

Looking Beyond the Bridge: How Temporary Agency Employment Affect Labor Market Outcomes

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Abstract: This paper comprehensively analyzes the stepping-stone effect of temporary agency employment. Using the timing-of-events approach, we not only investigate whether temporary agency employment is a bridge into regular employment but also at the individual's post-unemployment wages and post-unemployment job stability for Danish unemployed workers. We find evidence for large positive treatment effects. Agency employment is particularly a successful search strategy for immigrants. Moreover, our results suggest that taking up a temp job may improve the quality of post-unemployment jobs in terms of employment stability and post-wages indicating that agency employment may improve subsequent matching quality.

Key words: temporary agency employment, stepping stone, employment stability, earnings, Denmark

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1. Introduction

During the past decade, temporary agency employment increased in most European countries, employing about 2 percent of the EU working population in 2007 (CIETT 2009). Until recently, however, Denmark has been an exception from this rule as the temporary help service sector did not play any role. This has changed fundamentally. Although the temporary help sector is still small compared to the European average, it is far from being a negligible source of labor turnover and net employment growth today. In the past five years, the sector has increased almost fourfold, accounting for 1.7 percent of the total workforce in 2007 (Windelin and Hansen 2007). This marked increase comes as something of a surprise since the Danish labor market is rather flexible and hardly any employment protection exists. Moreover, until late 2008 the Danish unemployment rate has been low and the labor market has been considered to be tight. As temporary agency jobs in Denmark usually provide less social benefits than other jobs do, one would surmise that workers had no incentive to take up an agency job, such that the labor supply side may have rationed the market for temporary help services. However, the rapid growth of this sector may be a result of the tightening activation policies of the Danish public employment service. Pedersen *et al.* (2003) and Oxford Research (2003) present evidence that increasingly unemployed search and accept agency jobs in order to find regular jobs.

As in other European countries, there are concerns in Denmark whether agency workers are trapped in poor quality jobs or whether temporary agency work might be a bridge into regular jobs for individuals otherwise at risk of marginalization. Up until today, hardly any research on temporary agency employment in Denmark exists. It is the aim of this paper to fill this gap. Our study contributes to the literature in several ways: First, the paper looks comprehensively on the stepping stone effect of undertaking temporary agency employment during periods of unemployment in Denmark for the period 1997-2006. Second, to the best of our knowledge it is the first study employing the timing-of-events approach developed by Abbring & Van den Berg (2003) to model the lock-in effect and causal effect of taking a temporary agency job during unemployment.¹ Third, we estimate heterogenous effects for subgroups of unemployed workers. Finally, we are interested not only on the causal effect of the job finding rate for regular jobs, but also on the post-unemployment job and employment duration and on post-unemployment wages.

¹ Although De Graaf-Zijl & Van den Berg (2010) investigated within this framework whether temporary employment is a stepping stone into regular employment for the Netherlands. Gagliarducci (2005) did the same for Italy and Göbel & Verhofstadt (2008) for German school leavers. However neither of these studies could distinguish between temporary agency employment and direct-hire temporary employment.

The paper finds no evidence for a lock-in effect and a high positive treatment effect. Agency employment is particularly a successful search strategy for immigrants. In addition, it may also be a means to improve the quality of post-unemployment jobs, indicating that temporary agency employment may improve subsequent matching quality.

The results of this paper may be also of political interest as temporary agency employment has features of an active labor market program (ALMP). The US has already been experimenting with such instruments. While several researchers have advocated greater use of temporary agency firms in job placement programs (Lane *et al.* 2003, Andersson *et al.* 2009), the study by Autor & Houseman (2005) argues that such a policy prescription may be premature. Our results may be taken as an indication, that temporary agency employment could be a successful ALMP if targeted at the right treatment groups. Moreover, as Denmark is spending considerable resources on ALMP, using agency employment would offer considerable scope for cost savings since actively involving temporary work agencies into the placement strategy of the public employment service comes nearly without costs.

The paper is organized as follows: A short review of the related empirical literature and some theoretical arguments will be provided in the next Section. Section 3 highlights briefly some relevant facts about the temporary agency employment market in Denmark. Section 4 is devoted to the estimation strategy. Section 5 introduces the data set and provides some main descriptive statistics. Section 6 presents the results and, finally, Section 7 concludes.

2. Literature

The theoretical impact of agency employment on the employment outcomes of temporary agency workers (temps) is not clear *a priori*. Because temporary help agencies face lower hiring and firing costs than conventional direct-hire employers do, they may choose to hire individuals, who would otherwise have difficulties finding stable employment. By this means, jobseekers can overcome negative stigma effects due to a longer period of unemployment (e.g. Autor & Houseman 2002, Jahn 2010a, Katz & Krueger 1999). Moreover, temporary assignments to client firms may not only increase workers' human capital but may also be a means to developing labor market contacts that lead to stable employment (e.g. Houseman *et al.* 2003, Jahn & Ochel 2007). If so, temporary help agencies may reduce the time spent searching for a new job, facilitate rapid entry into regular employment and may improve the quality of the subsequent job. This holds the more if client firms use temporary help assignments as a screening device.

In contrast to this view, it may be argued that human capital effects cannot be strong due to the fact that temporary work agencies offer primarily low-skilled jobs of short duration that are often below the qualification of the worker (Segal & Sullivan 1997). These jobs may even be dead-ends, since firms may not plan to fill these jobs permanently limiting the future prospects of the temp workers (Heinrich *et al.* 2005). Consequently, temporary agency work might not provide significant possibilities to develop productive job search networks. They may even crowd out direct job search, which may inhibit longer-term labor advancement. Which hypothesis holds is therefore an open empirical question.

As a result, a growing literature attempts to identify the effects of agency employment on subsequent labor market outcomes. However, the empirical evidence is contradictory as well. No evidence for a springboard into regular employment can be found in Germany (Kvasnicka 2009), and Spain (Amuedo-Dorantes *et al.* 2008). Malo & Muñoz-Bullón (2008) show that temporary agency employment may only work for married women and García-Pérez & Muñoz-Bullón (2005) that temp employment works only for short-term unemployed young workers in Spain. In Italy the effect on labor market outcomes depend on the region investigated (Ichino *et al.* 2008). In general, it seems that rigid European labor market institutions do not support the successful transition into permanent jobs via agency work. The American evidence is somewhat more promising. As a consequence of the different institutional background most studies concentrate on earnings and employment stability of low wage earners or recipients of some kind of income subsidies entering the temporary help service sector.² Overall, most studies suggest that temporary agency employment does not have any long-run negative effect on the outcome of temp workers.

To identify the causal effects of agency employment on the likelihood attaining a permanent job the vast majority of the studies use variants of the conditional independence assumption (CIA) to identify the causal effects of agency employment on the likelihood attaining a permanent job, and concerns remain about selection on variables that are unobservable (Autor 2009). At least since the study by Autor & Houseman (2005) the debate on whether the CIA may be violated has been intensified. Using a quasi-experimental setting they show that moving participants into temporary help jobs increases their short-term earnings. However, these effects are offset by lower earnings, less frequent employment, and higher welfare recidivism over the next two years. Our study contributes to this debate as we employ the timing-of-events approach developed by Abbring & Van den Berg (2003) to model the causal effect of temporary agency employment on various labor market outcomes. The

² E.g. Lane *et al.* (2003), Andersson *et al.* (2005, 2009), Hamermesh & Heinrich (2008) and Heinrich *et al.* (2009).

advantage of this approach is that it exploits the random variation in the timing of the treatment to separate the time-varying treatment effects from the assumed time-invariant unobserved variables affecting both, selection into temporary agency employment and transition into regular employment.

3. Temporary Agency Employment in Denmark

Until 1990, the Danish temporary help sector was comprehensively regulated. Since 1990, more or less all regulations concerning establishing and running a temporary work agency were abandoned. Consequently, there is free market access for agencies except for agencies assigning workers to the health care or transportation sector. In these cases agencies need an authorization to operate and are required to employ staff with a medical background or an education in transport.

As a substitute for the regulation by law, collective bargaining at the sectoral, agency, and user-firm level plays an important role.³ About 80 percent of the temp workers are members of unemployment insurance funds which are operated by unions. Generally, standard labor law applies for employing an agency worker. Nevertheless, agency workers who are less than six to nine month employed at the same job are not covered by the Act on the legal relationship between employer and employee (Funtionærloven) and are usually not eligible for employment benefits as maternity benefits, payment on holidays, children's first sickness days and sickness pay pension and a right to at least one month's notice of termination, which may adversely affect agency workers on shorter assignments.

Until recently, temporary agency work only played a minor role in Denmark. Temporary agency workers were mainly used to accommodate the size of the workforce to fluctuations in product demand and to replace permanent staff being on leave or called in sick. On the labor supply side, lack of employment and income security, frequent change of working conditions and the tight Danish labor market are among the reasons why most workers do not consider agency jobs as attractive when there is an alternative job offer at hand.

This has changed dramatically. Since 1997, temporary agency work has experienced an impressive growth. The share of temporary agency workers (fulltime equivalent) increased more than five-fold, from 0.2 percent in 1997 to 1.1 percent in 2007. This may be only the bottom line. If the share of temp workers is calculated as the number of persons accepting a temp job, it totalled up to 1.7 percent of the workforce in 2007 (Windelin and Hansen 2007).

³ A comprehensive and detailed description about the system of collective bargaining in the Danish temporary help service sector can be found in Arrowsmith (2008).

Despite the fact, that large agencies dominate the temporary help service market, the number of registered agencies increased considerably, from 305 in 2005 to 623 by 2007 (Mølgaard and Hansen 2008). Until recently the turnover from assignments to the health care sector dominated the industry. Since 2002, the demand for temps in the manufacturing, construction and the transport sector dominates (Kudsk-Iversen & Andersen 2007). These industries have now surpassed the health sector which has been traditionally the biggest user of temporary agency workers. In 2007 assignments to the health care sector contributed to 32 percent of the total turnover of the industry, the turnover from assignment of industrial workers contributed to 35 percent and from workers to the transport sector 10 percent of the total turnover (Statistics Denmark 2009). As agency jobs have moved into blue-collar occupations, the temporary help industry has become an increasingly important employer of less-skilled workers.

There are several reasons responsible for the spectacular growth of the Danish temporary help service sector: First, the deregulation of temporary agency employment in 1990 may have increased incentives to enter into the market. Second, the temporary help service sector may serve as a stepping stone into the Danish labor market not only for the unemployed but also for East European immigrants: 20 percent of the 'work and stay' permissions in 2007 have been granted to East Europeans hired by temporary work agencies (Andersen 2007). The growing pool of migrant workers available for temporary agency employment may have stimulated employers' interest and demand in many sectors.

Third, as a consequence of the tight labor market in Denmark client firms have faced bottlenecks when recruiting new workers. This is why temporary work agencies have specialized in identifying agency workers skills and match them with the staffing needs of the firms. The advantage for the user firms is not only that this strategy may reduce administrative burden to find new employees but also enables employers to screen workers for direct-hire positions and improve subsequent matching quality. The labor shortage has particularly increased the demand for temps in the manufacturing industry, the construction sector, and the transport sector (Anderson 2007).

Fourth, temporary help employment has become increasingly attractive for workers in the health sector. According to anecdotal evidence, workers employed in the public health sector can not only gain influence on their working time but are also able to bargain higher wages if they are assigned by a temporary work agency. Particular nurses and doctors often combine a part time job in the public sector, which provides them with basic social benefits, with a part-time job at an agency. Jahn (2010b) shows that temporary agency workers in the health care sector indeed receive higher wages compared to nurses employed in non-temp firms.

Finally, recent research has contradicted the presumption that Danish temporary agency workers might accept a temp job voluntarily (Pederson et al. 2003, Oxford Research 2003). According to these studies all temps who were interviewed in a field study had chosen this employment form because of need or to escape unemployment. These findings in combination with the increase of the share of low-skilled workers in this sector have intensified the debate as to whether temporary agency work facilitate or hinders labor market advancement of jobseekers.

4. Econometric Strategy

The aim of this study is to investigate whether taking up a temporary agency job may be a bridge out of unemployment to (self-)employment. Hence, our population of interest are individuals who have lost their job or who have otherwise become unemployed. Thus, we sample workers at the time of inflow into unemployment and analyze how long it takes them to find non-temp employment and whether taking up a temporary agency job speeds up this process.

As unemployed workers do not take up an agency job randomly, we have to distinguish the causal effects of temporary agency employment from selection effects. As outlined in Section 2, most studies use the Conditional Independence Assumption (CIA) when analyzing the stepping stone effect of temporary agency employment. However, if there exists some unobserved variables influencing the selection process as well as the potential outcomes, the CIA approach will result in biased estimates. Albeit the data set at hand is quite detailed whether the CIA holds may be questionable as the motivation why unemployed take up an agency job is *a priori* not obvious.

The more appropriate econometric model might therefore be a duration model analyzing the time from inflow into unemployment until non-temp employment, taking into account the endogenous choice of workers to take up an agency job. Such an analysis aims at estimating the causal effect of working in the temporary help sector on the duration of unemployment, or alternatively, on the exit rate from unemployment (including periods the worker has been employed at a temporary work agency as a part of the unemployment spell) to regular employment. This is done by exploiting the timing-of-events approach formalized by Abbring and Van den Berg (2003). Exploiting random variation in the observed moment of transition from (full-time) unemployment to temporary agency employment, this approach is ideal for separating selection from causal effects. Furthermore, it allows us to estimate heterogeneous treatment effects of temporary agency employment.

4.1 The Timing-of-Events Approach

We consider being employed at a temporary work agency to be the treatment, which is undertaken during a spell of unemployment, and we then want to estimate the effect of this treatment on the exit rate from unemployment to employment both during and after the receipt of the treatment. Let T_u be a continuous random variable measuring the time from becoming unemployed until non-temp employment. Data on T_u are censored for those who remained unemployed until the last week of the year 2006. The hazard rate out of unemployment is assumed to be a Mixed Proportional Hazard (MPH):

$$\theta_u(t|x, d_1(t), d_2(t), v_u) = \lambda_u(t) \exp[x\beta_u + d_1(t)\gamma_1 + d_2(t)\gamma_2 + v_u] \quad (1)$$

The hazard function is defined as the product of a baseline hazard, $\lambda_u(t)$, depending on the elapsed unemployment duration, and a scaling function, depending on observed variables, x , unobserved heterogeneity that accounts for possible selectivity in the exit process v_u , and the two time-varying indicators for being in treatment, $d_1(t)$ (i.e. being employed in an agency at time t), and for having received treatment, $d_2(t)$ (i.e. having been a temp in the current unemployment spells before t but is not a temp at t). The coefficients γ_1 and γ_2 thus capture the lock-in- and post-treatment-effects of temp jobs on the hazard rate to employment, respectively. One would expect γ_1 to be negative, i.e. that there is a lock-in effect. In the case of temporary agency employment the sign of γ_1 may not be clear cut. On the one hand, while being on assignment the worker has less time searching for a job outside the sector. However, it is well known that client firms also use temporary agency employment as a screening device. This may be particularly true in Denmark where the labor market can be considered as tight. In this case, agency workers who meet the required productivity may receive faster an offer for a permanent job than comparable unemployed searching directly for a job outside the sector might do. If temporary agency employment proves to be a bridge into employment than γ_2 should be positive, i.e the hazard rate increases after taking up an agency job.

We model the MPH using a flexible, piecewise-constant duration dependence function:

$$\lambda_u(t) = \exp \left[\sum_l (\lambda_{u,l} I_l(t)) \right] \quad (2)$$

where $l = 0, \dots, 11$ is a subscript for the time intervals measured in weeks and $I_l(t)$ are time-varying dummy variables. We split the analysis period during the first six month in monthly intervals. From the 7th month on, we split the time axis into quarterly intervals (up to two years).

In order to allow an interpretation of γ_1 and γ_2 as causal effects, we have to take into account the potential endogeneity of temporary agency employment. Let T_p denote the time from becoming unemployed until the person finds a temp job. Note that, by construction $T_u \geq T_p$, since we consider temp periods to be part of the unemployment spell. Following the notation used above and specifying once again a MPH function, the transition rate into temporary agency jobs is specified as:

$$\theta_p(t|x, v_p) = \lambda_p(t) \exp[x\beta_p + v_p]$$

The unobserved random variables v_u and v_p are allowed to be correlated, which implies a correction for the potential endogeneity of the treatment status. Note that the random variation in the timing of the treatment identifies the causal effect of the treatment under the assumption that unobserved characteristics are time-invariant. Their distribution is approximated non-parametrically by a bivariate discrete distribution with M mass-points (Heckman & Singer 1984 and Gaure et al. 2007).⁴ Moreover, note that due to the random variation in the timing of treatment, no exclusion restriction is necessary to identify the parameters of this model non-parametrically. The only assumption necessary, beyond the assumption of mixed proportionally hazards, is one of non-anticipation, that is, the individual is not supposed to know in advance the exact starting date of the agency job, only its probability distribution.⁵ This assumption is crucial to rule out changes in behavior before the actual treatment takes place. As long as the individual does not know the exact starting date too long in advance, this is generally not perceived as a problem. In the case of temporary agency jobs, where workers are often called on the same morning as the job begins, this is hardly a problem. Let C_i be a non-censoring indicator that takes the value of 1 if spell i was completed by the end of the observation period, and zero otherwise. The likelihood function for individual j with N unemployment spells is specified as,

$$L(v_u, v_p) = \prod_{i=1}^N L_i(v_u, v_p)$$

⁴ With multi-spell data the identification does not lie completely on the proportionality assumption when we assume the unobserved heterogeneity term to be constant over time for each individual. As we observe multiple spells for many individuals in our data, we assume that the discrete distribution for unobserved heterogeneity is applicable.

⁵ The presence of repeated spells decreases the dependence on the mixed proportionally assumption (Abbring & Van den Berg 2003). Furthermore, the proportionality assumption is not needed for identification provided that we observe a sufficient amount of variation in covariates over time and across observations (Brinch 2007, Gaure et al. 2007).

where

$$L_i(v_u, v_p) = \theta_p[t_{pi}|x_i, v_p]^{I[t_{pi} < t_{ui}]} \theta_u[t_{ui}|x_i, d_1(t_{ui}), d_2(t_{ui}), v_u]^{C_i} \\ \times \exp \left\{ - \int_0^{t_{pi}} \theta_p[s|x_i, v_p] ds - \int_0^{t_{ui}} \theta_u[t|x_i, d_1(t), d_2(t), v_u] dt \right\}$$

We estimate heterogenous effects by allowing the effects to depend on the observable characteristics, and we assume that all heterogeneity is captured in this way. Conditional on observables, the effects are assumed to be homogenous, and hence, we do not have to distinguish between the average treatment effect on the treated and the average treatment effects as long as we condition on the observable characteristics (Heckman et al. 1999). To estimate the heterogenous effects of temporary agency employment, we augment the set of characteristics by including interaction terms between a subset of the characteristics, x^s , and the two program indicators $d_1(t)$ and $d_2(t)$. This implies that the effect of agency employment is allowed to depend on these characteristics. Apart from a larger set of parameters, the estimation procedure is as before, and the hazard function out of unemployment to employment can be written as

$$\theta_u(t|x, d_1(t), d_2(t), v_u) = \lambda_u(t) \exp[x\beta_u + (1 \ x^s)d_1(t)\gamma_1 + (1 \ x^s)d_2(t)\gamma_2 + v_u] \quad (2)$$

Where $(1 \ x^s)$ is a $1 \times K$ vector of characteristics, $(1 \ x^s)d_1(t)$ is a $1 \times (K + 1)$ vector and γ_1 is now a $(K + 1) \times 1$ parameter vector, and similarly for γ_2 .

4.2 Modeling Post-Unemployment Outcomes

In the next step we extend the described model by distinguishing between transitions into employment that pay better than the pre-unemployment job and transitions to regular jobs that pay worse or the same as the pre-unemployment job. As the econometric design is more flexible and less parametric as common approaches we use hazards to analyze post-unemployment earnings as well.⁶ To do so we separate the transition rate to employment into (1) the rate of leaving unemployment to a better paid job $\theta_b(t|x, d_1(t), d_2(t), v_b)$ and into (2) the rate of leaving unemployment for a worse or equally paid job $\theta_w(t|x, d_1(t), d_2(t), v_w)$. For some individuals, we do not observe the pre-unemployment wage, and in this case, the exit rate from unemployment to employment used in the likelihood function is the sum of $\theta_b(\cdot)$ and $\theta_w(\cdot)$. The three hazard rates add up to the original transition rate from unemploy-

⁶ Cockx & Picchio (2009) first modeled post-wages in a duration model by introducing competing risks, unobserved heterogeneity, and state dependence.

ment to a regular employment relationship. The treatment parameters provide information on how the likelihood ratio of leaving unemployment for a better job compared to a worse paid job (or no job) is affected by an agency spell. In this case $\gamma_{1b} - \gamma_{1w}$ informs about how temporary agency employment affects the likelihood of leaving for better paid jobs relative to the control group.

Moreover, within the same framework we want to evaluate the effects of temporary agency employment on subsequent job and employment stability in the post-unemployment period. First, we analyze the impact of agency employment on the duration of the first job starting right after unemployment exit. A job spell is defined as the number of consecutive employment weeks with the same employer. Second, we perform the same analysis with respect to the employment stability, analyzing the duration of uninterrupted employment, which may consist of a sequence of job spells. This is done in a framework, where we jointly estimate employment (or job-) duration, unemployment duration, and the duration until a temp job (the treatment). Unobserved variables in all hazard rates are allowed to be correlated as in the basic model. Thus this part of the model differs only in one respect from the basic model in Section 4.1; In the econometric specification for employment or job duration, we allow for lagged duration dependence by including a set of indicators for the duration of the previous unemployment spell.

5. Data Sources and Descriptive Statistics

Our empirical analysis is based on two rich sets of Danish register data. Our primary data set is an extract from a matched employer-employee data set, which contains weekly information of all persons living in Denmark aged 16 to 75. The data set is compiled from a variety of sources maintained by Statistics Denmark. Due to the involvement of the government in nearly all facets of the Danish life it not only records all transitions between employment, unemployment, participation in programs of active labor market policy and being out of the labor force but it also provides accurate information on the establishment in which workers are employed and hourly wages at the current job. To this data set we match additional socio-economic information available on a yearly basis from the Integrated Database for Labour Market Research (IDA), which is maintained by statistics Denmark as well. As the combined data set allows us to construct the (un-)employment career of workers which is exact to the week it is especially suitable for performing duration analyses. Due to its administrative nature, the data set can be considered as highly reliable.

Nevertheless, the data set has one minor limitation as we can identify employment spells in temporary help agencies only by an industry classification code. This implies that temporary agency workers cannot be distinguished from agencies' permanent administrative staff. However, we do not expect that this affects our estimations as the absolute number of the permanent staff in the data set is likely to be small and we concentrate our analysis to temp workers who have been unemployed before accepting a temp job.⁷

For the analysis, we use a two percent random sample of individuals aged 16 to 60 years and all individuals who have been employed at a temp agency at least once during their employment career during the period 1994 to 2006. We only include workers entering unemployment during the period 1997 to 2006; the information for the period 1994 to 1996 is used to construct the previous employment history of the job seekers.

An unemployment spell is defined as a sequence of weeks during which a person receives either UI benefits, is in some type of active labor market policy program, or is employed at an agency. Thus, agency employment is treated as a part of the unemployment spell in order to enable the counterfactual analysis. Unemployment spells continuing until the end of the sample period are treated as independently right-censored observations (about 3.9 percent of all spells).

The dependent variable is the unemployment duration measured in weeks. The two explanatory variables of interest are the time varying indicator for being employed as a temp worker, and the time-varying indicator for having been employed at an agency during the current unemployment spell. We define the destination "regular employment" as non-temp employment and self employment.

In order to concentrate on workers who accept an agency job because of lack of alternatives outside the sector, the following selection decisions are made. First, our treatment group only includes temp workers who received unemployment benefits or assistance before entering temp employment.⁸ Second, we only include temp spells if the temporary agency job is the primary job. By this selection we are able to exclude workers who engage in temp jobs in order to increase their income. Third, unemployed often try to escape unemployment by upgrading their education but work parallel as temps to improve their income. As their motivation might not be primarily to find employment outside the sector we exclude all previously unemployed temps who are undertaking formal education. Fourth, as mentioned earlier there

⁷ For Germany, Antoni and Jahn (2009) provide evidence that the agency staff accounts for about 5 to 7 percent of all workers identified as temp workers via the industry classification code.

⁸ This decision is also motivated by the fact that the implemented model cannot deal with selection at time zero.

is some evidence that the reason to accept a temp job in the health sector may be mainly driven by income motives. Therefore we exclude all individuals who are educated as nurses or as medical doctors.

Finally, we exclude temp workers who hold top management positions as it is likely that they belong to the permanent staff of the agency. For the same reason we exclude temp workers with a temp spell which lasts more than one year. After this sample selection the sample consists of 75,632 individuals experiencing a total of 260,672 unemployment spells.

We present all results separated by gender as the kind of assignments vary greatly between these two groups. While men are mainly assigned to the construction and manufacturing sector, women are more likely to be found in the trade and health care sector.

In addition, the following socio-demographic variables are used: Age (5 categories), being single or not, ethnic origin (5 groups), child in household, child below age of 7 in the household and a dummy variable which indicates whether the partner is employed. In addition, we have five educational variables, information on the UI fund (9 occupation/industry related funds), and a dummy variable which indicates if the worker is not a member in an UI fund, which implies that the worker receives unemployment assistance.

As a proxy for the human capital of the workers we use the employment history of the past three years: Previously employed (in the temporary help sector, self or regular employed, base category), sick, or out of the labor force. Moreover, we controlled for the total fraction of time spent in employment during the past three years, the number of temp and regular jobs held, and the number of participations in programs of active labor market policies during the past three years. Finally, we include dummies for the year and quarter of entry into the current unemployment spell as well as the regional unemployment rate (based on 14 counties). All controls, except for the two main explanatory variables, are measured at the beginning of an unemployment spell and will be treated as time-invariant regressors, which are fixed for each single spell but can vary over different spells for the same person.

Table A1 presents the descriptive statistics for the treatment and control group separated by gender.⁹ The observations refer to unemployment spells, not to individuals. Of the 260,672 unemployment spells, 25,473 involve at least one temporary agency work spell. Clearly, there are strong differences with respect to the median duration of unemployment. Median search for a regular job lasts about 10 weeks for the control group and even 33 weeks for individuals who experienced a temp spell during unemployment. The median (mean) time until first accepting an agency job is about 10 (21) weeks. The median (mean) duration of a temp spell is

⁹ Table A2 informs about the number of cases excluded for the above mentioned reasons. Basically we could not find major differences between the selected and the full sample.

5 (9) weeks and the average number of temp spells separated by unemployment during a given spell is 1.6; 7,430 of the unemployment spells of the treatment group experienced more than one temp job during the respective unemployment spell.

Table A1 moreover reveals that there are no strong differences in terms of background characteristics between treatment and control group. Women are more likely to experience a temporary agency spell during unemployment and female unemployed are slightly older than the male counterparts. The treatment group is on average about one year younger than the control group and is more often single (76 vs. 73 percent for man and 62 vs. 56 for women). Among the immigrants only the 1st generation non-western immigrants appear underrepresented among the treatment group.

Workers with a temp spell during their unemployment spell are better qualified than the control group, live more often in Copenhagen and possess a little more working experience during the past three years (75 vs. 74 weeks for man and 79 vs. 70 weeks for women).

Interestingly, there is a striking difference between the treatment and control group regarding the previous employment history. The treatment group experienced on average 0.8 temp jobs during the past three years the control group had on average only 0.4 temp jobs. About 50 percent (53 percent) of the male (female) control group were previously regular employed, while this is only true for 36 percent (37 percent) of the male (female) treatment group.

6. Results

6.1 Empirical Hazards

Figure 1 first shows the Kaplan-Meier estimates of the transition rate from unemployment to temporary agency employment as a function of elapsed unemployment duration, second, the hazard rate from unemployment to regular employment for all unemployed, third, the exit rate to regular employment for unemployed who did not experience an agency spell (control group) and, finally the hazard rate to regular employment for the treatment group. All durations are measured from the time of unemployment entry.

[Figure 1 about here]

The hazard rate to temporary agency employment measures the probability of entering temporary agency employment in the next week for those who are unemployed at the beginning of each week. As stated in Section 3, a key identifying assumption is that we observe some exogenous variation in the time until being assigned to a program. Figure 1 shows that there is indeed a lot of variation in these durations. The hazard rate to temporary agency employment for men starts with about 0.6 percent per week and decreases over the first year of

unemployment to a level of around 0.2 percent. The hazard rate to agency employment for the female unemployed starts at a slightly higher level (0.7 percent) and, similarly to the hazard rate for the men decreases gradually during the first year of unemployment to 0.3 percent.

The hazard rates to regular employment for the control group starts at a level of 5 percent for man and 6 percent for women and gradually decreases afterwards. Interestingly, the hazard rate to employment jumps up after one year for women. An additional bump after 6 month is visible as well. One reason may be that Denmark uses instruments of active labor market policies quite intensively. After one year (26 weeks for young workers and workers above 60) the participation in active labor market programs becomes compulsory. Noncompliance will result in severe sanctions. The threatening effect of program participation, which is well documented for Denmark, (Jensen et al. 2003, Rosholm & Svarer 2008) induces the unemployed to search more actively for employment immediately before the time of compulsory program participation.

Finally, Figure 1 displays the hazard rates to employment for the treated and non-treated unemployed. The hazard rate to regular employment for the non-treated decreases monotonically while the unemployment exit rate for the treated starts with around 0.9 percent at a very low level, peaks at about 2 percent after 26 weeks of job search have elapsed, stays constant for another 6 months, and tapers off gradually to the original of just 1 percent per week after 120 weeks of elapsed unemployment duration. Moreover, after six month the exit rate for the treated lies well above the hazard rate for the non-treated. This pattern suggests that there may be a lock-in effect present and that temporary agency employment may be indeed a bridge into employment for the unemployed. But of course this picture could be misleading as this pattern may be confounded by unobserved characteristics and endogenous selectivity.

6.2 Unobserved Heterogeneity and Homogenous Treatment Effects

In order to estimate homogenous treatment effects across individuals we proceed as follows. We first estimated a basic duration model with flexible baseline, no unobserved heterogeneity, no selection and only the two main explanatory variables (in treatment and post treatment). Second, we estimate the same model but adding the covariates described in Section 5. Third, we estimate the full timing of events model, starting from a two point distribution of unobservables. Model 1-3 in Table A3 indicate that there are no lock-in effects. This effect disappears after we added 5 mass points. The post-treatment effect in all models is positive and thus confirm the results from the raw hazard rates found in Figure 1.

We proceed by estimating the same model but allow stepwise for extra mass-points, freeing up the correlation structure of the unobservables. We add mass-points as long as the

Akaide Information Criterion improves, see e.g. (Gaure et al. 2007). The selection equation and the results after adding six support-points, which is most often the optimal number of support points, can be found in Table 1. As is already evident from Figure 1, duration dependence is more or less negative. It is only slightly increasing for men until week 16 and for women until week 52. Afterwards it decreases monotonically in both cases.

Which unemployed are more likely to experience a transition into agency employment? It seems that particularly young workers, below the age of 24 have a much higher transition rate to agency work than older workers. Given their weaker labor market attachment, temporary agency employment may provide an effective way to accumulate work experience and obtain useful skills for young workers. This holds for men and women. One would surmise that singles have a higher transition rate to temporary agency employment, as they might be more flexible. Contrary to this expectation, the transition into temp work does not depend on the civil status. On the other hand, living with a working partner in the household (married or not) seems to affect the transition rate positively. One reason could be that there are network effects present.

It is often claimed that especially women who have to take care for children may prefer temp employment as this employment form provides some flexibility. According to this argument these workers chose agency employment during school (or kindergarden) terms, while they claim unemployment benefits during school vacations in order to take care of the children. Contrary to this expectation, the transition rate for women is significantly negative and not significant for men.

The transition rate for non-western foreigners to temporary agency work is lower than for Danes or western immigrants. Again, this result is somehow unexpected as one would surmise that temporary agency employment may be especially a means for immigrants. By accepting a temp job they can overcome negative signals or information asymmetries and prove their true productivity. It seems that this is not the case.

If we look at the educational attainment of the unemployed the results confirm *a priori* expectation: Unemployed need at least some qualification in order to find a temp job. Low skilled workers, without any (formal) qualification rarely move to temporary agency jobs. Surprisingly, unemployed with short academic education have the highest transition rate into temporary agency employment. One would expect that a previous employment experience during the past three years may be beneficiary to find a temporary agency job. Table 2 shows that the transition rate into temporary agency employment indeed increases with the previous employment experience.

[Table 1 about here]

Table 1 also provides the coefficients on the hazard rate to regular employment for the homogenous model. The hazard rate is negative and more or less constantly decreasing for men and women.

Young workers, below the age of 25, have the highest hazard rate to employment. This is true for male and females. Especially for the oldest age class above 44 the exit rate is much lower than that of the reference group (25 to 34 years of age), indicating that temporary agency employment may not be a stepping stone into employment for this group. Interestingly, the exit rate to employment for single workers is negative albeit with -6 percent for man and -3 percent for women comparably low. While having older children does not prevent the exit to employment, the hazard rate for unemployed with children below the age of seven is negative and significant.

As known from studies evaluating active labor market programs with some practical training in Denmark, immigrants have lower exit rates than Danes (e.g. Kyyrä et al. 2009). This holds particularly for non-western immigrants, no matter whether they are 1st or 2nd non-western generation immigrants. It is also worth to note that the hazard rate is positive if the past real work experience increases for men, while it is significant negative for women. Note also, that unemployed in Copenhagen have a lower exit rate to employment after experiencing a spell in temporary agency employment than those in other regions.

Finally, Table 1 reveals the treatment effects. In contrast to the descriptive evidence and the results of the basic duration models presented in Table A2, the lock-in effects are not significant for men and women, which means that currently working in temporary agency employment does not affect the transition rate to non-temp employment. On the other hand, having experienced at least one temporary agency employment spell earlier in the spell of unemployment causes a significant increase in the hazard rate to ordinary employment of almost 20 percent for men and about seven percent for women.

6.3 Heterogeneous Treatment Effects

Table 2 shows the results for the models with heterogeneous treatment effects providing a deeper analysis of how lock-in and treatment effects vary among unemployed with different background characteristics. For the sake of brevity, Table 2 only presents the lock-in and treatment effects. Turning first to the lock-in effects the results confirm the finding of the homogenous treatment effects model that there are only rarely lock-in effects present. Nevertheless, there are some notable exceptions: We observe lock-in effects for men with vocational training who have a lock-in effect of 13 percent compared to the reference group of unskilled

workers for whom the treatment effect during temp jobs increases the transition rate into employment by 9 percent.¹⁰ Male workers with no work experience during the past three years have a lock-in effect of about 5 percent. For women, lock-in effects are only observable for unemployed above 45 years of age (15 percent), with vocational education (5 percent) and medium academic education (17 percent). Albeit there is a negative selection effect for immigrants into temporary agency employment, Table 2 highlights that treated immigrants leave unemployment considerably faster than the comparison group.

Table 2 also informs about the post-treatment effects for subgroups. The results are quite similar to the results of the homogenous effects model. With the exception of female workers with a previous employment experience between one and two years and women above the age of 45 the post-treatment effect is always positive.

[Table 2 about here]

The highest post-treatment effects are visible for western and non-western 2nd generation male immigrants leading to a roughly 85 percent increase in the hazard rate to employment for men and 50 to 60 percent for women. All groups of immigrants, with the exception of 1st generation immigrants from Western countries (presumably the ‘strongest’ groups of immigrants), experience large positive effects of holding temp jobs during an unemployment spell.

Among the male workers the age group 25 to 35 (24 percent), Danish workers (18 percent), workers with low education (23 percent) and unemployed with no previous work experience (22 percent) profit most from the treatment.

In general the post-treatment effects for women are somewhat lower compared to those for men. Beside the female immigrants, women profit most from temp jobs when they are between 25 and 34 years old. The hazard rate for Danish women and women with low education shifts up by about 6 percent and for women with more than two years of work experience by 15 percent.

To conclude, it seems that temporary agency employment reduces time spent in unemployment and thus serves as a stepping stone to ordinary employment. Moreover, for most groups temporary agency employment does no harm to the workers, neither during, nor after the temp job. Only for very few groups the evidence is mixed in the sense that temporary agency work has a lock-in effect – reducing the transition rate into ordinary jobs while being in agency jobs – but also a positive post-treatment effect.

Despite these positive results one might worry that subsequent job quality as measured by job- or employment stability or by the level of wages is worse for the treated unemployed

¹⁰ Calculated as $(\exp(0.0870-0.2252)-1)$. If the lock-in effect is not significant for the reference group we assume a value for the coefficient of zero.

who found a regular job after leaving unemployment. One reason might be that previously accepting a temp job might be perceived as a negative signal by future employers. Therefore they might offer lower wages or more unstable jobs. We address this question in the next section.

6.4 Post-Unemployment Wages, Job and Employment Stability

In this Section we investigate the effect of temporary agency employment on the quality of jobs found. In terms of wages the worker experiences an upward mobility if the job found after leaving unemployment pays more than the job prior to entering unemployment. If the job pays the same or less than the worker experiences a downward mobility. As job seekers enter into unemployment from different labor force status we only consider pre-unemployment wages if the worker has been employed at least three weeks before entering unemployment and if the job seeker found a wage and salary employment three weeks after leaving unemployment.¹¹

Descriptive evidence in Table A1 suggests that the male treatment group could on average improve post-wages by two percent while for the male control group we observe an upward mobility of three percent. Female job seekers with at least one temp spell during the unemployment spell gained about two percent while the control group even loses by one percent.

As noted in Section 4, addressing this issue with the timing-of-events approach requires specifying a competing risk model such that it takes the joint determination of experiencing a temporary agency employment spell and the hazards of leaving unemployment to a better paid job or a worse paid job compared to the wages before entering unemployment into account.

[Table 3 about here]

Table 3, which reports the results for the post-unemployment wages, shows that if the unemployed found a job while in an agency job, then they are much more likely to obtain a better wage and much less likely to get a lower wage. The hazard rate for men shifts up by 56 percent and that for women by 53 percent. Presumably, this reflects, at least to some extent, a screening mechanism where temps receive a follow up job offer from the firms they are currently on assignment.

If the unemployed find a job after having completed an agency job, than they are not less likely to get a better wage, but more likely to get a job paying a lower wage (59 percent for

¹¹ Employers report the gross earnings of their employees for the period the worker has been employed, but at least once a year. The wage refers to the average hourly wage during the notification period. Note, that the data set does not report income of the unemployed that leave unemployment to self-employment.

men and 45 percent for women) compared to those who did not hold a temp job. The upward shift of the hazard rate into worse paid jobs after the worker has left the agency job suggests that treated job seekers are becoming less selective in terms of the jobs accepted compared to the pre-unemployment job. There may be two reasons for this result: First, the reservation wages might decrease if the treated do not receive immediately a job offer by the client firm. A second interpretation may be that, leaving an agency job unsuccessful may signal a low productivity of the worker. Therefore, future employers offer only jobs with lower wages than other workers would receive.

Combining these results with the fact that there is strong negative duration dependence in the transition into jobs paying lower wages and virtually no duration dependence into jobs paying better wages, the evidence reported suggests that the treated are more likely to get jobs paying better wages than the non-treated.

In a final step we analyze the causal effect of having a temporary agency employment spell during the unemployment spell on the subsequent employment duration. First, as a short-term indicator, we use the job stability of the subsequent job immediately after leaving unemployment. As the post-unemployment wages, this variable again may be taken as an indication on whether the match quality in the next job improves.

As a long-term outcome we use, second, the employment stability measuring the number of weeks being employed after leaving unemployment, defined as the number of weeks a person has been employed without interruption after leaving successful unemployment. In this case workers are allowed to switch jobs. The employment career is considered as uninterrupted as long as there are no gaps lasting longer than three weeks. The reason for this decision is that there may be reporting gaps if a worker ends or starts a new job in the middle of the week. Moreover, the data show that reporting gaps increase during the summer vacation period. The likely reason is that workers with job changes during the summer often have a period of vacation before they start a new job which typically last three weeks.

[Table 4 about here]

Table 4 reports results from a set of models where the basic model is extended with either subsequent employment or job duration. The results show that having had a temp job during unemployment has only negligible impacts on subsequent employment and job stability. Only the coefficient for the employment stability of female unemployed is slightly significant at the ten percent level. However, women who find a job while being in treatment have longer job and employment durations. This picture confirms the results of the post-unemployment wages. The reason may be that client firms often use temporary agency employment as a screen-

ing device. If the temp worker proves to be productive, than the client firm may hire the former agency worker directly. As the client firm already knows the true productivity of the workers theory would predict that the worker-job match is of higher quality and, consequently, subsequent job-duration should be longer for those who received a job offer directly after or during the assignment.

To sum up, for those who find a job while being in treatment can not only increase their post-wages but some experience also longer post-unemployment job and employment durations, that is, temp jobs if anything improve subsequent job quality.

6.5. Robustness Checks

As a first robustness check we run our basic analysis on the full sample, excluding only workers which were parallel assigned into education. As Table 5 shows, exclusion of nurses and top manager in the baseline model does not fundamentally affect our results. The lock-in effect becomes now significant and the hazard rate shifts up. As described in Section 3 this result is somewhat expected because of the peculiar role the temporary help service industry has in the health sector in Denmark.

[Table 5 about here]

As defined in Section 5 the destination non-temp employment is defined as being either employed or self-employed. One might argue that self-employment (out of unemployment) might be often as precarious as temporary agency jobs. We therefore estimated the model defining the destination only as salary or wage employed. This produced results nearly identical to those reported in Table 1.

About 26 percent of the treatment group and 2 percent of the control group were employed as temp workers before they entered into unemployment. Since the implemented model cannot deal with selection at time zero, we further excluded as a third robustness check the unemployment spells from the sample starting with a temporary agency spell. Model 3 in Table 5 reveals that agency employment speeds up the transition into regular employment while being in treatment while for those having received treatment agency employment seems no longer be a bridge into regular employment. We believe that this may be again support the screening hypothesis. Agency employment might only be a stepping stone if the employer uses temp employment as a screening device.

7. Conclusion

The rapid growth of temporary agency employment in Denmark has led to doubts as to whether temporary agency employment is a desirable way of increasing labor market flex-

ibility, as employment protection in Denmark is already low and flexibility is high. This holds the more as agency jobs do provide less social and employment benefits than other jobs do. Nevertheless, temporary agency work might have potential as a means of integrating workers who would otherwise have problems finding employment on their own. On the other hand there might be a risk that they are dead-end jobs. Answering this question for workers who enter agency employment after a period of unemployment is of special interest, as this group might be most vulnerable with respect to their future employment career.

We used the timing-of-events model to estimate causal effects of temporary agency employment by taking selection based on observed and unobserved heterogeneity into account. First of all, it seems that there is some selectivity present. Moreover, we do not find any evidence for a lock-in effect. On the contrary: estimating heterogeneous effects reveals that for some labor market groups agency employment even speeds up the transition out of unemployment benefits. In addition, we find a positive post-treatment effect of having experienced at least one temporary agency spell during the unemployment spell across individuals. The labor market groups which benefits most from temporary agency employment are non-western and 2nd generation western and non-western immigrants. In addition, young unemployed aged 25 to 35 and unemployed with low education and no employment experience during the past three years also gain by accepting an agency job. It seems that they are able to develop their work experience, to enlarge their professional network, to signal their motivation, and ultimately improve their labor market career prospects.

Even if temporary agency employment may be a bridge to regular employment it is crucial to know what happens to the quality of a job match once a worker left unemployment. Does temporary agency employment harm the quality of the accepted jobs after unemployment in terms of reduced earnings and job stability? Research evidence on this question is of high policy relevance and entirely missing for Continental European countries. A worsening of post-unemployment job quality would be a reason to be cautious fostering temporary agency employment. This paper is the first study that empirically contributes to this issue. Our results suggest that unemployed not only gain in terms of employment probability; women being in treatment tend to enjoy longer job and employment and stability compared to the control group. Moreover, they may even improve their earnings for those being in treatment compared to the job before entering unemployment. Latter results may be an indication that the screening of workers may play an important role for employers who demand agency workers.

As temporary agency employment has features of an instrument of ALMP the question naturally arises whether the public employment office should consider utilizing temporary help

services more often as part of their overall job placement strategies. Denmark is spending about 2 percent of the GDP on ALMP (OECD 2009). Despite these tremendous expenses, evaluation studies generally find that the effects of most programs are modest and sometimes even negative (e.g. Card et al. 2009). In Denmark mainly activation policies which involve some real working experience for unemployed workers seem to be effective (see e.g. Rosholm & Svarer (2008) and Jespersen et al. (2008)) but have often remarkable lock-in effects. This may be a consequence of the fact that these instruments prolong benefit periods and discourage workers from searching for a regular job while in activation. Our findings suggest that temporary agency employment may be worth for consideration as instrument of active labor market policy as it also speeds up the exit from unemployment for some groups. In addition, this would offer considerable scope for cost savings since actively involving temporary work agencies into the placement strategy of the public employment service comes nearly without costs.

References

- Abbring, J.; Van den Berg, G. (2003), "The Nonparametric Identification of Treatment Effects in Duration Models," *Econometrica* 71(5), 1491-1517.
- Amuedo-Dorantes, C.; Malo, M.; Muñoz-Bullón, F. (2008), "The Role of Temporary Help Agency Employment on Temp-to-Perm Transitions," *Journal of Labor Research* 29(2), 138–161.
- Andersson, F., Holzer, H. Lane, J., (2005). *Moving Up or Moving On: Workers, Firms and Advancement in the Low-Wage Labor Market*, New York: Russell Sage Foundation.
- Andersson, F., Holzer H., Lane J. (2009), "Temporary Help Agencies and the Advancement Prospects of Low Earners." In David Autor, ed., *Studies in Labor Market Intermediation*, Chicago: The University of Chicago Press, 373-398.
- Andersen, S. (2007), "Vikarer mellem fleksibilitet og sikkerhed," *Tidsskrift for ARBEJDSLIV*, 9 (4), 63-78.
- Antoni, M.; Jahn; E. (2009), "Do Changes in Regulation Affect Employment Duration in Temporary Work Agencies?" *Industrial and Labor Relations Review* 62(2), 226 - 251.
- Arrowsmith, J. (2008), "Temporary agency work and collective bargaining in the EU", European Foundation for the Improvement of Living and Working Conditions, Luxembourg.
- Autor, D. (2009), "The Economics of Labor Market Intermediation: An Analytic Framework," In David Autor, ed., *Studies in Labor Market Intermediation*, Chicago: The University of Chicago Press, 1-23.
- Autor, D.; Houseman, S. (2002), "The Role of Temporary Employment Agencies in Welfare to Work: Part of the Problem or Part of the Solution?" *Focus* 22(1), 63-70.
- _____ (2006), "Temporary Agency Employment as a Way out of Poverty?." In Rebecca Blank, Sheldon Danziger and Robert Schoeni, eds., *Working but Poor: How Economic and Policy Changes are Affecting Low-Wage Workers*, New York: Russell Sage.
- _____ (2005), "Do Temporary Help Jobs Improve Labor Market Outcomes for Low-Skilled Workers? Evidence from Random Assignments," NBER Working Paper No. 11743.
- Brinch, C. (2007), "Nonparametric Identification of the Mixed Hazards Model with Time-Varying Covariates", *Econometric Theory*, 23, 349-354.
- Card, D.; J. Kluve; A. Weber (2009), "Active Labor Market Policy Evaluations: A Meta-Analysis" IZA Discussion Paper No. 4002, Bonn
- Cockx, B.; Picchio, M. (2009), "Are Short-Lived Jobs Stepping Stones to Long-Lasting Jobs?," IZA Discussion Paper No. 4007, Bonn.
- De Graaf-Zijl, M.; Van den Berg, G.; Hemya, A. (2010), "Stepping Stones for the Unemployed: The Effect of Temporary Jobs on the Duration until Regular Work", *Journal of Population Economics*, forthcoming.
- Gagliarducci, S. (2005), "The dynamics of repeated temporary jobs", *Labour Economics*, 12, 429-448.
- Gaure, S.; Roed, K.; Thang, T. (2007), "Time and causality: A Monte Carlo assessment of the timing of Events Approach," *Journal of Econometrics* 141(2), 1159-1195.
- García-Pérez, J.; Muñoz-Bullón, F. (2005), "Are Temporary Help Agencies Changing Mobility Patterns in the Spanish Labour Market?" *Spanish Economic Review* 7 (1), 43-65.

- Göbel, Ch.; Verhofstadt, E. (2008), "Is Temporary Employment a Stepping Stone for Unemployed School Leavers?" ZEW Discussion Paper No. 08-093, Mannheim.
- Hamersma, S.; Heinrich, C. (2008), "Temporary Help Service Firms' Use of Employer Tax Credits: Implications for Disadvantaged Workers' Labor Market Outcomes," Institute for Research on Poverty, Discussion paper 1335-08, Wisconsin.
- Heckman, J.; LaLonde, R.; Smith, J. (1999), "The Economics and Econometrics of Active Labor Market Programs," in *Handbook of Labor Economics*, Vol: III, ed. by Ashenfelter, O.; Card, D., 1865-2097, Amsterdam.
- Heckmann, J.; Singer, B. (1999), "A Method for Minimizing the Impact of Distributional Assumptions in Econometric Models for Duration Data", *Econometrica*, 52(2), 271-320.
- Heinrich, C.; Mueser, P.; Troske, K. (2005): "Welfare to Temporary Work: Implications for Labor Market Outcomes," *Review of Economics and Statistics* 87(1), 154-173.
- _____ (2009), "The Role of Temporary Help Employment in Low-wage Worker Advancement." In David Autor, ed., *Studies in Labor Market Intermediation*, Chicago: The University of Chicago Press, 399-436.
- Houseman, S; Kalleberg, A.; Erickcek, G. (2003), "The Role of Temporary Agency Employment in Tight Labor Markets," *Industrial and Labor Relations Review* 57(1), 105-127.
- Ichino, A.; Mealli, F; Nannicini, T. (2008), "From Temporary Help Jobs to Permanent Employment: What can we learn from matching estimators and their sensitivity?" *Journal of Applied Econometrics*, 23, 305-327.
- Kudsk-Iversen, S; Andersen, S. (2006), I krydsfeltet mellem fleksibilitet og sikkerhed, Faos Discussion paper 071, Copenhagen, <http://faos.sociology.ku.dk/dokum/fnotat71.pdf>.
- Jahn, E. (2010a), Reassessing the wage penalty for temporary agency workers in Germany, *Journal of Economics and Statistics*, forthcoming.
- Jahn, E. (2010b), The structure of the temp wages in tight labor markets, mimeo.
- Jahn, E.; Ochel, W. (2007), "Contracting-Out Temporary Help Services in Germany," *Journal of European Social Policy* 17(2), 125-138.
- Jensen, M.; Svarer, M.; Rosholm, M. (2003), „The Response of Youth Unemployment to Benefits, Incentives, and Sanctions," *European Journal of Political Economy* 19, 301-316.
- Jespersen, S., Munch, J.; Skipper, L. (2008), "Costs and benefits of Danish active labour market programmes," *Labour Economics*, Vol 15, 859-884.
- Katz, L.; Krueger, A. (1999), "The High-Pressure U.S. Labor Market of the 1990s," *Brookings Papers on Economic Activity* 1, 1-65.
- Kvasnicka, M. (2009), "Does Temporary Agency Work Provide a Stepping Stone to Regular Employment?" In David Autor, ed., *Studies of Labor Market Intermediation*, Chicago: The University of Chicago Press, 335-372.
- Kyyrä T.; Parrotta, P.; Rosholm, M. (2009), "The effect of receiving supplementary UI benefits on unemployment duration," IZA Discussion Papers 3920, Bonn.
- Lane, J.; Mikelson, K.; Sharkey, P.; Wissoker, D. (2003), "Pathways to Work for Low-Income Workers: The Effect of Work in the Temporary Help Industry," *Journal of Policy Analysis and Management* 22(4), 581-598.
- Malo, M.; Muñoz-Bullón, F. (2008), "Temporary help agencies and participation histories in the labour market: a sequence-oriented approach" *Estadística Española* 50(167), 25- 65.

- Mølgaard, J. and Hansen, L. (2008), "Vikarbeskæftigelsen fortsætter opad", Arbejderbevægelsens Erhvervsråd, København, www.ae.dk/analyse/vikarbeskaeftigelsen-fortsætter-opad.
- OECD (2009), Employment Outlook, Paris.
- Oxford Research (2003), "Nemme at hyre, nemme at fyre - undersøgelse af arbejdsforhold for vikarer i HK", Oxford Research, Copenhagen, 2003.
- Pedersen, H.; Stener, H.; Claus, B.; Mahler, S. (2003), "Temporary Agency work in the European Union (report), European Foundation for the Improvement of Living and Working Conditions, Dublin, <http://www.fr.eurofound.eu.int/pubdocs/2004/104/en/1/ef04104en.pdf>.
- Rosholm, M.; Svarer, M. (2008), Estimating the Threat Effect of Active Labour Market Programmes. *Scandinavian Journal of Economics* 110, 385-401.
- Statistics Denmark (2009), Produktstatistik for vikarbureauer og anden personaleformidling 2007, København, <http://www.dst.dk/pukora/epub/Nyt/2009/NR092.pdf>.
- Segal, L.; Sullivan, D. (1997), "The Growth of Temporary Services Work," *Journal of Economic Perspectives*, 11, 117-136.
- Windelin, M.; Hansen L. (2007), Kraftigt stigende tendens til at bruge vikarer, Arbejderbevægelsens Erhvervsråd, <http://www.ae.dk/analyse/kraftigt-stigende-tendens-til-bruge-vikarer>, København.

Tables and Figures

Fig 1: Smoothed Kaplan Meier hazard rates out of unemployment to employment and temp jobs

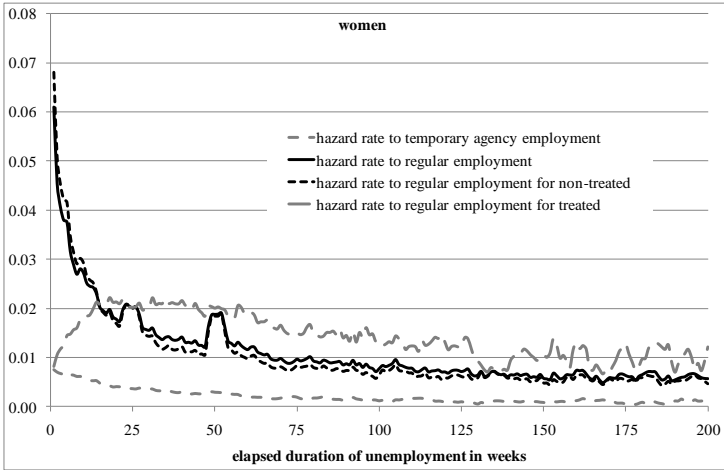
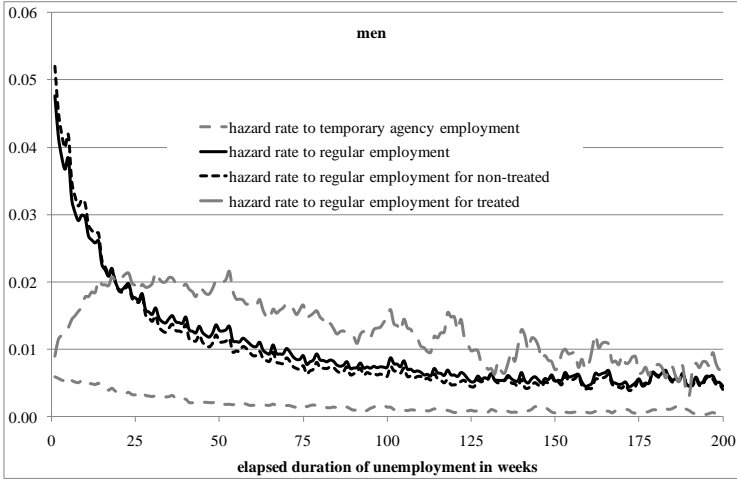


Table 1: Homogenous treatment effects

		Men				Women			
		sel. equation		hazard to empl.		sel. equation		hazard to empl.	
		coeff.	se	coeff.	es	coeff.	se	coeff	se
Baseline hazard (weeks)	0-4	-5.449	(0.173)	-1.791	(0.082)	-5.032	(0.163)	-1.708	(0.054)
	4-8	-5.212	(0.175)	-1.706	(0.082)	-4.908	(0.164)	-1.922	(0.054)
	8-12	-5.157	(0.176)	-1.816	(0.083)	-4.847	(0.164)	-2.126	(0.055)
	12-16	-5.082	(0.177)	-1.802	(0.083)	-4.852	(0.165)	-2.081	(0.055)
	16-20	-5.199	(0.178)	-1.921	(0.084)	-4.971	(0.167)	-2.265	(0.056)
	20-25	-5.317	(0.179)	-2.015	(0.084)	-4.971	(0.166)	-2.341	(0.056)
	25-35	-5.257	(0.179)	-2.031	(0.084)	-4.985	(0.167)	-2.198	(0.055)
	35-52	-5.428	(0.179)	-2.172	(0.084)	-5.102	(0.167)	-2.373	(0.055)
	52-78	-5.676	(0.181)	-2.271	(0.084)	-5.310	(0.168)	-2.437	(0.056)
	78-104	-5.771	(0.186)	-2.390	(0.086)	-5.554	(0.174)	-2.537	(0.058)
	104-156	-6.139	(0.192)	-2.549	(0.087)	-5.766	(0.177)	-2.663	(0.059)
	-156	-6.254	(0.198)	-2.662	(0.089)	-5.993	(0.185)	-2.788	(0.061)
Age (ref: 25-34)	less than 20	0.477	(0.063)	0.207	(0.030)	0.165	(0.083)	0.169	(0.038)
	20-24	0.425	(0.030)	0.252	(0.012)	0.265	(0.033)	0.200	(0.014)
	35-44	-0.004	(0.029)	-0.084	(0.011)	-0.021	(0.026)	-0.064	(0.011)
	above 44	-0.108	(0.033)	-0.255	(0.013)	-0.141	(0.028)	-0.165	(0.012)
Family status	Single	0.022	(0.030)	-0.062	(0.011)	0.038	(0.023)	-0.033	(0.010)
	Working partner	0.201	(0.026)	0.145	(0.010)	0.082	(0.021)	0.094	(0.008)
	Child in hh	-0.038	(0.043)	0.135	(0.015)	-0.107	(0.029)	0.045	(0.011)
	Child < 7 in hh	-0.050	(0.048)	-0.119	(0.016)	-0.253	(0.032)	-0.105	(0.012)
Nationality (ref: natives)	1st gen. west	0.026	(0.065)	-0.089	(0.029)	-0.070	(0.063)	-0.117	(0.032)
	2nd gen. west	0.060	(0.172)	-0.076	(0.071)	-0.109	(0.164)	0.077	(0.081)
	1st gen. non west	-0.381	(0.048)	-0.248	(0.021)	-0.661	(0.065)	-0.287	(0.026)
	2nd gen non west	-0.317	(0.119)	-0.082	(0.056)	-0.574	(0.138)	-0.258	(0.070)
Education (ref: low)	Voc. training	0.191	(0.026)	0.152	(0.011)	0.191	(0.023)	0.093	(0.010)
	Short academic	0.399	(0.053)	0.159	(0.023)	0.309	(0.039)	0.127	(0.020)
	Bachelor	0.140	(0.065)	0.250	(0.027)	0.016	(0.042)	0.246	(0.018)
	Master	-0.175	(0.108)	0.119	(0.041)	-0.130	(0.072)	0.226	(0.035)
Empl. dur. (weeks)		0.218	(0.043)	0.142	(0.016)	0.367	(0.039)	-0.188	(0.014)
Capital		0.062	(0.028)	-0.059	(0.012)	0.132	(0.023)	0.008	(0.011)
	Treatment effect	Lock-in			-0.015	(0.015)			-0.007
	Post-treatment			0.178	(0.022)			0.065	(0.019)
Mean log-likelihood				-2.706				-2.622	
N				146,987				176,316	

Notes: Bold coefficients are statistically significant at least at the 5 percent level. In addition the model includes indicators for the year and quarter of entry into unemployment, for the number of temporary agency jobs (1, 2, 3-4, more than five), the number of regular jobs (1, 2, 3-4, more than five) during the past three years, indicators on how often the worker participated in programs of active labor market programs during the past three years(1, 2-3, more than 4), the yearly regional unemployment rate (based on 14 regions), dummy variable indicating whether the workers was previously out of the labor force, or sick, and parameters for the distribution of the unobserved characteristics.

Table 2: Heterogeneous treatment effects

	Men				Women			
	Lock-in		Treatment		Lock-in		Treatment	
	coeff.	se	coeff.	se	coeff.	se	coeff.	se
Age								
Treatment (ref: 25<=age<35)	0.016	(0.022)	0.215	(0.033)	0.070	(0.021)	0.209	(0.030)
Treatment* age<20	0.030	(0.114)	0.018	(0.167)	0.162	(0.128)	-0.382	(0.247)
Treatment* 20<=age<24	-0.060	(0.035)	0.101	(0.054)	-0.039	(0.051)	0.058	(0.057)
Treatment* 35<=age<44	0.005	(0.033)	-0.092	(0.050)	-0.051	(0.031)	-0.102	(0.040)
Treatment* age>=45	-0.055	(0.037)	-0.171	(0.050)	-0.227	(0.032)	-0.307	(0.038)
Foreigner								
Treatment (ref: natives)	-0.025	(0.015)	0.165	(0.023)	-0.014	(0.015)	0.057	(0.019)
Treatment* west 1st	0.047	(0.084)	0.037	(0.107)	-0.002	(0.086)	0.192	(0.103)
Treatment* west 2nd	0.370	(0.130)	0.460	(0.207)	0.324	(0.164)	0.452	(0.226)
Treatment* non west 1st	0.131	(0.063)	0.225	(0.078)	0.229	(0.452)	0.346	(0.112)
Treatment* non west 2nd	0.379	(0.130)	0.450	(0.201)	0.433	(0.172)	0.440	(0.237)
Working Partner								
Treatment (ref: no)	0.003	(0.017)	0.187	(0.026)	0.020	(0.019)	0.076	(0.025)
Treatment* yes	-0.052	(0.027)	-0.044	(0.040)	-0.054	(0.024)	-0.019	(0.029)
Education (edu)								
Treatment (ref: low edu)	0.087	(0.021)	0.203	(0.029)	0.026	(0.022)	0.062	(0.027)
Treatment*vocational edu	-0.225	(0.027)	-0.050	(0.040)	-0.054	(0.027)	0.003	(0.032)
Treatment*short academic edu	-0.012	(0.056)	-0.002	(0.082)	0.074	(0.044)	0.097	(0.055)
Treatment*medium academic edu	0.003	(0.073)	-0.006	(0.097)	-0.190	(0.048)	-0.020	(0.063)
Treatment*long academic edu	0.012	(0.128)	0.019	(0.171)	0.009	(0.075)	0.094	(0.097)
Employment Duration (weeks)								
Treatment (ref: no employment)	-0.048	(0.024)	0.201	(0.035)	-0.036	(0.023)	0.075	(0.030)
Treatment* 0 < emdur <= 52 r	0.299	(0.046)	0.014	(0.059)	0.247	(0.042)	0.071	(0.048)
Treatment* 52 < empdur <= 104	0.062	(0.033)	-0.036	(0.045)	-0.022	(0.032)	-0.105	(0.038)
Treatment* 104 < emdur	-0.024	(0.033)	-0.066	(0.055)	0.061	(0.031)	0.144	(0.045)

Notes: Bold coefficients are statistically significant at least at the 5 percent level. In addition the model includes indicators for the year and quarter of entry into unemployment, for the number of temporary agency jobs (1, 2, 3-4, more than five), the number of regular jobs (1, 2, 3-4, more than five) during the past three years, indicators on how often the worker participated in programs of active labor market programs during the past three years(1, 2-3, more than 4), the yearly regional unemployment rate (based on 14 regions), dummy variable indicating whether the workers was previously out of the labor force, or sick, and parameters for the distribution of the unobserved characteristics.

**Table 3: Temporary agency employment and post-unemployment wages
(immediately after unemployment)**

	Men		Women	
	coeff.	se	coeff.	se
<i>Better wages:</i>				
In-treatment effect	0.443	(0.022)	0.425	(0.021)
Post-treatment effect	0.059	(0.033)	-0.008	(0.029)
<i>Lower wages:</i>				
In-treatment effect	-0.316	(0.025)	-0.200	(0.023)
Post-treatment effect	0.461	(0.039)	0.371	(0.031)
Mean log-likelihood	-2.912		-2.793	
N	146,987		176,316	

Notes: Bold coefficients are statistically significant at least at the 5 percent level.

Table 4: Temporary agency employment and job and employment stability

	Employment stability				Job stability			
	Men		Women		Men		Women	
	coeff.	se	coeff.	se	coeff.	se	coeff.	se
Lock-in Effect	-0.002	(0.028)	-0.052	(0.025)	-0.029	(0.027)	-0.048	(0.024)
Treatment Effect	0.021	(0.042)	0.062	(0.035)	-0.013	(0.040)	0.028	(0.033)
Mean log-likelihood	-3.869		-3.779					
N	146,987		176,316		146,987		176,316	

Notes: Bold coefficients are statistically significant at least at the 5 percent level

Table 5: Robustness checks

	Model 1 ^{a)}		Model 2 ^{b)}		Model 3 ^{c)}	
	coeff.	se	coeff.	se	coeff.	se
Men						
Lock-in	-0.186	(0.013)	-0.004	(0.015)	0.143	(0.017)
Treatment	0.210	(0.020)	0.178	(0.022)	-0.376	(0.024)
Mass points	6		6		6	
Mean Log-Likelihood	-2.736		-2.663		-2.718	
N	165,354		146,987		134,667	
Women						
Lock-in	-0.235	(0.012)	0.010	(0.014)	0.233	(0.015)
Treatment	0.080	(0.016)	0.078	(0.019)	-0.492	(0.018)
Mean log-likelihood	-2.658		-2.597		-2.681	
N	227,684		176,316		159,999	

Notes: ^{a)} Full data set only excluding unemployed being parallel assigned to education while working as a temp; ^{b)} exit state only wage and salary employed; ^{c)} excluding workers being previously unemployed; Bold coefficients are statistically significant at least at the 5 percent level.

Appendix

Table A1: Selected Sample Statistics

	Men				Women			
	Temp		Non temp		Temp		Non temp	
	mean	sd	mean		mean	sd	mean	sd
Socio-economic characteristics								
Single	0.760	0.427	0.729	0.445	0.618	0.486	0.561	0.496
Working partner	0.301	0.459	0.300	0.458	0.525	0.499	0.542	0.498
Child in household	0.205	0.403	0.232	0.422	0.379	0.485	0.438	0.496
Child < 7 in hh	0.131	0.337	0.147	0.354	0.223	0.416	0.277	0.447
Age								
Average	33.4	10.6	34.4	11	36.3	10.6	37.3	11.2
Less than 20	0.032	0.175	0.031	0.172	0.013	0.113	0.018	0.132
20-24	0.222	0.416	0.183	0.387	0.129	0.336	0.109	0.312
25-34	0.346	0.476	0.359	0.480	0.353	0.478	0.341	0.474
35-44	0.213	0.409	0.221	0.415	0.251	0.434	0.247	0.431
Above 44	0.188	0.390	0.206	0.405	0.253	0.435	0.284	0.451
Nationality								
Danish	0.902	0.298	0.887	0.316	0.948	0.223	0.928	0.259
1st gen. west	0.028	0.165	0.025	0.157	0.024	0.152	0.021	0.143
2nd gen. west	0.004	0.065	0.004	0.064	0.003	0.058	0.004	0.060
1st gen. non west	0.058	0.233	0.075	0.263	0.020	0.141	0.041	0.199
2nd gen non west	0.008	0.089	0.009	0.094	0.005	0.070	0.006	0.079
Education								
Low	0.497	0.500	0.527	0.499	0.374	0.484	0.455	0.498
Vocational training	0.404	0.491	0.382	0.486	0.434	0.496	0.377	0.485
Short academic	0.055	0.227	0.040	0.195	0.089	0.284	0.059	0.236
Bachelor	0.031	0.173	0.034	0.181	0.075	0.264	0.084	0.277
Master	0.013	0.114	0.018	0.133	0.029	0.167	0.025	0.157
Copenhagen	0.291	0.454	0.264	0.441	0.363	0.481	0.279	0.448
Prev. LF status								
Employed	0.363	0.481	0.494	0.500	0.374	0.484	0.530	0.499
Temp Employd	0.266	0.442	0.027	0.161	0.249	0.432	0.020	0.139
Self-employed	0.004	0.063	0.010	0.099	0.001	0.034	0.006	0.077
Sick	0.072	0.259	0.066	0.248	0.082	0.275	0.071	0.257
Out of labor force	0.295	0.456	0.404	0.491	0.294	0.455	0.373	0.484
Employment history								
Empl. dur (weeks)	75	52	74	52	79	52	70	50
Avg. no. temp jobs	0.755	1.290	0.405	0.948	0.818	1.610	0.485	1.420
Avg. no. almp	0.585	1.200	0.596	1.190	0.538	1.100	0.632	1.190
Avg. no. reg. jobs	2.870	2.380	3.300	3.220	2.610	2.430	3.930	4.710
Med. dur. unem-spell	33		10		32		9	
Med. dur. temp-spell	6				5			
Exit to regular job	0.245	0.430	0.598	0.490	0.210	0.407	0.651	0.477
Employment stability	36		25		52		14	
Job stability	22		11		32		7	
Pre-wage	129	132	122	123	122	135	121	147
Post-wage	132	157	126	99	125	172	120	116
No of persons	3,824		31,810		5,557		34,441	
No of u-spells	11,224		112,205		14,249		122,994	

Notes: Pre-wages refer to the average hourly wage in Danish kroner of the job before entering unemployment; post-wages refer the first job after leaving successful unemployment. Employment stability measures the median total number of weeks employed and job stability measures the median number of weeks employed in the first job after leaving successful unemployment.

Table A2: Sample selection

	Men				Women			
	Temp	Non Temp	Temp	Non Temp	Temp	Non Temp	Temp	Non Temp
	in %	in %	in %	in %	in %	in %	in %	in %
Full Sample	128,547	100.0	14,079	100.0	163,569	100.0	19,529	100.0
- spell over 52 weeks	0	0.0	1,230	8.7	0	0.0	809	4.1
- CEO/ Topmanager	11,350	8.8	972	6.9	18,641	11.4	1,443	7.4
- health sector	1,342	1.0	140	1.0	17,989	11.0	1,700	8.7
parallel students	3,650	2.8	875	6.2	3,945	2.4	834	4.3
public sector temp	0	0.0	59	0.4	0	0.0	73	0.4
Final data set	112,205	87.3	11,224	79.7	122,994	75.2	14,249	73.0

Table A3: Homogenous treatment effects – baseline estimations

	Model 1		Model 2		Model 3		Model 4	
	coeff.	se	coeff.	se	coeff.	se	coeff.	se
Men								
Lock-in	0.859	0.013	0.059	0.014	0.070	0.014	-0.009	0.014
Treatment	0.275	0.019	0.260	0.022	0.261	0.022	0.175	0.022
Unobserved heterogeneity	no		no		yes		yes	
Control variables	no		yes		yes		yes	
Mass points	-		-		2		5	
Log-Likelihood	-2.416		-2.259		-2.712		-2.707	
N	146,987		146,987		146,987		146,987	
Women								
Lock-in	0.857	0.012	0.078	0.013	0.094	0.015	-0.006	0.014
Treatment	0.227	0.016	0.164	0.020	0.135	0.019	0.068	0.019
Unobserved heterogeneity	no		no		yes		yes	
Control variables	no		yes		yes		yes	
Mass-points	-		-		2		5	
Mean log-likelihood	-2.334		-2.173		-2.628		-2.622	
N	176,316		176,316		176,316		176,316	

Notes: Bold coefficients are statistically significant at least at the 5 percent level.