inherently difficult to differentiate the effects of holding given job types from the skills and motivations that cause workers to hold these jobs initially". It is also difficult to make international comparisons in this context, since the definition of what constitutes agency work differs across countries, and so does the degree of regulation on this type of employment (e.g. see Voss et al., 2013).

While there is widespread evidence that agency work serves as a route out of unemployment (for the less-skilled, in particular), the debate on the THA industry often centers around the question of whether or not agency jobs are a "stepping stone" to more stable forms of employment. Different authors use different empirical strategies to shed light on this issue, and the resulting empirical evidence is mixed. For instance, Kvasnicka (2009) finds no evidence of a "stepping stone" effect of agency jobs in Germany, and reports that workers entering THA employment from unemployment are more likely to be agency workers over the next four years. Related work by Antoni and Jahn (2009) finds that German agency workers tend to experience repeated spells in agency jobs. According to Ichino et al. (2005), Italian agency workers are less likely to be hired on a permanent basis in the near future than observationally equivalent temporary workers who are directly hired by their employers. By contrast, Zijl et al. (2011) and Jahn and Rosholm (2014) do find evidence of a stepping stone effect in the Netherlands and Denmark, respectively.

Other studies find that spells in THA employment have no significant effects on the subsequent employment trajectories of agency workers, but do find evidence of selection (e.g. see Autor (2009) and the literature cited therein). In particular, agency workers who are more vulnerable seem to fare worse than their-direct hire counterparts in terms of their prospects of accessing more stable forms of employment. The findings in Autor and Houseman (2005) indicate that this is the case for former welfare recipients in the U.S., for instance. By contrast, using data for Missouri, Heinrich et al. (2005) find that, whereas agency work is an important source of employment for unemployed workers with low skills, it has no measurable effect on the workers' subsequent employment outcomes, after controlling for unobserved heterogeneity. Yet they also report that workers who experience repeated agency employment spells experience substantial earnings losses in the long run.

Somehow surprisingly, there are only a few studies for Spain. These studies focus on the initial (pre-recession) period after which Spanish THAs were first allowed to operate in the mid 1990s. The analysis in García-Pérez and Muñoz-Bullón (2005a) confirms that THAs facilitate unemployment to work transitions. These authors compare the transitions out and into unemployment of young workers who had previously held agency jobs to those of similar workers (both in terms of observables and unobservables) who had not. They find that the former workers are more likely to exit unemployment than the latter (at short durations), but they also face a higher risk of transitioning back to unemployment. Moreover, the reported employment hazard rates are higher for workers with low qualifications, and increase with the surge of fixed-term contracts in the late 1990s. Regarding the stepping stone effect, García-Pérez and Muñoz-Bullón (2005b), Malo and Muñoz-Bullón (2008) and Bullón and Rodes (2004) find that taking up an agency job instead of staying unemployed may facilitate a future transition to permanent employment for some workers. In particular, controlling for self-selection, García-Pérez and Muñoz-Bullón (2005b) report that this is the case for high-skill workers, though the opposite result holds for workers in low occupational categories, and suggest that this is evidence that Spanish THAs may be playing a role as a screening mechanism that allows firms to select more productive workers. The contribution by Amuedo-Dorantes et al. (2008) differs from the above papers because of its choice of direct-hire temps (instead of unemployed workers) as the control group. These authors find that workers employed through a THA at some point between 1998 and 2004 are less likely to be hired on a permanent basis following their temporary assignment than their direct-hire counterparts, and also report important differences across groups. We elaborate on the differences between our work and that of Amuedo-Dorantes et al. (2008) and García-Pérez and Muñoz-Bullón (2005b) in detail in Section 7, after we discuss our main results.

3 Temporary Help Agencies in Spain

3.1 Institutional and legal framework

The Spanish labor market stands out not only for its chronically high unemployment rate (specially among the youth) but for having one of the highest shares of temporary employment in Europe as well. At the onset of the Great Recession, about one third of all salaried employees in Spain were temporary. This share has been relatively stable since the late 1990s.

The high incidence of temporary employment in Spain has been attributed to the liberalization of the use of fixed-term contracts in 1984 (see Bentolila et al., 2012; Dolado et al., 2002;

García-Pérez et al., 2019). It has been argued that the regulation of these contracts in Spain is less stringent than in other European countries with similar labor market institutions and its de-facto enforcement is limited in reality, whereas the regulation of permanent contracts is much more strict (e.g. Bentolila et al., 2012). The share of temporary employment has remained high in recent years, despite the introduction of latter countervailing reforms which failed to reduce labor market dualism. As noted by Felgueroso et al. (2017), the deepest reform, which took place in 2012, significantly reduced the degree of employment protection of permanent workers, which is now close to the OECD average. Still, almost 85% of all contracts signed in 2017 were temporary. Felgueroso et al. (2017) also highlight the fact that these contracts are of increasingly shorter durations.

Unlike regular temporary employment, agency work had traditionally been tightly regulated in Spain. THAs were first authorized and regulated by the Spanish Parliamentary in 1994 (Law 14/1994). According to the statutory definition, their "activity is intended to transfer hired employees to user companies on a temporary basis". The law specifies a triangular employment relationship, whereby an agency and a worker sign an employment contract ("contrato de trabajo"), and the agency and the user company sign a contract specifying the terms under which the worker is transferred to the user company ("contrato de puesta a disposición").[3] Once the worker joins the user company, the latter assumes the direction and control of employment activity. While the assignment to the user company is temporary, employment contracts signed with THAs can be either temporary or permanent, though the latter are rare in practice (see Countouris et al., 2016).

The main objective of the 1994 law was to standardize the regulation of agency work with that already existing in some European countries (along the lines of the 96th ILO Convention), and at the same time to safeguard the labor rights and employment protection of agency workers. A number of requirements were established for the operation of THAs, such as special administrative permissions, a minimum organizational structure, the fulfillment of salary and social security obligations, and exclusive dedication to temporary agency work activities. The use of agency work was also banned in certain situations,[4] and so were training agency contracts.

[3]These contracts must include detailed information about the reasons for the assignment and the job to be performed, remuneration and estimated duration of the assignment, job location and time schedule, and collective bargaining agreements applying to both the user company and the agency. THA collective agreements in Spain are intersectoral and national, and compatible with other agreements at regional level.

[4]Specifically, the hiring of agency workers to replace workers on a legal strike, carry out particularly hazardous jobs, fill vacancies caused by recent layoffs at the user company, or transfer workers to another agency was rendered illegal.

The law requires that THAs provide adequate training for their employees before they join the user company and devote at least 1 percent of their total wage bill to training, and forbids employees to bear any training costs. THA employment contracts cannot include clauses prohibiting the hiring of a worker by the user company once the contract expires. Agency workers who continue to work at the user company after their contract expires are automatically considered permanent workers of the latter (just as the users company's own temporary workers). The law also specifies other basic worker rights (e.g. regarding security and health at work) that user companies must comply with.

In 1999, the law was amended to ensure the principle of equal pay of agency workers and to strengthen their employment protection (Law 29/1999). In particular, the amendment ruled that agency workers ought to receive at least the wage rate associated with their position as specified by the collective bargaining agreement of the user company.[5] At the same time, it contributed to the deregulation of this sector by allowing THA employment contracts to be signed "in the same cases and under the same conditions and requirements" which apply to regular fixed-term contracts, and by weakening some of the original restrictions in the 1994 law.

In the aftermath of the 2008 financial crisis, and in the context of the progressive deregulation that aimed at enhancing labor market flexibility, additional restrictions on the use of agency work were lifted. In particular, the ban on sectors such as construction and mining, as well as in public administration was removed in 2010, formally transposing EU Directive 2008/104 (Law 35/2010). The current THA collective agreement contains a commitment of unions to avoid the inclusion of clauses in any collective agreements that exclude the use of temporary help services.[6] THAs were also allowed to act as placement agencies and sign training contracts in 2014, and the authorization process was greatly simplified (Act 18/2014).

3.2 THA employment in Spain: descriptive evidence

We use data from the Continuous Sample of Working Lives (Muestra Continua de Vidas Laborales, MCVL hereafter), which is a micro-level dataset extracted from Spanish Social Security records. An exhaustive description of the dataset is provided in Section 4.

Figure 2 displays the evolution of THA employment during the period 2005-2017 for workers aged 16 to 65 (solid line), and for a restricted sample composed by male high school dropouts

[5] As opposed to user company employees, agency workers do not receive holiday periods or extraordinary payments, but the proportional payments are included in their wages.

[6] Before 2011, many collective agreements included restrictions on the use of agency work. Several of these restrictions were revoked by Law 35/2010. See Countouris et al. (2016).

aged 20 to 45 (dashed line). The empirical analysis in Section 5 is based on the restricted sample because, as we discuss below, the incidence of THA employment is substantially higher among these workers. For both samples, we report the share of THA employment in salaried employment, and also the respective share of THA contracts in the total number of contracts signed and terminated in a given month. While the first statistic provides a static measure of the importance of agency work in total employment, the other two speak to its importance for job creation and job destruction flows and thus for the dynamics of the Spanish labor market.

In 2017, THA employment accounted for around 1% of salaried employment in the full sample and for 3% in the restricted one (upper panel of Figure 2). The upward trend in these shares indicates that this type of employment has gained importance in recent years. In the restricted sample, the share fell sharply during the early phase of the Great Recession but increased substantially afterwards, suggesting that agency work has become more relevant in the low-skill segment of the labor market during the long recession (when unemployment rate was high and workers struggled to find jobs). Still, these moderate employment shares conceal the actual importance of agency work for job creation and job destruction. Around 10% of all contracts signed in a given month in 2017 were agency contracts (bottom left-hand panel of Figure 2). This share doubles in the restricted sample, where one out of five contracts were signed with an agency. Regarding job destruction, 12% of all contracts terminated in a given month in 2017 where agency contracts, the corresponding share shooting up to around 22% in the restricted sample (bottom right-hand panel). Again, all the aforementioned shares display an increasing pattern since 2009.

Table 4 in the Appendix displays the composition of workers by the type of contract, for 2017. The age distribution of temporary workers in agency and direct-hire contracts is similar, but these workers are significantly younger than those on permanent contracts. On the other hand, the share of males in agency contracts (59%) exceeds the corresponding shares in direct-hire temporary and permanent contracts (around 50%). This is consistent with the fact that part-time is less common in agency contracts (25%) than in direct-hire temporary jobs (29%). The share of foreign workers in agency contracts (16.2%) is slightly higher than in direct-hire jobs (13.1%) and almost identical than that in permanent contracts (16.3%). Low-educated workers are also over-represented in agency jobs. In particular, high school dropouts account for 64% of all agency contracts, while the corresponding share is 57.3% for direct-hire temporary contracts and 55.4% for the permanent ones.

Figure 2: Evolution of THA employment

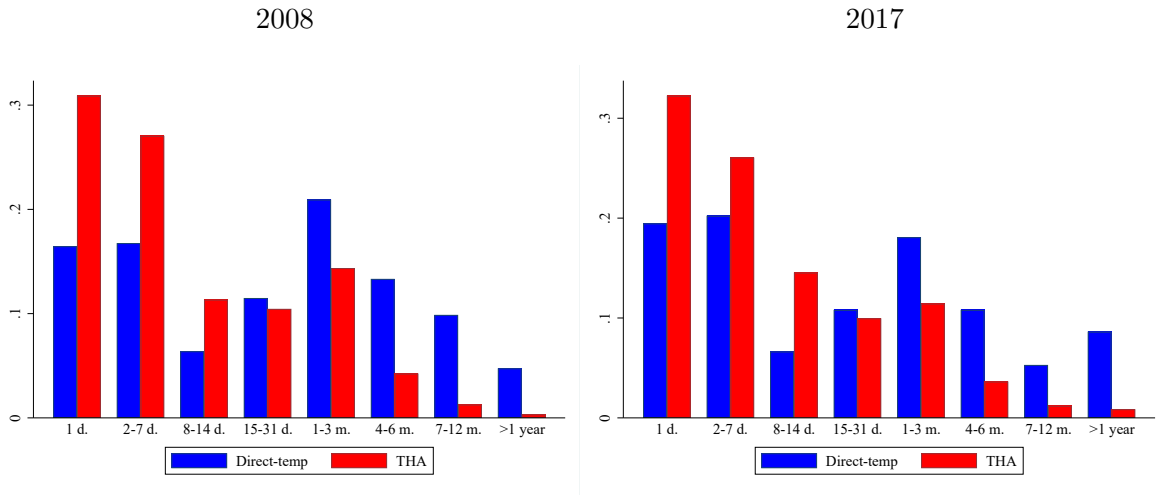
Notes: THA contract shares defined as the % of THA contracts over all contracts signed/terminated in a given month. Shaded areas indicate recessions (Double-Recession: 2008Q2-2009Q2, 2010Q4-2013Q2). All series are seasonally adjusted. Source: MCVL, 2005-2017.

There are also important differences in the composition of agency and regular temporary jobs by skill type and job duration. Strikingly, 96% of all agency contracts correspond to medium-low and low-skilled occupations.[7] These occupations are not nearly as relevant in the case of direct-hire temporary and permanent contracts (73% and 64%, respectively). In fact, whereas agency contracts account on average for 12% of all contracts signed in 2017, this share is close to 20% for jobs in medium-low and low-skilled occupations.[8] The other key difference is that agency contracts are shorter than regular temporary contracts (Figure 3). For instance, 33% of all THA contracts signed in 2017 lasted only 1 day and 82% lasted less than 1 month, whereas the respective shares are 16% and 53% for regular temporary contracts. Therefore,

[7] See Table 7 in the Appendix for the description of the skill categories.
[8] Table 5 in the Appendix reports the shares of THA contracts by worker/job characteristics.

the THA industry seems to be important in explaining the surge of jobs with very short-term durations (e.g. it accounted for 23% of all 1-day jobs and for roughly 20% of jobs lasting less than a month in 2017, as shown in Table 5).

Figure 3: Duration of THA vs direct-hire temporary jobs



Notes: Full sample. Source: MCVL, 2005-2017.

One important drawback of the MCVL is that it does not report the sector of activity of agency jobs. The sectoral composition of the THA workforce, however, can be tracked using the THA statistics provided by the Spanish Social Security (see Figure 7 in the Appendix).[9] THA contracts mainly concentrate on manufacturing (28%), agriculture, forestry, and fishing (17%), accommodation and food services (14%), transportation and storage (14%), and wholesale (11%). These are sectors where temporary workers abound. Agency contracts are highly over-represented in the manufacturing sector, where they accounted for more than 50% of all contracts in 2017, as well as in the transportation and storage sector, where the corresponding share exceeds 40%.

Summing up, in Spain, THAs are mainly employing young males with low levels of education in low-end occupations. This is the reason why our empirical analysis is based on the restricted sample of male high school dropouts aged 20 to 45.

We close this section by describing the aggregate patterns of employment transitions for agency, direct-hire temporary and permanent contracts within the restricted sample (Figure 4). Let A, D and P stand for agency, direct-hire temporary and permanent employment,

[9] To guarantee comparability of the two data sources, we have computed all the previous descriptive statistics (composition by age, education, occupation, duration...) using data from the THA statistics and compared them to the ones we obtained using the MCVL. The numbers are very similar.

respectively, and let U denote unemployment. We compute the proportion of A, D, and P contracts that transition to states A, D, P, and U from month t to month $t+1$ (in panels a, b, c and d, respectively). For instance, the line DP (AP) in Panel a depicts the proportion of direct-hire temporary (agency) contracts that transition to a permanent contract in a given month. The transitions PP, DD, and AA are defined as the proportion of $s \in \{P, D, A\}$ contracts that transition to another s contract. Notice that transitions are defined as a change of contract, and they can be signed with the same employer or with a different one.[10]

Throughout the whole period, the proportion of exits to U is higher for agency contracts than for direct-hire temporary contracts (Panel b). The opposite is true for the exits to P (Panel a). Yet transitions into (and out of) permanent contracts are rare events since few workers hold permanent jobs in our sample. Note that the largest gap is observed in the proportion of exits to A: throughout the whole period this proportion was above 30% in agency contracts and around 1% in direct-hire temporary contracts (Panel d). The opposite pattern is observed in the transition to D, though the gap is smaller; e.g. the proportion is around 15-18% for regular temporary contracts and about half that number for agency contracts during the most recent period (Panel c). In any case, all these figures must be taken with caution since, as we have shown, agency and direct-hire temporary workers have different characteristics and agency employment spells also tend to be shorter.

4 Data

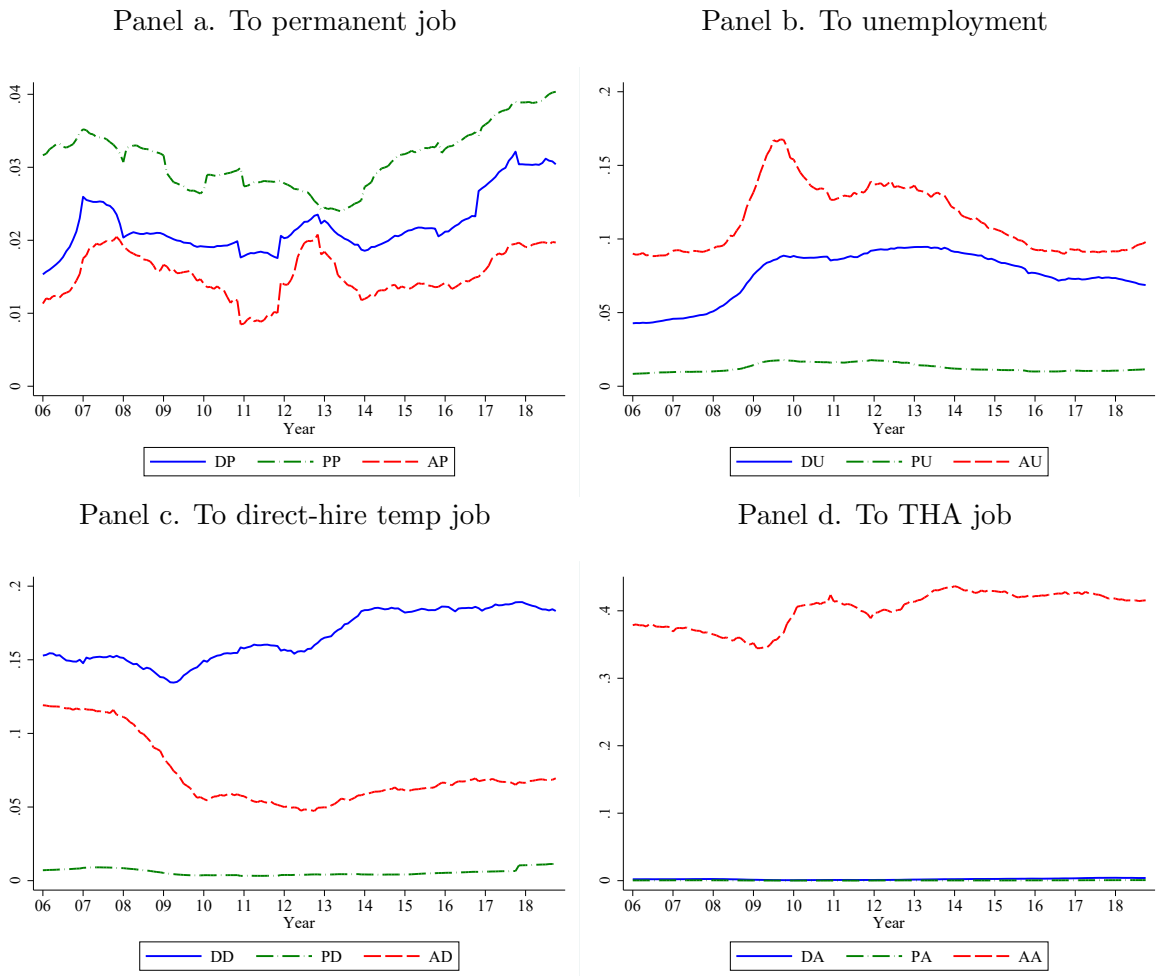
4.1 Data and sample descriptive statistics

The MCVL is a 4% representative random sample of all workers affiliated with the social security administration (working as employed or self-employed, receiving a public pension or being registered as unemployed) during at least one day in the year when the sample is extracted. The dataset was released in 2004 and, after that year, it follows the same sample of individuals over time, adding new observations each year to replace absences while keeping the sample representative of the population. Furthermore, the data provides retroactive information on the workers' entire labor market history, allowing us to construct accurate measures of experience.

We pool the database for years 2005-2017, so our dataset keeps track of the complete employment history of any worker who had registered at least one day of activity in the social

[10] The percentage of transitions to another temporary contract with the same employer is 87.3% for AA and 59.26% for DD.

Figure 4: Aggregate employment transitions



Notes: Sample of low-educated male workers aged 20-44. Source: MCVL, 2005-2017.

security administration between 2005 and 2017.[11] Additional information is available for each individual, including personal and demographic characteristics (age, gender, education, nationality, region of residence), employer information at the establishment level (location, size), and labor market information (industry, occupation, type of contract). The dataset also reports whether the worker is employed by an agency. Yet no information regarding the user companies (and thus the industry) where agency workers perform their work is reported. The unit of observation is the spell in the individual's labor market history defined as a contractual relationship between a firm and a worker, reporting the starting and ending date of the spell.

Since our sample is only representative from 2005 on, we restrict to employment spells that started in 2005 or later. Given that we are interested in temporary employment, we

[11] Data extraction for each year is done in April of the following year. Therefore, we have some spells in our dataset ending between January 2018 and April 2018.

exclude self-employed and permanent spells (contracts). We also restrict to contracts with the general social security regime, abstracting from agricultural and other exceptional regimes. The restricted sample of male high school drop-outs aged 20 to 44 consists of 168,897 individuals. To save computational memory, for our estimations we draw a random subsample of 5,000 individuals, which leaves us with 44,393 contracts (495,347 observations). Out of these, 7,859 (17.70%) correspond to agency contracts, whose characteristics are reported in Table 1. While the workers' composition of agency contracts and direct-hire temporary contracts is similar, some of the key differences described in Section 3.2 prevail within this more homogeneous sample. Agency workers are slightly younger and more concentrated in low-skilled occupations, and they experience shorter employment spells than their direct-hire counterparts (3.95 vs 10.77 weeks, on average).

Figure 5 allows us to take a first glimpse at the differences between THA employment (solid line) and regular temporary employment (dashed line) in terms of the likelihood of leaving current temporary employment by duration. In particular, for each contract duration measured in weeks, we calculate the ratio of the number of agency and direct-hire temporary contracts that exit to states P, U, D and A to the total number of contracts of each type that are still active.

Note that all figures display peaks around the time of contract termination (the most prominent peak being typically associated with 6-month spells).[12] As one would expect, and except for the peaks, the exit rate to unemployment falls sharply with duration for both agency and regular temporary contracts during the first 2 months (Panel b of Figure 5). By contrast, there is no duration dependence in exits to permanent employment (Panel a of Figure 5).[13] As to the differences by contract type, average exit rates to states U and P are both higher for agency contracts than for regular temporary contracts. Regarding transitions within temporary employment, direct-hire temps are more likely to switch to another regular temporary contract than to an agency contract (Panel c of Figure 5), while the opposite is true for agency workers (Panel d). The differences in the latter transition are large: the average exit rate to state A is

[12] The maximum legal duration of fixed-term contracts for circumstances of production ("contratos eventuales por circunstancias de la producción"), which account for about 44% of the spells in the sample, is 6 months (within a 12-month period). While collective wage agreements may modify this maximum limit, it cannot exceed 12 months (within any 18 month period). The maximum duration of per-task fixed-term contracts ("contratos de obra y servicio"), which represent about 50.2% of the spells in the sample, is 3 years.

[13] Carrasco and García-Pérez (2015), among others, highlight the negative duration dependence in exit rates to unemployment for temporary contracts in Spain, and show that there is no duration dependence in these exit rates for permanent contracts.

Table 1: Descriptive statistics

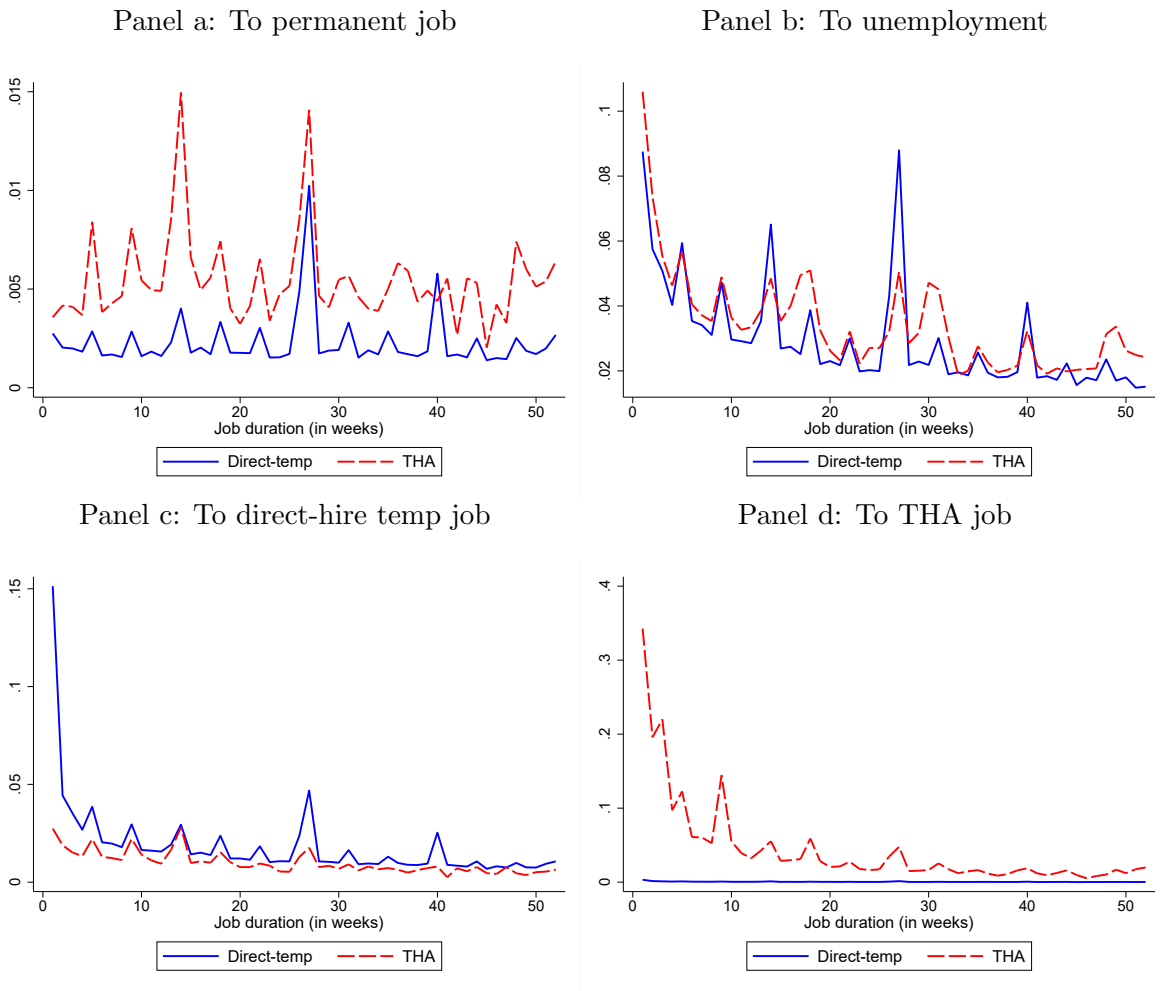
	THA		Direct-temporary	
	Total	(%)	Total	(%)
Total	7,859	17.7%	36,534	82.3%
Censored	32	0.4%	1,655	4.5%
Age 20-24	1,824	23.2%	7,675	21.0%
Age 25-29	1,987	25.3%	7,703	21.1%
Age 30-34	1,683	21.4%	7,147	19.6%
Age 35-39	1,266	16.1%	7,971	21.8%
Age 40-44	1,099	14.0%	6,038	16.5%
Very high & high-skilled	3	0.0%	224	0.6%
Medium-high skilled	237	3.0%	2,936	8.0%
Medium-low skilled	2,934	37.3%	21,714	59.4%
Low skilled	4,685	59.6%	11,660	31.9%
Obra y servicio	2,466	31.8%	19,871	54.4%
Eventual	4,954	63.0%	14,452	39.6%
Others	439	5.6%	2,211	6.1%
Foreign	707	9,0%	6,606	18.1%
Duration				
1 day	2,137	27.2%	3,665	10,0%
2-7 days	2,032	25.9%	6,068	16.6%
8-11 days	1,306	16.6%	2,673	7.3%
14-31 days	880	11.2%	4,408	12.1%
1-3 months	989	12.6%	8,773	24.0%
4-8 months	343	4.4%	5,530	15.1%
7-12 months	137	1.7%	3,567	9.8%
$>$ 1 year	35	0.5%	1,850	5.1%
Part-time	1,798	22.9%	8,251	22.6%
Average duration (weeks)	3.95		10.77	
Weekly hazard exit rates				
To Permanent	0.5%		0.3%	
To Unemployment	6.0%		3.9%	
To Direct-hire temp	1.8%		3.2%	
To THA	15.7%		0.1%	

Source: MCLV, 2005-2017.

15.7% for agency workers, but it is less than 0.1% for direct-hire temps.

The average hazards shown in Figure 5 result from the aggregation of individuals with different hazard rates in different time periods. With the estimation of the econometric model, controlling for personal characteristics and time effects, we should be able to disentangle from the observed hazards the effects that result from individual heterogeneity.

Figure 5: Kaplan hazard rates by job duration



Notes: Sample of low-educated male workers, aged 20-44. Source: MCLV, 2005-2017

5 Empirical models

We analyze the dependence of the exit from temporary employment on the type of contract (direct or through an agency), the length of time employed and on other economic and demographic variables by the estimation of duration models. We treat temporary employment duration (T) as a discrete random variable which is right censored when the individual is still employed at the time of leaving the sample.

Note that our empirical approach does not allow us to infer causality. Our estimates result from the interplay of labor demand and supply factors, but they are useful to have a deeper knowledge of the characteristics associated with the different temporary employment risks that agency workers and direct-hire temps face.

5.1 Single risk models

We consider first a single-risk discrete duration model. Formally, let T_i be the length of a spell of temporary employment. At this stage, only one hazard exists which may cause failure: exiting a temporary employment spell, without distinguishing between destination states. The discrete hazard rate at t is defined as

$$h_i(t) = \Pr\left[T_i = t \mid T_i \geq t, THA_i(t), x_i(t)\right] = F(\alpha_{0t} + THA_{it}\alpha_1 + x_{it}^{'}\alpha_2). \tag{1}$$

In this expression, $F(\cdot)$ is the logistic cumulative probability function, $F(z) = \frac{e^z}{(1+e^z)}$, α_{0t} is a specific parameter associated to each duration t that captures additive duration dependence in a flexible way, and THA is a dummy variable taking the value 1 if the individual is employed through an agency and 0 if she holds a regular temporary contract. Additional effects of duration are captured by introducing the interaction of THA with duration as a regressor.[14] We condition on a vector of variables x_{it} which includes age, immigrant status, a dummy for part-time employment, occupational skill level, contract type, previous experience in permanent, agency and direct-hire temporary employment, and year (see Table 6 in the Appendix for the definition of the variables).

If d_i is the observed duration of the $i-th$ spell (completed or censored) and c_i is an indicator variable equal to 1 if the spell is completed and 0 if it is censored, its contribution to the log-likelihood function is given by

$$\log L_i = \left[c_i \left\{ \sum_{t=1}^{d_i-1} \log[1 - h_i(t)] + \log h_i(d_i) \right\} + (1 - c_i) \left\{ \sum_{t=1}^{d_i} \log[1 - h_i(t)] \right\} \right]. \tag{2}$$

The log-likelihood function of the sample is given by the sum of the contributions of the N temporary employment spells and is maximized with respect to the model parameters to provide Maximum Likelihood (ML) estimates.

It is well-known that this model can be estimated as a sequence of binary choice equations with cross-equations restrictions defined on the surviving population at each duration t (e.g. see Bover et al., 2002; Jenkins, 1995; Narendranathan and Stewart, 1993). More specifically,

[14] Notice that in this type of non-linear models the marginal effects of the variables are non-constant even if one does not include interactions between the variables in the model specification. We include this interaction just to capture potential additional effects of THA by duration.

for each t we define the following variables:

$$y_{it} = 1(T_i = t),$$
$$S_{it} = 1(T_i \geq t),$$

where y_{it} takes the value 1 if an exit from the temporary employment spell is observed in period t and 0 if there is no exit or if the observation is censored at t, and S_{it} takes the value 1 for the surviving population at each t (notice that $S_{i1} = 1$ with probability one). We can then write

$$h_i(t) = \Pr\left[y_{it} = 1 \mid S_{it} = 1, THA_i(t), x_i(t)\right].$$

Therefore, the log-likelihood function can be written as:

$$\begin{aligned} \log L(\alpha) = \sum_{i=1}^{N} \sum_{t=1}^{d_i} S_{it} \Big\{ & y_{it} \log F(\alpha_{0t} + THA_{it}\alpha_1 + x_{it}^{'}\alpha_2) \\ & + (1 - y_{it}) \log(1 - F(\alpha_{0t} + THA_{it}\alpha_1 + x_{it}^{'}\alpha_2)) \Big\}, \end{aligned} \tag{3}$$

where each spell i contributes d_i observations. Since the hazard rate $h_i(t)$ in the likelihood function is a logistic distribution, estimation is equivalent to estimating a sequence of logit models (with cross-equation restrictions) defined on the surviving population at each duration.

5.2 Competing risk models

The previous model considers the determinants of a single risk, that of exiting a temporary employment spell. But much of the interest comes from the analysis of a situation where there are competing risks. Therefore, we consider a model in which there is more than one possible exit from a temporary employment spell and allow for a different behavior with respect to the different risks. Specifically, we distinguish between exits to unemployment (U), permanent employment (P), agency employment (A) and regular temporary employment (D). As already noted, exits to D (A) occur when workers employed in a regular temporary contract (agency contract) sign another contract of this type with the same firm (agency) or with a different one.

We define exit rates to each of the states conditional on not exiting to the alternatives state:

$$\begin{aligned} h_{ij}(t) &= \Pr\left[T_i = t, j_i = 1 \mid T_i \geq t, s_i = 0\right], \\ j &= U, P, A, D; \text{ for all } s \neq j, \end{aligned} \tag{4}$$

where $j, s = U, P, D, A$ are the alternative's indicators which equal 1 if an exit into the corresponding state is observed and 0 otherwise.

We can treat the discrete duration competing risk model as a sequence of discrete choice models by defining the following indicators:

$$y_{itj} = 1(T_i = t, j_i = 1), \;\; j = U, P, A, D. \tag{5}$$

Using this notation, we specify the conditional exit rates to each state as binary choice logit models:

$$\begin{aligned} h_{ij}(t) &= \Pr\left[y_{itj} = 1 \mid T_i \geq t, THA_i(t), x_i(t), y_{its} = 0\right] = \\ &= \frac{\exp(\alpha_{0t}^j + THA_{it}\alpha_1^j + x_{it}^{'}\alpha_2^j)}{1 + \exp(\alpha_{0t}^j + THA_{it}\alpha_1^j + x_{it}^{'}\alpha_2^j)}, \\ j, s &= U, P, A, D; \text{ for all } s \neq j. \end{aligned} \tag{6}$$

We define indicators $c_{ij} = 1$ if spell i ends in state j; 0 otherwise.[15] The conditional log-likelihood function for exit j is then given by:

$$\begin{aligned} \log L_j = \sum_{i=1}^{N} \Bigg[c_{ij} \left(\sum_{t=1}^{d_i - 1} \log\left[1 - h_{j,i}(t)\right] + \log h_{j,i}(d_i) \right) \\ + (1 - c_{ij}) \sum_{t=1}^{d_i} \log\left[1 - h_{j,i}(t)\right] \Bigg]. \end{aligned} \tag{7}$$

The full log-likelihood is the sum of terms like (7) over $j = U, P, A, D$. Therefore, exits to alternative s in (7) are treated as censored observations, so that formally $\log L_j$ has the same form as the likelihood with a single risk of the previous section. This implies that the Conditional ML estimators $\widehat{\alpha}^U, \widehat{\alpha}^P, \widehat{\alpha}^A, \widehat{\alpha}^D$, defined as the maximum of $\log L_U$, $\log L_P$, $\log L_A$ and $\log L_D$, can be obtained as separate ML estimates of four binary logit models.

Once we have obtained the estimates of the coefficients $(\widehat{\alpha}^U, \widehat{\alpha}^P, \widehat{\alpha}^A, \widehat{\alpha}^D)$, we estimate the parameters of interest in this type of models, which are the average predicted probabilities and the average marginal effects of the main variable of interest, THA, on the probabilities of exiting to a specific alternative for each duration.

Bover and Gómez (2004) point out that another possibility is to model the so-called "transition intensities" for each state, instead of the conditional hazard rates, and to measure the effect of the explanatory variables with respect to the transition intensities. In particular, the

[15] Note that $c_i = \sum_j c_{ij}$.

transition intensity to state j is defined as the probability of exiting to that state at $T = t$ among those who remain in that state for at least $T \geq t$ periods:

$$\phi_{ij}(t) = \Pr\left[T_i = t, j = 1 \mid T_i \geq t\right], \ j = U, P, A, D. \tag{8}$$

The relationship with the conditional hazards is given by:

$$h_{ij}(t) \quad = \quad \frac{\phi_{ij}(t)}{1 - \sum_{s \neq j} \phi_{is}(t)}. \tag{9}$$

If the specification used for the transition intensities is a multinomial logit model as

$$\phi_{ij}(t) = \frac{\exp(\alpha_{0t}^j + THA_{it}\alpha_1^j + x_{it}'\alpha_2^j)}{1 + \sum_s \exp(\alpha_{0t}^s + THA_{it}\alpha_1^s + x_{it}'\alpha_2^s)},$$

in accordance with the relationships in (9), the conditional exit rates are binary logit with the same parameters as specified in (6). The estimation of the parameters $(\alpha^U, \alpha^P, \alpha^A, \alpha^D)$ in this case would require the joint log-likelihood function of a multinomial logit model.

Both methods, modeling the conditional hazard or the transition intensities, provide consistent and asymptotically normal estimates of the parameters, although the latter is in general asymptotically more efficient. We have chosen to model the conditional hazard rates because the separate estimation of $(\widehat{\alpha}^U, \widehat{\alpha}^P, \widehat{\alpha}^A, \widehat{\alpha}^D)$ is computational faster, especially when one accounts for the effect of time invariant unobserved heterogeneity among individuals, as we will show in next section. Moreover, given that the sample used in this paper is very large, we do not expect important relative inefficiencies from the separate estimation of $(\widehat{\alpha}^U, \widehat{\alpha}^P, \widehat{\alpha}^A, \widehat{\alpha}^D)$.

5.3 Competing risk models with unobserved heterogeneity

In the specification of the hazards (6) there may be omitted variables which could introduce a bias in the estimators of the model parameters. Such unobserved heterogeneity can be related to the job search effort, job networking, motivation, or individual ability that may affect the transition rate out of a temporary employment spell and is likely to be correlated with the type of employment contract and introduce spurious duration dependence.

A version of the competing risk model allowing for unobserved heterogeneity for a given exit state, η^j, $j = U, P, D, A$, would be given by

$$h_{ij}(t, \eta^j) = \frac{\exp(\alpha_{0t}^j + THA_{it}\alpha_1^j + x_{it}'\alpha_2^j + \eta_i^j)}{1 + \exp(\alpha_{0t}^j + THA_{it}\alpha_1^j + x_{it}'\alpha_2^j + \eta_i^j)}. \tag{10}$$

The problem of how to account for the distribution of η^j, $H(\eta^j)$, has been addressed extensively in the literature (e.g. see Van den Berg, 2001). Heckman and Singer (1984) proposed to adopt a semi-parametric approach to identify the unobserved distribution from a mixed distribution assuming that η^j is a discrete random variable with finite support. We follow this approach and we assume that $H(\eta^j)$ has two mass points (s_1^j, s_2^j) for a given $j = U, P, A, D$, with associated probabilities $P_1^j = \Pr(\eta^j = s_1^j)$ and $P_2^j = \Pr(\eta^j = s_2^j)$. Therefore, there are two types of individuals whose unobserved characteristics affect each transition differently: individuals with high and with low exit rates to U, P, A, and D. The probabilities associated to each type also differ according to the transition being considered.

The log-likelihood function with unobserved heterogeneity for exits into state j takes the form:

$$\log L_j(\alpha^j, \eta^j) = \sum_{i=1}^{N} \sum_{l=1}^{2} \log L_{ij}(\alpha^j, s_l^j) \times P_l^j, \tag{11}$$

where $\log L_{ij}(\alpha^j, s_l^j)$ is given by

$$\begin{aligned} \log L_{ij}(\alpha^j, s_l^j) \quad = \quad & \left[c_{ij} \left(\sum_{t=1}^{d_i - 1} \log \left[1 - h_{ij}(t, s_l^j) \right] + \log h_{ij}(d_i, s_l^j) \right) \right. \\ & \left. + (1 - c_{ij}) \sum_{t=1}^{d_i} \log \left[1 - h_{ij}(t, s_l^j) \right] \right]. \end{aligned} \tag{12}$$

The mass points are estimated as constant terms in the hazard index, and the associated probabilities of each mass point are also estimated jointly with the rest of the model parameters. For the estimation we use the "gllamm" command in STATA. To obtain the predicted probabilities and the marginal effects of interest, we have computed the corresponding magnitudes for each point of support of the heterogeneity distribution. These magnitudes are then weighted using the estimated probabilities for each point.

6 Estimation results

We report the estimates of the hazard of exiting a temporary employment spell focusing on the effect of the type of contract. We first present the results for each the four risks considered (U, P, A, D), for each duration and for different time periods. A discussion of the results allowing for unobserved heterogeneity then follows. The qualitative impact of the type of contract is discussed in terms of the sign and statistical significance of the estimated coefficients. The size of these impacts is assessed by the estimation of the average predicted probabilities and

marginal effects at different durations and time periods. While we do not claim causality in our estimations, for the sake of clarity, we will refer to the latter as the marginal effects of THA employment.

Table 8 in the Appendix presents the ML estimates for the single risk model (column 1) and the competing risk model for the four risks considered (columns 2 to 5), while Table 9 reports the estimates of the competing risk model which accounts for unobserved heterogeneity. As already mentioned, we control for duration dependence in a flexible way by including a dummy variable for each weekly duration.[16] Due to the relatively small number of observations, durations longer than 53 weeks are treated as right-censored at 53 weeks.

6.1 Predicted employment hazards by contract type

Column 1 in Table 8 contains the parameter estimates for the single risk model. Our results indicate that employment exits are more likely for agency workers than for their direct-hire counterparts (notice the positive coefficient on the dummy variable THA). Also, there is a negative duration dependence, that is, the longer an individual has been employed, the more likely she is to continue in this state (see Figure 9 in the Appendix). Nonetheless, this model does not specify separately the effect of the covariates through their effect on the probability of exiting to different alternative states. For this reason, we focus on the estimates of the competing risk model (columns 2 to 5).

Our results point to a positive effect of THA employment on the hazard of leaving temporary employment, both to P (column 2) and U (column 3). This positive effect increases with duration for exits to P (notice the positive coefficient on the interaction between the dummy variable THA and duration), while this interaction is not statistically significant for exits to unemployment. To assess the magnitude of the effect, Figure 6 plots the average predicted hazards for states P (Panel a)[17] and U (Panel b) for both agency and regular temporary contracts.

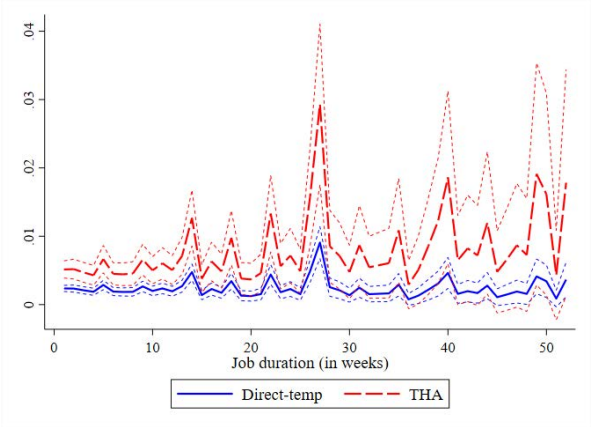
In the case of state P, the predicted hazard is higher for agency contracts than for regular temporary contracts at all durations. For instance, in the first of employment the respective hazards are 0.51% and 0.23%, and they are 0.50% and 0.20% in the 10th week. Differences are statistically significant only for job durations shorter than 15 weeks. The estimated average

[16] We do not report the duration coefficients in the table, but all estimations include 53 weekly job duration dummies as additional regressors.

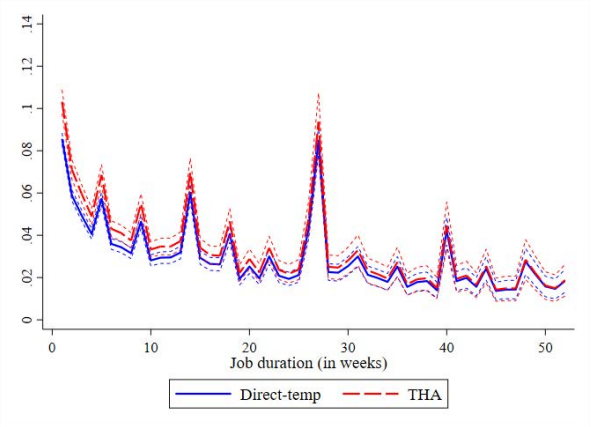
[17] For this transition, the estimates are noisier for longer employment spells because there are few observations in the corresponding cells. Consequently, we focus our discussion on short durations.

Figure 6: Predicted hazard rates, THA vs direct temps

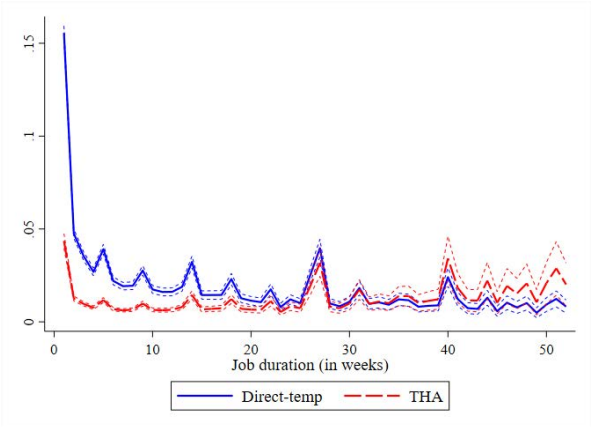
Panel a: To permanent job



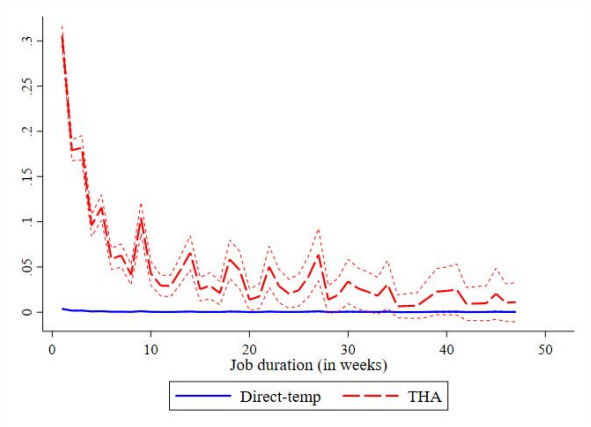
Panel b: To unemployment



Panel c: To direct-hire temp job



Panel d: To THA job



Notes: The figures display the average predicted probabilities at each duration. Apart from controlling by agency employment and the interaction between agency employment and duration, all models include controls for age, nationality, part-time, skills, type of contract, experience in permanent employment, direct-hire temporary employment, and in agency employment and year fixed effects. The dashes lines correspond to 95 percent confidence intervals. Source: MCVL, 2005-2017.

marginal effect (across durations) is around 0.56 pp. This marginal effect is small because, as we have already noted, exits to P are rare in the sample (where the average exit rate is 0.26%). Still, agency workers are three times more likely to exit to P than their direct-hire counterparts, the average estimated probabilities being 0.8% and 0.24%, respectively. Note also that we do not find evidence of duration dependence: as shown in the graph, the hazard levels off, except for the peaks.

As to the transitions to U, notice that negative duration dependence is much more evident. In the first week of employment, the estimated probabilities are 10.3% and 8.6% for agency workers and direct-hire temps, respectively, and the implied marginal effect of THA employment

is 1.7 pp. This marginal effect decreases with job duration as both probabilities decrease; e.g. it is 0.9 pp for jobs lasting one month. The average marginal effect is 0.40 pp. These results suggest that agency jobs are characterized by higher turnover, especially at short durations, being more unstable than regular temporary jobs.

Consider now the estimated exit probabilities to states A and D (columns 4 and 5 in Table 8). Whereas it is common for agency workers to sign another agency contract after their contracts expire, direct-hire temps seldom do so (see Panel d in Figure 6). Also, the estimated probability for agency workers displays negative duration dependence. This probability is 30.6% within the first week of employment and 10% after 1 month, and it remains above 2% even after 6 months, suggesting that THA employment is particularly persistent. For direct-hire temps, however, the probability is close to zero regardless of job duration. As to transitions to state D (see Panel c in Figure 6), these are more likely for direct-hire temps than for agency workers, especially for durations shorter than 20-25 weeks. For instance, in the first week of employment, the estimated probability is 15.6% for the former and 4.4% for the latter. In general, the implied negative marginal effect of THA employment is larger for short employment spells, amounting to -4.8 pp after 1 month of employment, and it is -0.57 on average.

Effect of contract type over time It is also important to understand how the aforementioned marginal effects change over time. To do so, we split the sample in three subperiods: the economic expansion (2004-2007), the economic crisis (2008-2012) and the recovery period (2013-2017). Table 2 reports the average marginal effects for each subperiod (see also Figure 8 in the Appendix).

The marginal effect associated to employment exits to state P is clearly procyclical: it fell from the expansion to the recession period, rising again in during the recovery. So, while we have already noted that agency workers faced on average a higher (if small) chance of landing a permanent job than direct-hire temps, the difference was higher in the expansion and recovery periods than in the recession. For instance, when employment duration is 3 months, the probability of entering P is 0.5 pp higher for agency workers than for workers on agency contracts during the expansion and recovery, whereas this number falls to 0.3 pp during the recession period.

As far as exits to U are concerned, note that the marginal effect of THA employment increased after 2008, but there are not significant differences between the recession and recovery

periods in this case. In other words, the differences in unemployment risk between agency workers and direct-hire temps increased at the onset of the recession and have not narrowed during the recovery. For instance, after 1 week of employment, holding an THA contract (rather than on a regular fixed-term contract) increased the probability of becoming unemployed by 1.3 pp on average before 2008, while the corresponding estimate after 2008 is 1.9 pp.

Interestingly, the positive marginal effect of THA employment on the probability of transitioning to another agency job (A) displays a clear increasing pattern over time, as the agency sector experienced a gradual liberalization. The effect is also larger at short durations in all subperiods, indicating a close relationship between THA employment and short-duration jobs. Note that, for durations of at most 1 week, the marginal effect increased sharply from 21.9 during the pre-crisis period to 34.7 pp in the recovery period. On the other hand, the negative marginal effect of THA employment on the probability of transitioning to D is also substantially larger (in absolute value) for the latest period of the sample (2013-2017). These results suggest that the degree of persistence in THA employment has increased during this period.

Table 2: Marginal effect of agency contract by period

Exit to	Permanent			Unemployment			Direct-temp			THA		
Job dur.	E	C	R	E	C	R	E	C	R	E	C	R
1 w	0.3	0.2	0.3	1.3	1.9	1.9	-9.2	-9.0	-14.3	21.9	31.2	34.7
2-4 w	0.3	0.2	0.3	0.8	1.1	1.1	-2.2	-2.1	-3.6	10.8	16.1	18.1
5-12 w	0.3	0.2	0.4	0.5	0.8	0.8	-1.2	-1.2	-2.0	4.1	6.5	7.4
3 m	0.5	0.3	0.5	0.4	0.6	0.6	-0.9	-0.9	-1.5	3.1	5.0	5.8
14-25 w	0.5	0.3	0.5	0.3	0.5	0.5	-0.6	-0.6	- 0.9	2.2	3.6	4.2
6 m	1.2	0.8	1.3	0.4	0.6	0.5	-0.5	-0.5	-0.7	2.7	4.3	4.9
27-44 w	0.7	0.5	0.8	0.2	0.2	0.2	0.2	0.2	0.2	1.4	2.4	2.6
45-53 w	0.9	0.7	0.9	0.0	0.1	0.1	1.0	0.9	1.0	0.8	1.3	1.4

Notes: The table displays the average marginal effects of agency employment by period for a selected set of job duration. Letters E, C, and R stands for the expansion (2004-2007), crisis (2008-2012) and recovery periods (2013-2017), respectively. For durations that are aggregated, we compute the average. Apart from controlling by agency employment and the interaction between agency employment and duration, all estimations include controls for age, nationality, part-time, skills, type of contract, experience in permanent employment, in direct-hire temporary employment and in agency employment and year fixed effects. Source: MCVL, 2005-2017.

Other characteristics The estimated effect of other variables on the above hazards can be summarized as follows. We find that foreign workers and younger workers (aged 20 to 30) have a lower probability of exiting temporary employment to U, D and A than natives and older workers (aged 30 to 40). There is also evidence of a positive effect of part-time employment

and higher job skills on the temporary employment hazard rate to U, D and A. Finally, previous experience in (both agency and regular) temporary employment is associated with a lower probability of exiting temporary employment, while previous experience in permanent employment increases the probability of exiting temporary employment only to P. Notice that, in general, the effects of the covariates on the exit to P are estimated with very low precision given the small number of transitions observed.

Regarding the marginal effect of THA employment by worker characteristics,[18] we do not find significant differences by age and immigrant status. We find larger marginal effects of THA employment on the exit rates to A and D for low-skilled workers, and no significant differences for exits to P and U.

6.2 Unobserved heterogeneity

We turn to the estimation results of the competing risk model with unobserved heterogeneity. Before discussing the estimates of the model coefficients, we present the estimates of the parameters related to the unobserved heterogeneity distribution. As previously explained, the distribution is specified with two mass points for each risk. As shown in Table 3, the probability of the type with a high exit rate to P (that is, the probability associated to the smallest mass point in absolute value) is the lowest in our sample, 5.1%. In other words, having the unobserved characteristics that make this transition more likely is rare. A similar result is obtained for exits to A and D. However, the probability of the type with a high exit rate to U is approximately 38%. That is, being an individual with unobserved characteristics that makes this transition more probable is not so unlikely.

The estimates of the log-likelihood function for the hazard model with unobserved heterogeneity are presented in Table 9 in the Appendix. The coefficients of the dummy for the type of temporary contract have the same sign in the models with and without unobserved heterogeneity. Figure 10 in the Appendix plots the average predicted hazards for each of the four destination states for both agency and regular temporary contracts. These have been calculated as the predicted hazards for each individual type weighted by the estimated probability of each type. Panel a shows that there is no duration dependence for the transition to P, and we still find that the predicted hazard is greater for agency workers at all durations. For instance, for the 10th week in employment, the hazard is 0.48% for agency workers and 0.18% for direct-hire

[18] The marginal effects by worker characteristics are available upon request.

Table 3: Heterogeneity Parameters

	Competing-risks model			
	Exit to P	Exit to U	Exit to D	Exit to A
Support Points				
s_1	-5.984	-3.735	-3.043	-12.919
	(0.475)	(0.251)	(0.281)	(3.524)
s_2	-4.030	-2.698	-1.102	-10.872
	(0.519)	(0.251)	(0.284)	(3.524)
Probabilities				
P_1	0.949	0.623	0.934	0.953
$1 - P_1$	0.051	0.377	0.066	0.047

Notes: The distribution of the unobserved heterogeneity is specified with two mass points for each risk: s_1^j, s_2^j with probabilities $P_1^j = \Pr(\eta^j = s_1^j)$. To ensure that the estimated probabilities are between 0 and 1, we apply a logistic transformation, so that the estimated parameters are $\log(\frac{P_j^P}{1-P_j^P})$, with standard errors of 0.422, 0.082, 0.132, 0.085 for j=P,U,D,A.

temps. These figures are 0.50% and 0.20% when unobserved heterogeneity is not accounted for. A similar pattern is found when we look at the exists to U: accounting for unobserved heterogeneity increases the positive effect of THA employment on the probability of entering unemployment. As to the exit to A, we find that agency workers are much more likely to make this transition than direct-hire temps, although in this case the magnitude of the marginal effect is smaller when unobserved heterogeneity is accounted for. Similarly, direct-temps are again more likely to experience these transitions to D, but the magnitude of this effect is also smaller now.

In terms of the estimated average marginal effects by period, the results are again qualitatively similar in the models with and without unobserved heterogeneity. As Table 10 shows, the marginal effect of THA employment on the exit rate to P is again pro-cyclical, and in general the magnitude is very similar. For instance, after 3 months of employment, the average probability of entering P is 0.4 pp higher for agency workers than for direct-hire temps during the expansion, while this figure falls to 0.3 pp during the recession and then increases again to 0.5 pp during the recovery. These figures are 0.5, 0.3 and 0.5 pp in the models without unobserved heterogeneity (see Table 2).

As to the transitions to U, we still find that the marginal effect of THA employment increased after 2008 and has not decreased during the recovery, though the magnitude of the effects is slightly higher when unobserved heterogeneity is accounted for. For instance, after 3 months of employment, THA employment increases the probability of exiting to U by 0.7 pp before

2008, while the corresponding estimate after 2008 is around 1.1-1.2 pp. In the model without unobserved heterogeneity, these figures are 0.4 and 0.6 pp, respectively. For exits to A and D, we also find a similar pattern by period in the model with and without unobserved heterogeneity. Yet, in contrast with the exit to U, the estimation suggests that the associated marginal effects are smaller (in absolute value) when unobserved heterogeneity is accounted for.

7 Conclusions

Our main findings can be summarized as follows. (1) THA employment has a positive effect on the probability of switching from temporary employment to unemployment, and this probability displays negative duration dependence. Moreover, this effect is stronger during the recession than during the expansion, but it has not decreased during the recovery period. Part of the increase in its magnitude then seems to be structural (rather than cyclical) and may be related with the progressive liberalization of the THA sector, which intensified after the recession, and the fact that THA are mainly placing low-skill workers in low-quality jobs with increasingly higher turnover. (2) Transitions into temporary employment are more likely for agency workers if the new contract is also a THA contract, and for direct-hire temps if it is a regular contract. These differential effects follow a similar pattern along the business cycle as in the case of the transition to unemployment. (3) THA workers are more likely to transition to permanent employment than direct-hire temps at all durations, the effect being stronger during expansion and recovery periods. While this is consistent with the view that agency jobs have a stepping-stone effect when compared with regular temporary jobs—even for low-qualified workers—these transitions are very infrequent for both. (4) Accounting for individual unobserved heterogeneity in the above hazard rates changes the magnitude of the marginal effects, but it does not alter our conclusions.

The results in this paper can be related to other estimates reported in the literature for Spain. Our estimates differ from those of Amuedo-Dorantes et al. (2008), who use a propensity score matching approach to evaluate the impact of agency work on the temporary workers' posterior likelihood of being hired on a permanent basis. They find that workers who have had a THA job at some point during their sample period (1998-2004) have a lower probability of being hired on a permanent basis after their temporary assignment than their direct-hire counterparts. Their approach is similar to ours in the sense that they also compare temporary workers, with and without a THA contract. However, they account neither for duration dependence, which

seems crucial given the differences between the two worker groups, nor for the effect on other destination states. García-Pérez and Muñoz-Bullón (2005a) estimate duration models for the period 1990-99, but they analyze transitions out of unemployment and out of employment. They find that having previous experience in THA employment has a positive impact on the likelihood of leaving unemployment, but it also implies shorter job tenure while in employment. The main difference with our approach is that we look explicitly at the effect of current THA employment on the transition out of temporary employment and thus focus on temporary workers only. We also study the effect for different destination states, and for a longer period which covers the expansion, the recession and the recovery. In addition, we select a highly homogeneous group of low qualified workers and study shorter durations.

Our analysis reveals the importance of accounting for short duration dependence and for different risks when analyzing the effect of THA contracts on the hazard of exiting temporary employment. We identify mainly two types of effects when we consider transitions to alternative employment states: the aforementioned small stepping stone effect on the hazard of entering permanent employment, but also a positive effect on the probability associated to a repeated spell in THA employment. The former effect is consistent with the argument that THA may act as a screening device that improves the assignment of workers to jobs. The latter effect can be explained by two channels. The first is a direct channel, as agency employment is associated with a large risk of transiting to another agency job. The second is an indirect channel, as agency workers face also higher unemployment risk, which can lead them to re-start the job search through a THA in order to exit unemployment. This higher unemployment risk might be related to differences in the kind of jobs employers seek to fill when they hire workers directly and when they do it through a THA, in particular, if the latter are on average more unstable jobs characterized by higher separation rates. In a companion paper (Carrasco et al., 2022), we propose a theoretical mechanism (along these lines) that is consistent with some of our key empirical findings. Unfortunately, our dataset does not provide information about the jobs that agency workers perform at client firms. Yet we do have indirect (descriptive) evidence on wages. Conditional on duration, THA jobs in our sample tend to pay higher entry wages. This is consistent with the idea that agency workers ought to be compensated for the higher turnover risk they face. A full empirical analysis focusing on wages is outside the scope of this paper, and is left for future work.

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Appendices

A Other Tables and Figures

Table 4: Composition of workers by contract type

	(1) THA	(2) Direct-temporary	(3) Permanent
Age			
Less 20	3.7%	3.5%	1.4%
20-24	20,0%	16.7%	8.6%
25-29	20.6%	18.7%	14,2%
30-34	16.8%	16,1%	15.8%
35-39	14,3%	13.8%	15.7%
40-44	11,0%	11.5%	13,2%
45-49	7,1%	8.9%	11,2%
50-54	4,2%	6.8%	8.7%
55-59	1.9%	3.4%	6,3%
>= 60	0.4%	1,3%	4.6%
Education			
High-school dropouts	63.9%	57,3%	55.4%
High-school graduates	23.7%	22.8%	24,2%
College graduates	12.5%	19.9%	20.5%
Occupation			
Very-high-skilled	0,1%	3.4%	7,1%
High-skilled	0,3%	10,1%	10,2%
Medium-high-skilled	3,0%	13,3%	18.8%
Medium-low-skilled	38.8%	47,3%	47,2%
Low-skilled	57.8%	26,0%	16.8%
Men	58.9%	50.5%	48,0%
Women	41,1%	49.5%	52,0%
Native	83,8%	86,9%	83,7%
Foreign	16,2%	13,1%	16,3%
Part-time	24.6%	28.6%	21.7%
Full-time	75.4%	71.4%	78,3%

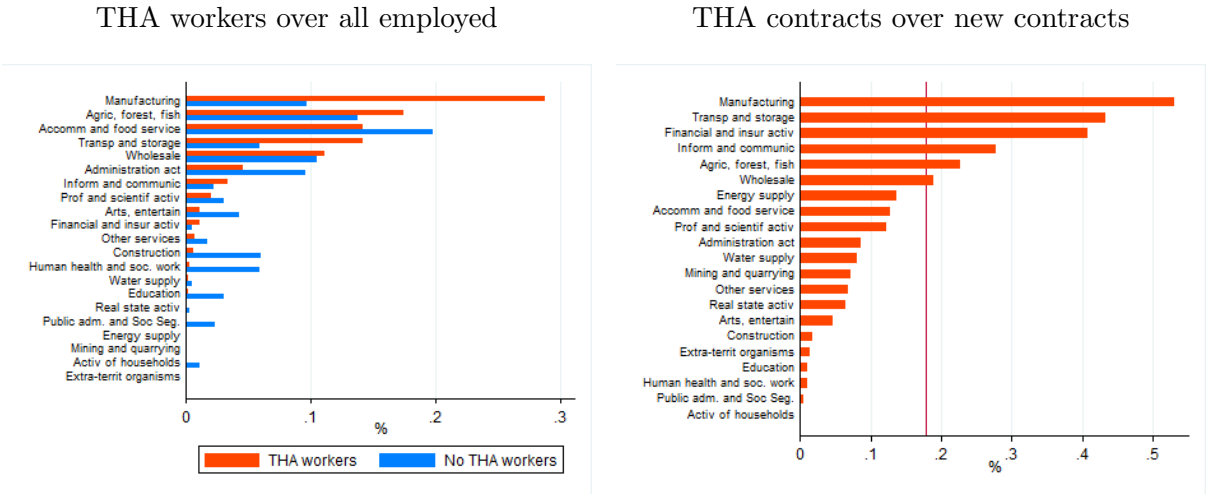
Notes: Sample of salaried workers aged 16 to 65. We pool all contracts signed in 2017.
Source: MCVL.

Table 5: Contract shares by worker/job characteristics

	(1) THA	(2) Direct Temporary	(3) Permanent	(4) THA share (% of temp. contracts)
Total	11.9%	68.6%	19.5%	14.8%
Age Less 20	14.1%	77.4%	8.6%	15.4%
20-24	15.3%	73.9%	10.8%	17.1%
25-29	13.6%	71,0%	15.4%	16,0%
30-34	12.4%	68.4%	19.2%	15.3%
35-39	12,0%	66.5%	21.6%	15.2%
40-44	11,0%	66.4%	22.6%	14.3%
45-49	9.3%	66.9%	23.9%	12.2%
50-54	7.8%	65.7%	26.5%	10.6%
55-59	5.9%	61.4%	32.7%	8.7%
>= 60	3.2%	50.9%	45.9%	5.9%
Education				
High school drop-outs	13.1%	68.1%	18.8%	16.2%
High school graduates	12.1%	67.4%	20.4%	15.3%
College graduates	7.7%	71.3%	20.9%	9.8%
Occupation				
Very-high-skilled	0.3%	64.7%	35,0%	0.5%
High-skilled	0.4%	79,0%	20.6%	0.5%
Medium-high-skilled	2.8%	71.2%	26,0%	3.8%
Medium-low-skilled	10.2%	71.4%	18.4%	12.5%
Low-skilled	24.9%	64.3%	10.7%	27.9%
Sex				
Men	13.7%	67.9%	18.4%	16.8%
Women	10,0%	69.3%	20.8%	12.6%
Nationality				
Native	11,6%	69,4%	19,1%	14,3%
Foreign	13,7%	63,6%	22,7%	17,7%
Duration				
1 day	23.6%	70.5%	5.9%	25.1%
2-7 days	19.1%	74.8%	6.1%	20.3%
8-11 days	23.7%	70.5%	5.8%	25.1%
14-31 days	12.3%	80.2%	7.5%	13.3%
1-3 months	8.3%	80,0%	11.7%	9.4%
4-8 months	4,0%	77.4%	18.6%	4.9%
7-12 months	1.8%	64.5%	33.8%	2.7%
> 1 year	0.4%	27,0%	72.6%	1.5%
Part-time	10.9%	73.3%	15.8%	13,0%
Full-time	12.2%	66.8%	20.9%	15.5%

Notes: Sample of salaried workers aged 16 to 65. We pool all contracts signed in 2017. Source: MCVL.

Figure 7: Sectoral composition of agency work (2017)



Notes: The vertical line in the right panel figure stands for the average share of THA contracts across all sectors. Own elaboration using data from the THA Statistics, Spanish Social Security.

Table 6: Variables Definition

Variable Name	Definition
THA	Dummy for Temporary Help Agency employment
Duration	Weeks at the job
Age 20 to 30	Dummy if worker is aged 20 to 30
Foreign	Dummy if worker has foreing nationality
Part-time	Dummy for part-time employment
Main skill	Job skill, based on the social security occupational code (see Table 7)
Temporary contract category	"Per-task", "For circumstances of production", "Interim"
Experience in D, A, P	Previous cumulated experience at D, A or P (in days)

Table 7: Occupation Classification

1. Very high skilled
Engineers, college graduates and senior managers
2. High skilled
Technical engineers and graduate assistants Administrative and technical managers
3. Medium-high skilled
Non-graduate assistants Administrative officers Subordinates
4. Medium-low skilled
Administrative assistants First and second class officers Third class officers and technicians
5.Low skilled
Labourers

Note: The social security asks employers to assign workers into one of ten occupation categories, which are closely related to the level of formal education required for the job. We divide them into five broad occupation groups

Table 8: Estimated coefficients of the single risk and competing risk models

	(1) Single Risk	(2) Exit to P	(3) Exit to U	(4) Exit to D	(5) Exit to A
THA	1.121***	0.765***	0.212***	-1.468***	4.947***
	(0.022)	(0.127)	(0.034)	(0.053)	(0.069)
THA × Duration	-0.025***	0.016**	-0.004	0.046***	-0.026***
	(0.002)	(0.008)	(0.003)	(0.004)	(0.006)
Age 20 to 30	-0.248***	0.000	-0.246***	-0.231***	-0.171***
	(0.013)	(0.070)	(0.018)	(0.021)	(0.041)
Foreign	-0.389***	0.025	-0.303***	-0.473***	-0.411***
	(0.016)	(0.079)	(0.020)	(0.025)	(0.060)
Part-time	0.130***	0.094	0.035*	0.079***	0.694***
	(0.014)	(0.075)	(0.019)	(0.021)	(0.041)
Medium-low skilled	0.133	-0.889*	0.415*	-0.181	-1.582**
	(0.173)	(0.531)	(0.230)	(0.309)	(0.724)
Medium-high skilled	0.837***	-0.404	0.784***	1.018***	0.203**
	(0.154)	(0.422)	(0.209)	(0.264)	(0.088)
High-skilled	0.838***	-0.535	0.881***	0.973***	-0.154***
	(0.153)	(0.413)	(0.208)	(0.262)	(0.033)
Very high-skilled	0.882***	-0.699*	0.978***	0.910***	0.000
	(0.153)	(0.415)	(0.208)	(0.263)	(.)
For circumstances of production	0.154***	0.641***	-0.099***	0.264***	0.730***
	(0.011)	(0.060)	(0.016)	(0.018)	(0.036)
Interim	0.344***	0.746***	-0.141***	0.734***	0.610***
	(0.024)	(0.125)	(0.037)	(0.033)	(0.071)
Experience in D/100	-0.0210***	-0.016***	-0.026***	-0.014***	-0.012***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Experience in A/100	-0.042***	-0.076***	-0.051***	-0.038***	-0.009***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Experience in P/100	-0.008***	0.014***	-0.009***	-0.007***	-0.001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
year=2006	0.027	0.171	-0.004	0.081*	-0.175**
	(0.027)	(0.124)	(0.037)	(0.042)	(0.083)
year=2007	0.063**	0.063	0.040	0.132***	-0.125
	(0.026)	(0.126)	(0.037)	(0.041)	(0.081)
year=2008	0.178***	-0.201	0.334***	-0.011	0.079
	(0.027)	(0.138)	(0.037)	(0.044)	(0.085)
year=2009	0.327***	-0.260*	0.557***	0.002	0.225**
	(0.028)	(0.155)	(0.038)	(0.047)	(0.090)
year=2010	0.334***	-0.157	0.522***	0.024	0.399***
	(0.029)	(0.154)	(0.039)	(0.048)	(0.084)
year=2011	0.341***	-0.394**	0.594***	-0.048	0.327***
	(0.029)	(0.164)	(0.039)	(0.049)	(0.081)
year=2012	0.505***	-0.398**	0.701***	0.223***	0.468***
	(0.029)	(0.172)	(0.040)	(0.047)	(0.084)
year=2013	0.570***	-0.198	0.723***	0.427***	0.223***
	(0.029)	(0.165)	(0.040)	(0.045)	(0.083)
year=2014	0.592***	0.037	0.653***	0.504***	0.350***
	(0.028)	(0.152)	(0.039)	(0.043)	(0.080)
year=2015	0.596***	0.158	0.547***	0.580***	0.514***
	(0.028)	(0.142)	(0.039)	(0.042)	(0.077)
year=2016	0.589***	0.535***	0.482***	0.658***	0.284***
	(0.027)	(0.130)	(0.039)	(0.041)	(0.076)
year=2017	0.603***	0.311**	0.520***	0.711***	0.159**
	(0.027)	(0.137)	(0.039)	(0.041)	(0.078)
year=2018	1.031***		1.737***	-3.219***	
	(0.063)		(0.066)	(0.708)	
Constant	-1.908***	-5.777***	-3.044***	-2.617***	-6.132***
	(0.155)	(0.440)	(0.211)	(0.265)	(0.103)
Observations	495347	484426	495347	495347	470090

Note: Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$

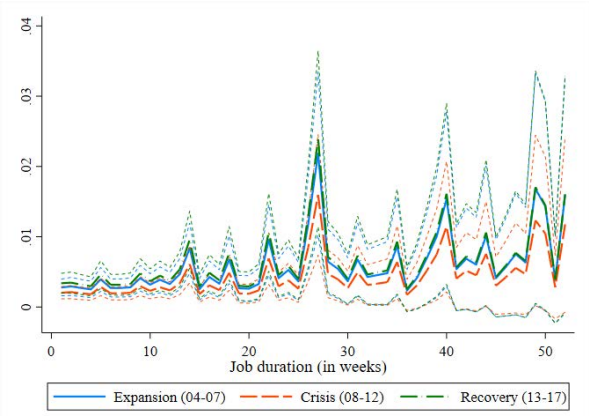
Table 9: Estimated coefficients, CR models with unobserved heterogeneity

	(1) Exit to P	(2) Exit to U	(3) Exit to D	(4) Exit to A
THA	0.825***	0.340***	-1.033***	4.561***
	(0.131)	(0.038)	(0.056)	(0.076)
THA × Duration	0.015*	-0.007**	0.039***	-0.004
	(0.008)	(0.003)	(0.005)	(0.006)
Age 20 to 30	0.001	-0.218***	-0.267***	-0.250***
	(0.075)	(0.023)	(0.030)	(0.049)
Foreign	0.006	-0.344***	-0.385***	-0.286***
	(0.088)	(0.032)	(0.051)	(0.077)
Part-time	0.080	0.001	0.039	0.539***
	(0.079)	(0.022)	(0.025)	(0.049)
Medium-low skilled	-0.953*	0.451*	-0.525	
	(0.563)	(0.273)	(0.330)	
Medium-hig skilled	-0.443	0.856***	0.606**	1.422**
	(0.454)	(0.248)	(0.274)	(0.720)
High skilled	-0.590	0.966***	0.684**	1.175
	(0.445)	(0.247)	(0.274)	(0.715)
Very high-skilled	-0.754*	1.062***	0.662**	1.314*
	(0.447)	(0.247)	(0.274)	(0.715)
For circumstances of production	0.629***	-0.056***	0.336***	0.684***
	(0.063)	(0.018)	(0.022)	(0.042)
Interim	0.791***	-0.071*	0.695***	0.378***
	(0.130)	(0.042)	(0.051)	(0.080)
Experience in D	-0.016***	-0.034***	-0.021***	-0.022***
	(0.000)	(0.000)	(0.000)	(0.000)
Experience in A	-0.069***	-0.066***	-0.074***	-0.035***
	(0.000)	(0.000)	(0.000)	(0.000)
Experience in P	0.014***	-0.01***	-0.010***	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)
year=2006	0.204	-0.008	0.071	-0.227**
	(0.126)	(0.038)	(0.043)	(0.099)
year=2007	0.102	0.057	0.141***	-0.132
	(0.130)	(0.039)	(0.044)	(0.101)
year=2008	-0.170	0.409***	-0.004	0.014
	(0.142)	(0.039)	(0.047)	(0.109)
year=2009	-0.227	0.709***	0.024	0.069
	(0.160)	(0.040)	(0.051)	(0.116)
year=2010	-0.134	0.677***	0.052	0.590***
	(0.159)	(0.042)	(0.052)	(0.107)
year=2011	-0.363**	0.777***	-0.007	0.308***
	(0.169)	(0.042)	(0.054)	(0.105)
year=2012	-0.375**	0.920***	0.222***	0.404***
	(0.177)	(0.043)	(0.053)	(0.108)
year=2013	-0.166	0.957***	0.417***	0.259**
	(0.170)	(0.043)	(0.051)	(0.108)
year=2014	0.063	0.896***	0.514***	0.239**
	(0.157)	(0.043)	(0.049)	(0.105)
year=2015	0.208	0.751***	0.553***	0.418***
	(0.148)	(0.043)	(0.049)	(0.103)
year=2016	0.606***	0.665***	0.626***	0.135
	(0.136)	(0.043)	(0.047)	(0.101)
year=2017	0.378***	0.668***	0.722***	0.187*
	(0.143)	(0.043)	(0.046)	(0.102)
year=2018		1.981***	-3.159***	
		(0.071)	(0.709)	
Observations	484426	495347	495347	470090

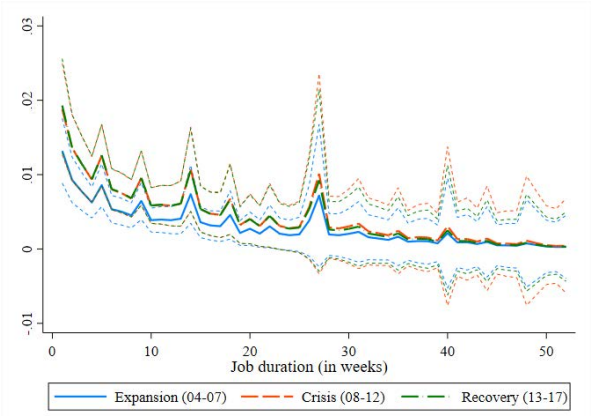
Note: Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$

Figure 8: Marginal effect of THA by period

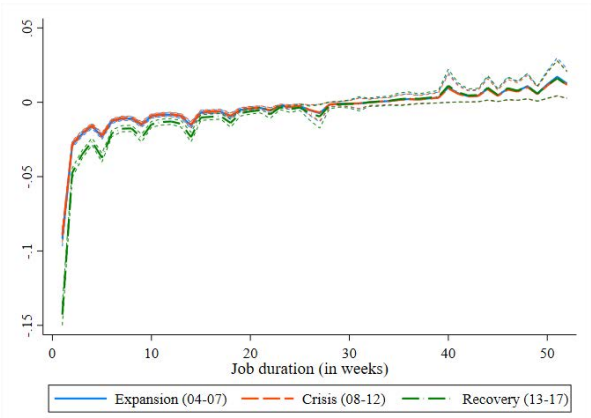
Panel a: To a Permanent job



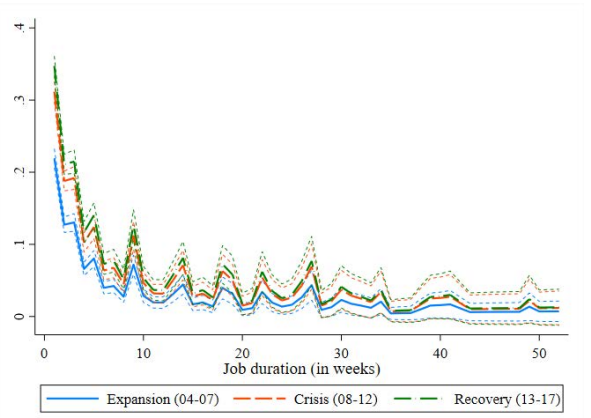
Panel b: To unemployment



Panel c: To direct-hire temp job

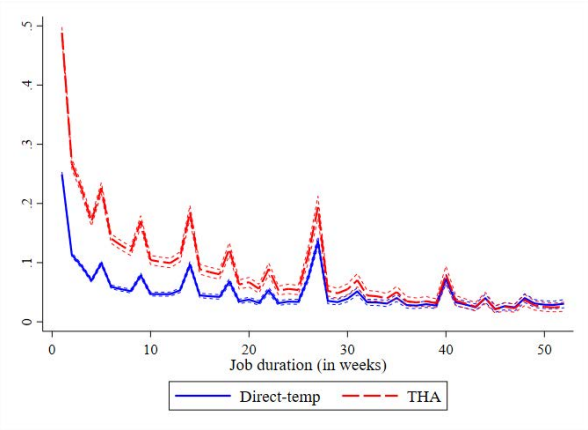


Panel d: To THA job



Notes: The figures display the average marginal effect at each duration, by period. Apart from controlling by agency employment and the interaction between agency employment and duration, all models include controls for age, nationality, part-time, skills, type of contract, experience in permanent employment, in direct-hire temporary employment and in agency employment and year fixed effects. The dashes lines correspond to 95 percent confidence intervals. Source: MCVL, 2005-2017.

Figure 9: Predicted hazard rate from the single risk model, THA vs direct temps



Notes: The figure plots the average predicted probability of agency employment at each duration. Apart from controlling by type of contract and the interaction between agency employment and duration, the model includes controls for age, nationality, part-time work, skills, experience in permanent, agency and direct-hire temporary employment, and year fixed effects. The dashes lines correspond to 95 percent confidence intervals. Source: MCVL, 2005-2017.

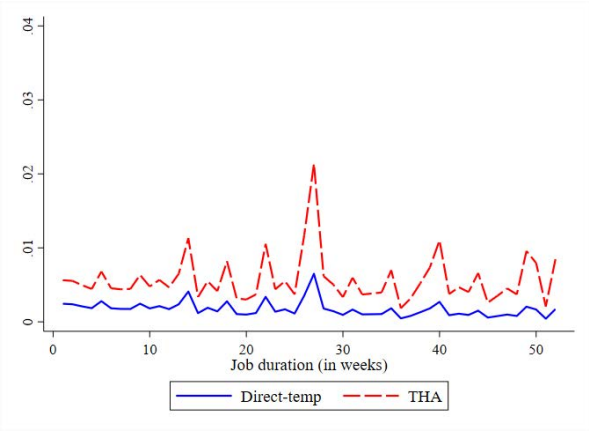
Table 10: Marginal effect of THA by period, model with unobserved heterogeneity

Exit to	Permanent			Unemployment			Direct-temp			THA		
Job dur.	E	C	R	E	C	R	E	C	R	E	C	R
1 w	0.3	0.2	0.4	1.9	3.0	3.1	-4.6	-4.4	-6.9	12.3	17.4	18.6
2-4 w	0.3	0.2	0.4	1.2	1.9	2.0	-1.4	-1.3	2.1	9.4	13.2	13.9
5-12 w	0.3	0.2	0.4	0.9	1.5	1.6	-0.9	-0.8	-1.3	5.0	7.4	7.8
3 m	0.4	0.3	0.5	0.7	1.1	1.2	-0.4	-0.4	-0.6	3.6	5.5	5.7
14-25 w	0.4	0.3	0.4	0.5	0.9	0.9	-0.2	0.2	-0.3	2.8	4.1	4.3
6 m	0.9	0.7	0.9	0.6	1.0	1.0	0.0	0.0	0.0	3.6	5.3	5.5
27-44 w	0.5	0.4	0.5	0.2	0.4	0.3	0.1	0.1	0.1	2.1	3.1	3.1
45-53 w	0.5	0.4	0.4	0.0	-0.1	-0.1	0.2	0.2	0.2	2.0	3.1	3.1

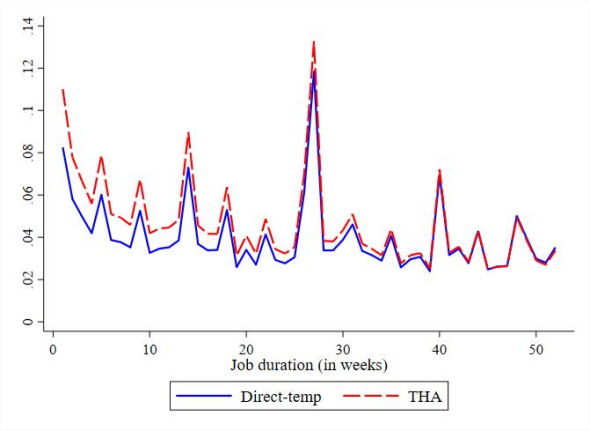
Notes: The table display the average marginal effects of agency employment by period for a selected set of job duration. Letters E, C, and R stands for the expansion (2004-2007), crisis (2008-2012) and recovery periods (2013-2017), respectively. For durations that are aggregated, we compute the average. Apart from controlling by agency employment and the interaction between agency employment and duration, all models include controls for age, nationality, part-time, skills, type of contract, experience in permanent employment, in direct-hire temporary employment and in agency employment and year fixed effects. Source: MCVL, 2005-2017.

Figure 10: Predicted hazard rates of the model with unobserved heterogeneity

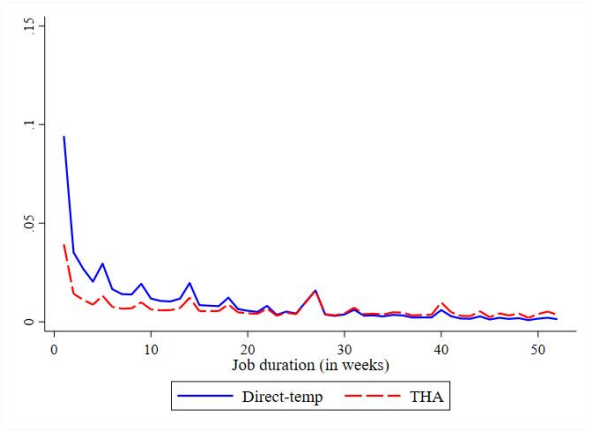
Panel a: To a Permanent job



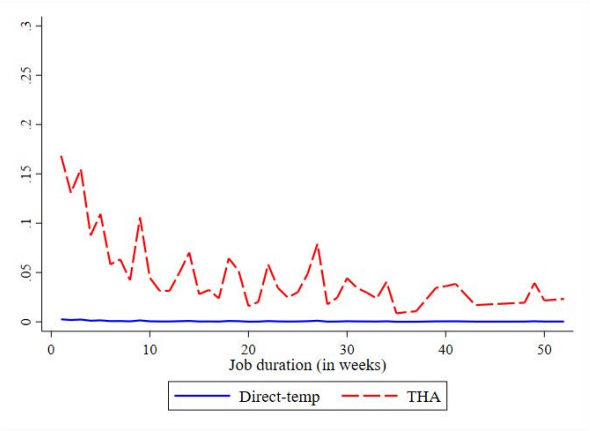
Panel b: To unemployment



Panel c: To direct-hire temp



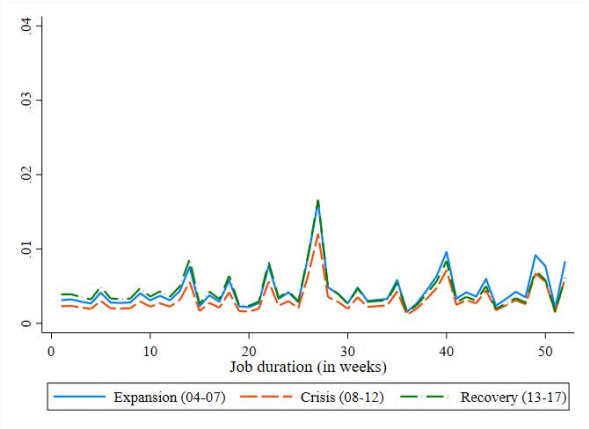
Panel d: To THA job



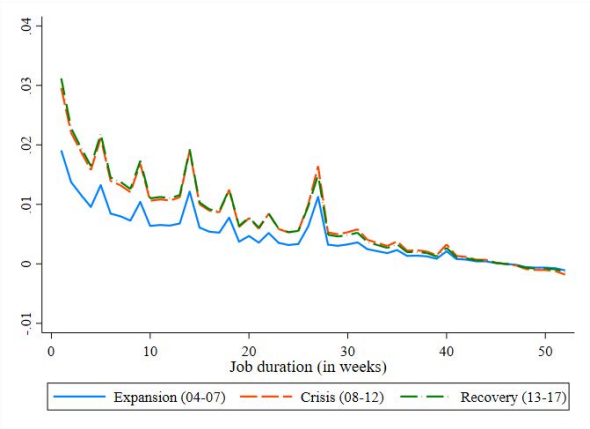
Notes: The figures display the average marginal effects of agency employment at each duration. Apart from controlling by agency employment and the interaction between agency employment and duration, all models include controls for age, nationality, part-time, skills, type of contract, experience in permanent employment, in direct-hire temporary employment and in agency employment and year fixed effects. Source: MCVL, 2005-2017.

Figure 11: Marginal effect of THA by period, model with unobserved heterogeneity

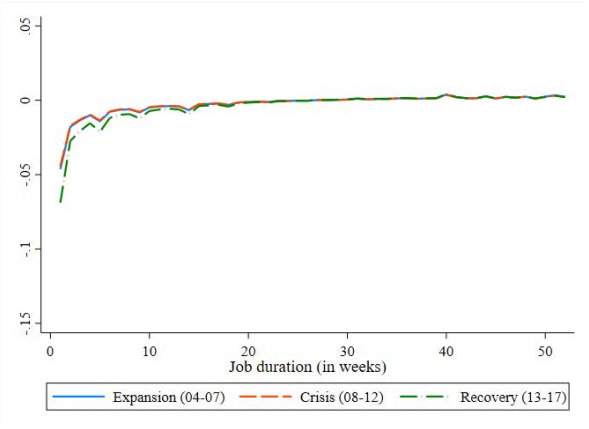
Panel a: To a Permanent job



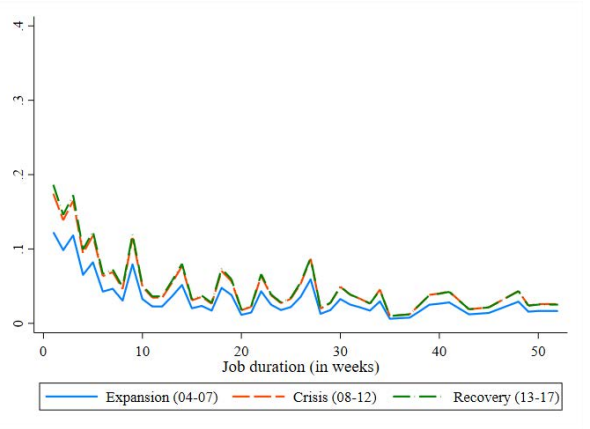
Panel b: To unemployment



Panel c: To direct-hire temp



Panel d: To THA job



Notes: The figures display the average marginal effects of agency employment at each duration, by period. Apart from controlling by agency employment and the interaction between agency employment and duration, all models include controls for age, nationality, part-time, skills, type of contract, experience in permanent employment, in direct-hire temporary employment and in agency employment and year fixed effects. Source: MCVL, 2005-2017.