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Stepping-stones for the unemployed:
The effect of temporary jobs on the duration until regular work

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Stepping-stones for the unemployed: the effect of temporary jobs on the duration until regular work

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Abstract:

Individual labour market transitions from unemployment into temporary work are often succeeded by a transition from temporary into regular work. We investigate whether temporary work increases the transition rate to regular work. In that case, temporary work may enhance labour market efficiency. We use longitudinal survey data of individuals to estimate a multi-state duration model, applying the 'timing of events' approach. To deal with selectivity, the model incorporates transitions from unemployment to temporary jobs and unobserved determinants of the transition rates. The data contain multiple spells in labour market states at the individual level. We analyse the results using novel graphical representations. The results unambiguously show that temporary jobs serve as stepping-stones towards regular employment. They shorten the duration of unemployment and they substantially increase the fraction of unemployed workers who have regular work within a few years after entry into unemployment, as compared to a situation without temporary jobs.

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JEL codes: J64, C41.

1. Introduction

In many countries, the labour market has displayed an increase in flexible jobs in general, and in temporary jobs in particular. There is an extensive debate on the extent to which such jobs improve welfare in general and help individual workers in particular. It is often argued that the existence of temporary work is especially beneficial to currently unemployed workers, because it provides them opportunities to gain work experience and acquire human capital, to deepen the attachment to the labour market, and to search more effectively for more desirable jobs. Temporary job experience may be informative about the ability and motivation of the individual (screening or signalling). Some studies show that employers indeed use atypical contracts as a way of screening for permanent jobs (e.g. Storrie, 2002; Houseman et al., 2003). In this paper we examine the extent to which temporary work facilitates individual unemployed workers to move from unemployment to regular work, that is, the extent to which temporary work acts as a stepping-stone towards regular work.

Our empirical analysis follows the 'timing of events' approach formalised by Abbring and Van den Berg (2003). We use longitudinal survey data of individuals to estimate a multi-state duration model. The model specifies the transition rates from unemployment to temporary jobs, from temporary jobs to regular work, and from unemployment directly to regular work. Each transition rate is allowed to depend on observed and unobserved explanatory variables as well as on the elapsed time spent in the current state. To deal with selection effects, we allow the unobserved determinants to be dependent across transition rates. For example, if more motivated individuals have less trouble finding permanent jobs but are also over-represented among those in temporary jobs, then a casual observer who does not take this into account may conclude that there is a positive causal effect even if in reality there is none.[1] We also exploit subjective responses on whether the individual desires to have a regular job. We exploit the multi-spell nature of the data to reduce the dependence of the results on functional form specifications. The 'timing of events' approach exploits variation in observed moments of transitions in order to empirically distinguish between causal effects and selection effects. Somewhat informally, if a transition to a temporary job is often quickly succeeded by a transition into a regular job, for any constellation of

[1] Purcell et al. (1999), Feldman et al. (2001) and Von Hippel et al. (1997) have found low levels of motivation among temporary workers.

explanatory variables, then this is strong evidence of a causal effect.[2] Here we adopt the specific model framework developed by Van den Berg, Holm and Van Ours (2002), for two reasons. First, it allows in a natural way for 'lock-in' effects of temporary jobs, meaning that they may involve a temporary standstill of search activities for other jobs. Secondly, it allows for heterogeneous treatment effects, meaning that the effect of having a temporary job on the transition rate to regular work may vary across observed and unobserved individual characteristics. Because of lock-in effects and effect heterogeneity, the parameter estimates are hard to interpret. We contribute to the methodological literature by analysing this in some detail and by developing a graphical procedure to express the main results.

The estimation results also shed light on whether the individuals with a high incidence and/or duration of unemployment flow into temporary work more often, and whether they benefit more from a stepping-stone effect of temporary work. More in general, we address whether individuals who benefit from temporary work also have a high transition rate into temporary work. This is of importance from a policy point of view. If certain types of individuals barely flow into temporary work although their average duration until regular work would be substantially reduced by it, then it may be sensible to stimulate the use of temporary work among this group, for example by helping individuals to register at temporary work agencies.

We abstract from effects of the existence of temporary jobs on the transition rate from unemployment directly into regular work (i.e. without intervening temporary work spell). It can be argued that this effect is negative if a temporary job facilitates a move to a regular job and if unemployed individuals are aware of this. However, the data do not allow for identification of this effect. We also abstract from equilibrium effects. Temporary contracts imply lower layoff costs and therefore stimulate employment creation (see for example Bentolila and Bertola, 1990; Bentolila and Saint Paul, 1994; Booth, 1997; Hoffmann and Walwei, 1999). Furthermore, the economic performance of firms may improve if there is less need to hoard workers as an insurance against a sudden upswing in demand (Pacelli, 2002; Kahn, 2000, Von Hippel et al., 1997). The use of temporary workers may reduce cyclical

[2] The approach does not require exclusion restrictions, instrumental variables, or conditional independence assumptions. Recently, a number of studies have appeared in which the 'timing of events' approach is applied to analyze the effects of dynamically assigned treatments on duration outcomes (see Abbring and Van den Berg, 2004, for an overview).

swings in labour productivity, since firms might be better able to shed workers quickly during a downturn (Estevão and Lach, 1999).

To the extent that the data allow us, we examine how job characteristics of regular jobs depend on whether they were directly preceded by a spell of unemployment or whether there was an intermediate spell of temporary work (see also Booth et al., 2002; Houseman, 2001).[3]

The paper is organised as follows. Section 2 presents the data set, discusses some variables that we use in the analyses, and provides descriptives. Section 3 presents the model. The estimation results are presented in Section 4. Section 5 concludes.

2. Data

We use the OSA labour supply panel, which is a longitudinal dataset collected by the Dutch Institute for Labour Studies (OSA). This dataset follows a random sample of Dutch households over time since 1985, by way of biannual face-to-face interviews. The survey concentrates on individuals who are between 16 and 64 years of age, and who are not full-time students. Therefore only households with at least one person in this category are included. All individuals in the household who fall under this category - head of the household, partner, children and other household members - are interviewed. This results in some 4000 individuals per wave. All households that cooperate in a wave are asked to participate again two years later except if all household members became over 65 years of age. An attempt is made to locate family (members) who moved. If household members refuse to participate then the other members are surveyed anyway. If the whole household refuses, a replacement household is approached. A replacement household matches the refusing one by sex, age, family size and region. We use data from 1988 to 2000. The 1988 wave consists of 4464 individuals. In 1998, a quarter of them is still in the panel. In 1990, 1992, 1994, 1996, 1998 and 2000 refreshment samples were drawn, so that in 2000 the sample size was 4185. Van den Berg and Lindeboom (1998) and Van den Berg, Lindeboom

[3] We are unable to check whether temporary work is associated with lack of training opportunities, as suggested by Farber (1997, 1999), Arulampalam and Booth (1998), and Amuedo-Dorantes (2002).

and Ridder (1994) study the effect of attrition in the OSA data on the estimates of the transition rates between unemployment and employment and between jobs. They find that although attrition is sometimes sizeable, it does not have discernible effects on the estimates of these rates. These two studies also provide ample background information on the data as well as references to other studies using these data.

In the OSA panel, an effort is made to collect extensive information on the labour market histories of the individual respondents. Individuals are asked about their labour market status two years ago - the previous interview date - about all transitions made since then, and about the current labour market status. For every transition we observe when it happened, why it happened, by which channel the new position was found and what the respective labour market positions were. Regarding the labour market position after a change, individuals can choose from: other function with same employer, employee at other employer, self-employed, co-working partner of self-employed, no paid job but looking for one, no paid job and not looking for one, military service, and full-time education. From these labour market histories we obtain the sequence of labour market states occupied and the sojourn times in these states. People are defined to be unemployed when they do not have a job but are looking for one. One does not need to receive unemployment benefits to be unemployed.

We define regular work as being in a job that is a permanent job or being in a job with a limited-term contract that is supposed to become permanent. In the Netherlands, starting on a one-year contract in a job is very common, and practically everybody gets a subsequent offer of a permanent contract for the same job. These one-year contract jobs are not the temporary jobs we are interested in here, since these are by definition a starting point for regular employment. Instead, we define temporary jobs as the more contingent types of jobs: fixed-term jobs, temporary agency work, on-call contracts and subsidised temporary jobs. It should be noted that in the Netherlands, contrary to certain other countries, unemployed individuals who are registered at commercial temporary work agencies but are currently not assigned to an employer, do not receive wage income and are considered to be unemployed. This also applies to our data.

Concerning the employment positions at the survey moments we observe the wage, number of hours worked, industry, occupation, type of work, type of contract, etcetera. For

periods between survey moments we have less information, and this leads to two problems. First, we do not observe many characteristics of jobs that start and end between two consecutive interviews. Notably, we often do not observe the wage of such jobs. This implies that the set of explanatory variables that we can use is mostly restricted to background characteristics of the individual (listed below). Secondly, it is not always clear whether a job that starts and ends between two consecutive interviews is temporary or not. In case of doubt we infer the type of contract from other variables. We use the stated channel by which the job was found – this can be a temporary help agency – and the stated reason why transitions into and out of the job are made – to get more job security or because of the end of contract, respectively. In some cases these variables are missing, and we right-censor the unemployment spell at the moment of the transition into such a job. The latter occurred in 12% of all spells.

We can then measure the duration between the start of unemployment and the moment at which the individual moves into either regular or temporary work. This is what we call the unemployment spell. Subsequently, we can measure the duration from the start of a temporary job until the moment at which the individual moves to a regular job. This is what we define to be the temporary job spell. The latter duration period may include intermittent temporary jobs and periods of unemployment in between. All these durations may be right-censored due to a transition to another labour market state, or due to reaching the end of the observation window. We do not consider spells of regular employment in our model.

We do not include unemployment spells that started before the first interview, so that there are no initial conditions problems that arise with interrupted spells. The indicated selection results in a sample of 976 individuals. All individuals have become unemployed at least once during the time period 1988-2000. We use up to three spells of unemployment per individual. This results in 1175 spells.

Table 1 provides some descriptive statistics of the labour market positions of individuals at interview dates. E.g. 16 percent of the unemployed are in temporary employment two years later. These numbers are roughly consistent with earlier findings both in the Netherlands and other Western countries (e.g. Dekker and Kaiser, 2000; Segal and Sullivan, 1997). Transitions from temporary jobs to regular work are frequent, and, indeed, more frequent than transitions from unemployment to regular work. This suggests that

temporary employment might serve as a stepping-stone towards regular work. Figure 1 shows the total number of observed labour market transitions in our subsample. Note that some types of transitions do not play a role in the empirical analysis below, in particular the transitions to and from 'not in the labour force', the transitions to unemployment, and the transitions from regular (or permanent) employment to temporary employment.

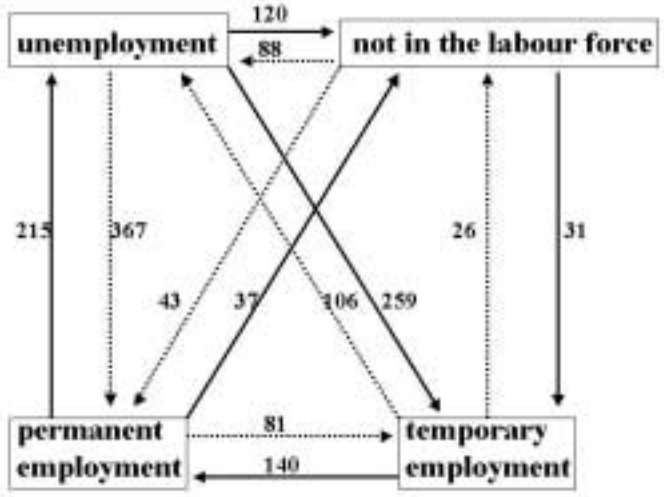
Table 1. Labour market transitions in our subsample, 1988-2000 (percentages).

	Labour force status survey year t+2			
Labour force status survey year t	Out of the labour force	Unemployment[#]	Temporary employment	Regular employment
Out of the labour force	58%	26%	7%	9%
Unemployment	22%	32%	16%	30%
Temporary employment	6%	21%	35%	38%
Regular employment	3%	18%	8%	71%

Transitions to unemployment are relatively frequent in our sample since we select only those who are observed to become unemployed at least once.

A number of individual characteristics is recorded at the first interview, and an attempt is made to keep track of changes in time-varying characteristics such as family composition, marital status and level of education. These characteristics are used as explanatory variables. Appendix 1 gives some sample averages. Information on the labour market tightness, notably the unemployment/vacancy ratios per education level, is gathered from Netherlands Statistics (CBS).

Figure 1. Labour market transitions in the data set



3. The model specification

3.1. The transition rates

In the introduction of the paper we mentioned the distinguishing features of the 'timing of events' methodology that we apply. We adopt the model framework of Van den Berg, Holm and Van Ours (2002), which was constructed to study the existence of stepping-stone jobs in the Dutch medical profession. In our context, the model specifies the transition rates from unemployment to temporary employment, from unemployment to regular employment, and from temporary employment to regular employment. In general, the transition rate or hazard rate θ_{ij} is defined as the rate at which an individual flows from one state i to another state j, given that (s)he survived in state i until the current moment. We define the indices i and j to have values: 1 = unemployment, 2 = temporary employment, and 3 = regular employment. We specify a mixed proportional hazard model for each transition rate. Let observed characteristics be denoted by x_{ij} and the baseline hazard by $\lambda_{ij}(.)$, for the transition rate from state i to state j. In addition, β_{ij} is a vector of parameters to be estimated. The multiplicative random effects v_{ij} are state and exit destination specific. Then,

$$\theta_{ij}(t \mid x, v_{ij}) = \lambda_{ij}(t) e^{\beta_{ij}' x_{ij} + v_{ij}}$$

and the corresponding survival function equals

$$S_i(t \mid x, v_{ij}) = e^{-\sum_{j=1, j \neq i}^{j=3} \int_0^t \theta_{ij}(s|x, v_{ij}) ds}$$

Note that this imposes that the hazard rates only depend on the elapsed duration in the current state and not on earlier outcomes.[4]

Recall that we define an unemployment spell to be the time span between entry into unemployment and entry into either regular or temporary work. A temporary job spell is defined as the time span between the start of the first temporary job and entry into regular employment. The total spell between the start of unemployment and regular employment is the sum of the unemployment spell and, if applicable, the temporary job spell. In our data we observe more than one of these 'total' spells per individual.

For a given individual, the values of v_{ij} are assumed to be identical across different spells. To deal with selective inflow into temporary work and permanent work, we allow the v_{ij} to be related for a given individual. For example, the observed transition rate from temporary work to regular work may be higher than the observed rate from unemployment to regular work just because individuals for whom it is easy to find regular work tend to self-select into temporary work. Then v_{12} is positively related to v_{13} and v_{23}. It is also possible that persons who most easily find regular work find less easily a temporary job, which means that v_{12} and v_{13} are negatively related.

The individual likelihood contributions are unconditional on the unobserved heterogeneity terms (see e.g. Lancaster, 1990). With unobserved heterogeneity, the likelihood function is not separable in the parameters of different transition rates. Abbring and Van den Berg (2003) analyse the identification of these types of models. It turns out that the availability of multiple spell data is useful in the sense that fewer assumptions are needed for identification, and therefore the empirical results are less sensitive to aspects of the model specification. See also Abbring and Van den Berg (2004) for comparisons to inference with latent variable methods and panel data methods. In particular, in multi-spell duration

[4] With random effects, including individual past labour market outcomes as explanatory variables is difficult as it gives rise to initial conditions problems, unless the data contain a natural starting point of each individual labor market history. By implication, the individual treatment effects defined below do not directly depend on e.g. past annual earnings, but at most on the observed and unobserved determinants of past outcomes.

analysis, as in fixed effects panel data analysis, the results do not critically depend on the assumption that observed and unobserved explanatory variables are independent.

An important condition for identification concerns the absence of anticipation of the moment of treatment. This basically means that the individual should not know more about the moment of treatment than is captured by the modelled distribution of the duration until treatment. In our context, anticipation occurs for example if the individual stops looking for regular work (or actually has an increased transition rate into regular work) upon the moment it is decided that he will enter a temporary job in a certain time period from now. If the researcher does not observe the moment of this decision then the estimates of current transition rates are determined by future events. However, such a scenario seems unlikely in the present setup, and indeed one may argue that the "no anticipation" assumption is in line with the flexible nature of temporary work. The matching of employers and employees is a random process, and temporary workers are often called at short notice. Against this one may argue that some individuals are registered at temporary work agencies as looking for such jobs, but that this is unobserved, and that these individuals may have a higher rate of moving from unemployment to temporary work. However, this is captured as unobserved heterogeneity. Also, the data contain an explanatory variable indicating whether the individual, when unemployed, prefers temporary work to regular work.

3.2. Parameterisation and quantities of interest

We follow the literature by taking the duration dependence functions (or baseline hazards) $\lambda_{ij}(t)$ to have piecewise constant specifications. We subdivide a duration axis into a finite number of intervals numbered 1,2,… from the origin onwards. Let t denote the elapsed duration, τ refer to the successive intervals and $I_\tau(t)$ denote time-varying dummy variables that are equal to 1 iff t is in the interval τ. The piecewise constant duration dependence function can then be written as

$$\log \lambda_{ij}(t) = \sum_{\tau=1,2,\ldots} \lambda_{ij\tau} I_\tau(t)$$

With an increasing number of time intervals, any duration dependence pattern can be approximated arbitrarily closely. We use 8 intervals. This captures the empirical shapes well.

We take the distribution of the unobserved heterogeneity term v to be multivariate discrete with a finite number of mass points, and we take the locations of the mass points as well as the associated probabilities to be unknown parameters. Each individual has a unique set of v_{12},v_{13},v_{23}. We allow for N different types of individuals, where a type is characterized by a unique set of values of v_{12},v_{13},v_{23}. Let p_n with n=1,2,…,N denote probabilities that add to 1, and let v_{ijn} denote a realization of the random variable v_{ij}. The resulting family of distributions of v is a special case of the general multivariate discrete distribution. The latter has N possible realizations of each v_{ij}, and every combination of realizations of v_{ij} and $v_{i^*j^*}$ is allowed, so that the vector v has N^3 possible realizations. This amounts to N^3+3N-1 unknown parameters, which, in the light of the large number of parameters elsewhere in the model, is less feasible even for N=2. So, following the specifications of the distribution G of v in Card and Sullivan (1988) and Van den Berg, Holm and Van Ours (2002), we impose that

$$\Pr(v_{ij} = v_{ijn}) = p_n \quad \text{for all } ij \in \{12,13,23\}$$

$$\text{and } v_{ij} = v_{ijn} \Leftrightarrow v_{i^*j^*} = v_{i^*j^*n} \quad \text{for all } ij, i^*j^* \in \{12,13,23\}$$

This specification of the distribution of v restricts the general multivariate distribution by imposing some structure on the relation between the elements of v_{12},v_{13},v_{23}, and indeed it has only 4N-1 unknown parameters. Note that since we also allow for constant terms in the vectors of regression coefficients, not all of these parameters are identified. Hence, we normalise the mean of (v_{12},v_{13},v_{23}) to be 1. This reduces the number of estimated parameters for the distribution of v by three.[5] Note that the relation between the elements of v_{12},v_{13},v_{23} is not imposed to be monotone. As noted above, the extent to which v_{12} is related to v_{13} and v_{23} determines the extent to which selectivity affects the relation in the raw data between having temporary work or not on the one hand, and the rate of entering regular work on the other hand. In the empirical analysis, we report standard errors for the estimates conditional on the value of N.

It is not difficult to estimate slightly more general specifications of the distribution G and use this for specification tests. Notably, we may allow for realisations of all possible combinations of the values of v_{12} on the one hand and of (v_{13},v_{23}) on the other.

[5] Clearly, if we would divide the states of unemployment and/or temporary employment into a number of sub-states then the number of parameters would become too large to be able to estimate the model.

We now examine which model quantities are informative on the treatment[6] or stepping-stone effect. The discussion is informal and suppresses notation in terms of counterfactual outcomes (see Abbring and Van den Berg, 2003). For expositional reasons we briefly resort to an extension of the above model framework, allowing θ_{23} to depend on the time since entry into unemployment (say, τ) as well as on the time t since entry into temporary work. Consider an individual who became unemployed at time zero. The treatment effect of having moved into temporary work at a given time t_{UE} on the individual transition rate into regular work at a time $t>t_{UE}$, compared to not having entered temporary work until and including t, equals

$$\theta_{23}(t,\tau|x,v_{23})/\theta_{13}(\tau|x,v_{13})-1.$$

Note that $\tau=t+t_{UE}$. This treatment effect is not represented by a single model parameter, even if $v_{13}=v_{23}$.[7] To see this, note that a zero treatment effect can only be attained if there is no duration dependence in the transition rate from temporary work to regular work, because otherwise the numerator varies over t whereas the denominator cannot. In other words, if there is such duration dependence then there will be a treatment effect for at least some t. Ruling out such duration dependence would be absurd in the light of the fact that temporary jobs may involve a lock-in effect, causing the transition rate into regular work to be lower right after having entered a temporary job and higher some time later. Indeed, the absence of duration dependence is violated by the data. Also, it would be absurd to let the time variation in the transition rate from temporary to regular work be functionally related to the time variation in the transition rate from unemployment to regular work at the same point of time in the counterfactual case. In our actual parameterisation, the transition rate from temporary work to regular work depends on the time since entry into temporary work, whereas the rate from unemployment into regular work depends on the time since entry into unemployment. Therefore, it can be expected that the results indicate a treatment effect on the transition rate into regular work, at least for some t.

[6] The present use of the term "treatment" is somewhat out of line with the common use, because the move into a temporary job is to a large extent driven by the behavior of the individual under consideration.

[7] The fact that we allow β_{13} to be different from β_{23} and that we allow v_{13}/v_{23} to be different across individuals means that we allow the individual effects of temporary work to differ between individuals. The average effects can then be obtained by averaging the individual effect over x and v.

Of course it is still interesting to examine the duration dependence patterns and average levels of the transition rates into regular work, and the ensueing treatment effects. For example, if for an individual with given values of x and v it always holds that $\theta_{23}(t|x,v_{23})>\theta_{13}(\tau|x,v_{13})$, then the individual treatment effect is positive at all points of time. However, given the complexity of the model, a quantitative assessment of the over-all effect of temporary work is more easily studied with an outcome measure that aggregates over effects on instantaneous transition rates. For this purpose we use the cumulative probability of moving into a regular job, at various points of time after entry into unemployment. We quantify these probabilities, as well as the effect of temporary work on them, by using the estimated model. First, it is not difficult to show that the cumulative probability of moving into regular work within t periods after having entered unemployment equals

$$\int_0^t \theta_{13}(\tau) S_{13}(\tau) S_{12}(\tau) + \theta_{12}(\tau) S_{12}(\tau) S_{13}(\tau)(1 - S_{23}(t-\tau))\, d\tau \qquad (1)$$

where the indices of S refer to the corresponding duration variable (i.e. S_{12} is the survivor function of the duration from unemployment into temporary work, which is a latent variable). The first part of the expression equals the probability of moving into regular work by way of a direct transition from unemployment, whereas the second part equals the probability of moving into regular work by way of temporary work. Logically, the probability of moving into regular work directly from unemployment does not converge to 1 as t goes to infinity. The relevant population estimate of (1) follows by integration of the total expression over the distribution of observed and unobserved characteristics.

The decomposition of (1) into its two terms does *not* capture a treatment effect. To see this, note that both terms are positive even if there is no individual treatment effect, i.e. if the states of unemployment and temporary work are equivalent in the sense that the transition rate from temporary work to regular work at any calendar time point equals the transition rate from unemployment to regular work that would have prevailed at that point. One can define a sensible treatment effect by comparing the actual magnitude of expression (1) to the magnitude in a situation where the two transition rates into regular work are equal at any point of time. However, as we have just seen, the latter is not covered by the model parameterisation. Fortunately, there is an equivalent way to quantify the probability of

moving into regular work within *t* periods in the absence of a treatment effect: simply impose in (1) that the transition rate into temporary work θ_{12} equals zero. This holds for the general model parameterisation where θ_{23} is also allowed to depend on the time τ since entry into unemployment, as well as for our actual parameterisation. In Appendix 2 we demonstrate this formally.

Some comments are in order. First, in the absence of temporary work, some of the individuals who would otherwise have moved into regular work by way of a temporary job move into regular work directly from unemployment. Therefore, the cumulative fraction of individuals moving into regular work that we calculate exceeds the observed fraction of individuals who move directly from unemployment into regular work. This counterfactual cumulative probability converges to 1 as *t* goes to infinity. Secondly, all these calculations at the micro level assume that on the macro level the absence of temporary jobs does not affect the magnitude of the direct transition rate from unemployment to regular work (recall the discussion in Section 1). There are many reasons why this assumption may be incorrect. Notably, there may be equilibrium effects on the demand and supply of regular jobs, and individuals may increase their search intensity for regular work.

Thirdly, it is not possible to nonparametrically test whether the curve described by (1) is different from the curve obtained by imposing $\theta_{12}=0$. Of course, the curve described by (1) can be estimated nonparametrically, using the Kaplan-Meier estimator to deal with right censoring at the end of the observation window. However, the curve obtained by imposing $\theta_{12}=0$ is counterfactual. It cannot be estimated from durations until transitions from unemployment into regular work, because these are right-censored by actual transitions into temporary work, and such censoring times are dependent because they depend on unobserved heterogeneity.

4. Estimation results

4.1. Stepping-stone effect

We start with the estimates of the shapes of the individual transition rates as functions of the elapsed durations in the states under consideration. Given the initial level of a transition rate (i.e., upon entry into the state under consideration), the shape of this rate is described by the parameters of the duration dependence function (see the estimates in Table 2a). Figure 2 plots the individual transition rates as functions of the elapsed duration in the present state for an individual with average observed (x) and unobserved characteristics (v), using the estimated model.[8] Tables 2b and 2c present the parameter estimates of the covariate effects and the unobserved heterogeneity distribution; these are discussed in detail later in this section. These curves are informative on the individual treatment effect for the average individual.

Evidently, from unemployment, the rate into temporary work is much smaller than the rate into regular work. However, once in temporary employment, the rate of flowing into regular work is larger than otherwise. This demonstrates the presence of a stepping-stone effect. One might expect that workers who accept a temporary job are initially strongly attached to that job, for example for contractual reasons. In some sense this is true: the transition from temporary into regular employment substantially increases after a period of one year. However, even newly employed temporary workers have a higher rate into regular work than unemployed workers. The treatment effect is unambiguously positive, regardless of the durations at which it is evaluated.

Since the transition rate from temporary work to regular work increases during the temporary job, the accumulation of human capital may be a major reason for employers to prefer individuals who have occupied a temporary job. An increasing size of the social network among employed workers may also explain this. Apparently, for prospective employers, being in a temporary job constitutes more than just a (positive) signal that one has been found acceptable for such a job. Of course, all transition rates are affected by conditions

[8] The average unobserved characteristics are calculated by multiplying the estimated v_{ij}'s with the estimated corresponding probabilities (p's).

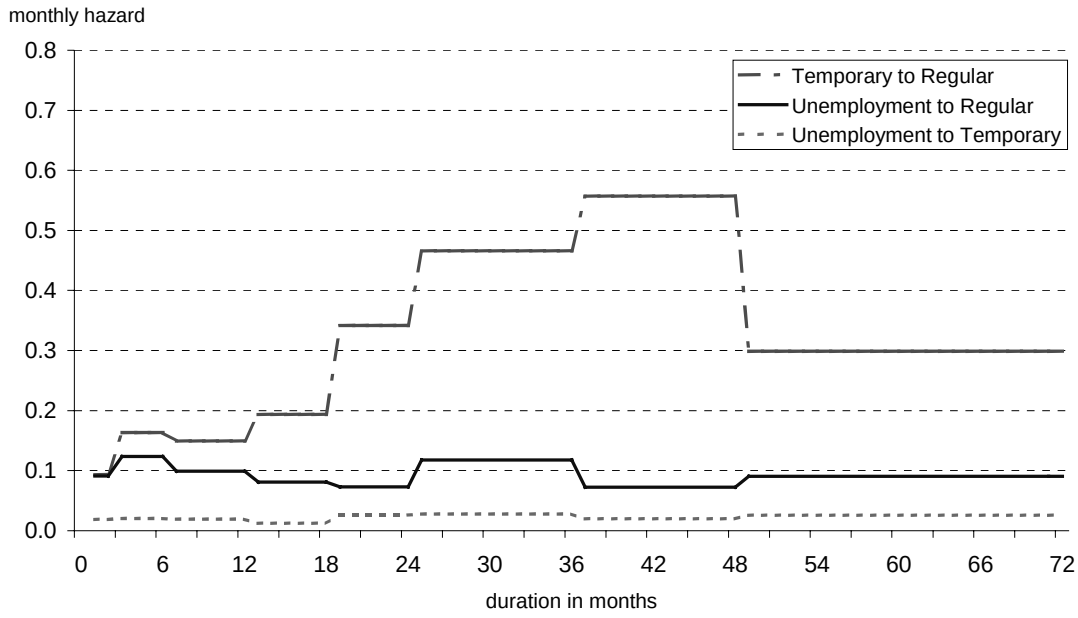
in the labour market and by the behaviour of the individual and prospective employers, and we should emphasise that in this paper we do not aim to formally estimate an economic model that distinguishes between the roles of these factors.

Table 2a. Estimation results for the log duration dependence functions.

	Unempl to temp	Unempl to regular	Temp to regular
3 – 6 months	0.070 (0.157)	0.307 (0.119)	0.561 (0.236)
7 – 12 months	0.023 (0.164)	0.084 (0.131)	0.472 (0.228)
13 – 18 months	-0.409 (0.191)	-0.117 (0.146)	0.732 (0.226)
19 – 24 months	0.332 (0.205)	-0.222 (0.152)	1.300 (0.260)
25 – 36 months	0.400 (0.233)	0.256 (0.149)	1.610 (0.243)
37 – 48 months	0.059 (0.329)	-0.230 (0.185)	1.789 (0.259)
> 48 months	0.319 (0.378)	-0.007 (0.285)	1.166 (0.339)

Standard errors in parentheses.

Figure 2. Estimated transition rates for the average individual.



Note that the estimation results discussed above are not due to selection effects, because we corrected for observed and unobserved heterogeneity. Estimates of a model without unobserved heterogeneity show a much larger stepping-stone effect. This indicates a

strong selection over the direct and indirect routes.

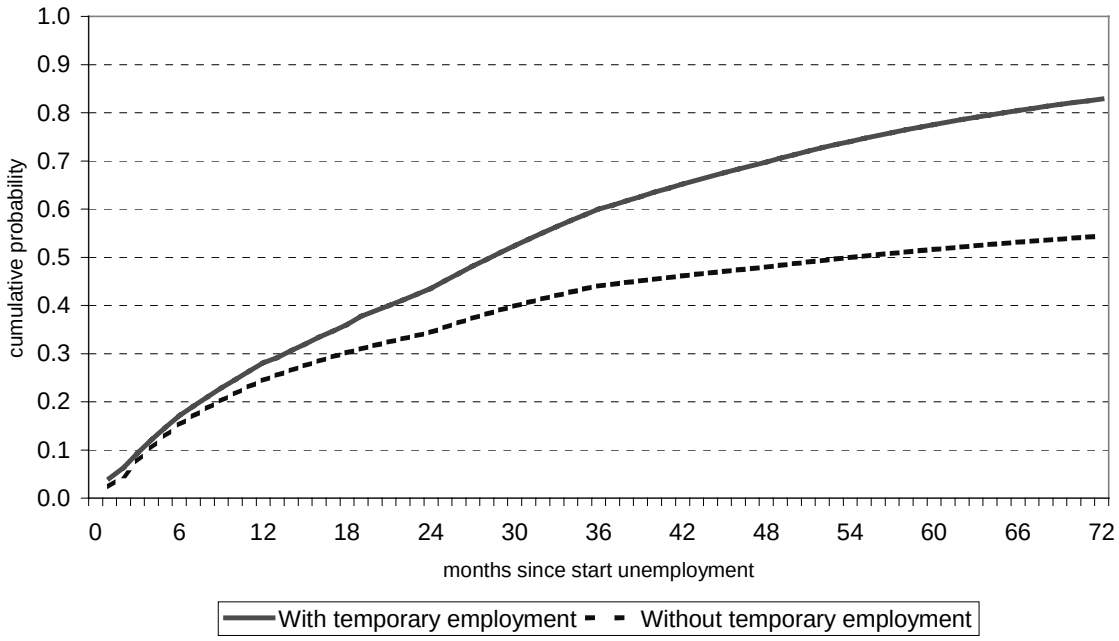
Figure 3. Estimated probability of moving to regular work, directly or through temporary work.

We now turn to the quantification of the over-all effect of temporary work on the cumulative probability of moving into regular work. The solid curve in Figure 3 displays the latter probability as a function of the time since entry into unemployment. This is obtained by using the estimated model to calculate expression (1) for each individual in the sample and for all possible combinations of v_{ij}*'s* weighted by the estimated *p*'s, so the curves in Figure 3 estimate population fractions. Similarly, the dashed curve visualises the probability of moving into regular work without an intermediate spell of temporary work, applying the decomposition of expression (1). The difference between the curves estimates the actual probability of moving to regular work by way of temporary work. After 6 months, 11 percent of the flow into regular work consists of transitions through temporary work, while after 72 months this percentage has increased to 36.

The dashed curve in Figure 4 plots the estimated counterfactual probability of moving into regular work if there is no temporary employment. This is obtained by imposing in

expression (1) that the transition rate into temporary work equals zero, taking again averages across individuals in the sample and across the v_{ij}'s. For comparison, the solid curve of Figure 3 is repeated in Figure 4. In the absence of temporary jobs, only 55 percent (instead of 83 percent) move into regular work within five years after entry into unemployment. This shows that the stepping-stone effect is dramatically large.

Figure 4. Estimated probability of moving to regular work, with and without stepping-stone effect.



Note that the dashed curve in Figure 4 is only marginally higher than the dashed line in Figure 3. This reflects the fact that the transition rate into temporary work is much lower than the transition rate from unemployment into regular work. Shutting down the temporary work channel does not affect many unemployed individuals, so there is no massive substitution towards the direct channel into regular work. However, in the presence of temporary work, the individuals who manage to move into temporary work face a very high transition rate into regular work, so that shutting down the temporary work channel implies a much lower over-all probability of moving into regular work. In sum, not many individuals

move into temporary work, but those who do benefit enormously from it. In the next subsections we examine whether this result is an average result or whether it is uniformly valid for all types of individuals.[9]

4.2. Covariate effects

Table 2b presents the covariate effects on the individual transition rates.[10] Note that a positive sign indicates a shorter duration. The comparison of the coefficients for "unemployment to regular" to the coefficients for "temporary to regular" is informative on the variation of the stepping-stone effect across different types of individuals. Given the presence of a stepping-stone effect, the comparison of the coefficients for "unemployment to regular" to "unemployment to temporary" is informative on the relevance of this effect for obtaining regular work. Before making these comparisons, we first discuss the coefficients themselves.

The transition rates into regular work are higher in labour markets with many vacancies per unemployed individual. This is generally found in the literature. However, it does not hold for the rate into temporary work. Apparently, this rate is less sensitive to business cycle fluctuations. Bover and Gomez (1999) found this effect for Spain as well. The results also show that in general it is easier to become employed if one wants to work more hours. Older unemployed individuals need more time to move into regular and temporary positions. Individuals searching for part-time work have lower transition rates both into regular and temporary work.

Having a partner has a strong positive effect on the direct transition from unemployment to regular work. This effect is well known (for an overview of studies on this issue, see Ginter and Zavodny, 2001). There is no generally accepted reason for this phenomenon. Partners may make individuals more productive and therefore more attractive to employers. Alternatively, individuals who are successful on the labour market may have

[9] Some recent studies consider the effect of temporary work on long run employment outcomes using models without potentially selective unobserved heterogeneity (Amuedo-Dorantes, 2000, and Hagen, 2003). Hagen found a stepping-stone effect of temporary work in Germany, Amuedo Dorantes found none for Spain. Gagliarducci (2004) considers the effect of the number of temporary jobs, taking selection effects into account.

characteristics that also make them attractive on the marriage market. The effect we find is larger for working partners than for non-working partners, which supports the selection hypothesis. However, men with a partner but without children have lower transition rates into temporary work, and this suggests that such men simply focus their search effort on regular work. Women with a working partner and women without children have higher transition rates into temporary work. Women with a working partner are often not breadwinner and may therefore have a lower need for job security.

Unemployed individuals who prefer temporary work to regular work do not make the direct transition from unemployment to a regular job often. However, they have a much higher probability of finding regular employment in succession to a temporary job. These individuals may have a particular reason to expect a temporary job to serve as a stepping-stone.

Men with children at home have a higher transition rate from temporary to regular work. These men may be under high pressure to provide a satisfactory level of family income and thus may be eager to transform their insecure temporary job into a more secure regular position. We also find a negative effect for men with a partner, perhaps indicating that having a partner reduces the urgency for provision of a satisfactory level of family income by the man alone.

What do the covariate effects imply for the magnitude of the stepping-stone effect for different types of individuals? From a policy point of view, it is particularly interesting to focus on disadvantaged groups, notably ethnic minorities – defined as the four largest groups originating from Surinam, Dutch Antilles, Morocco and Turkey – and women. For example, according to Netherlands Statistics ethnic minorities have unemployment rates that are more than twice as large as native Dutch individuals – in 2002: 7.7 versus 3.3 percent. The stepping-stone effect may be larger for ethnic minorities if employers who are reluctant to hire ethnic minorities can screen them by way of a temporary contract. In that case, it makes sense to stimulate unemployed immigrants to register at temporary work agencies.

[10] There are no observed transitions from temporary work to regular work by women with a non-working partner.

Table 2b. Estimation results of covariate effects

	Unemployment to regular	Unemployment to temporary	Temporary to regular
Age/10	-0.432 **	-0.208 **	-0.208 **
	(0.063)	(0.083)	(0.093)
Female	-0.218	-0.036	-0.088
	(0.135)	(0.156)	(0.193)
Ethnic minority	-0.092	-1.477 **	1.022
	(0.072)	(0.102)	(0.823)
Education:			
Low	-0.206	-0.180	0.066
	(0.106)	(0.135)	(0.151)
High	0.198 **	-0.149	-0.132 *
	(0.094)	(0.099)	(0.079)
Region (Randstad is default)			
West	0.245 *	1.267 **	0.623 **
	(0.145)	(0.265)	(0.207)
North	-0.516 **	0.512 *	0.632 *
	(0.177)	(0.296)	(0.330)
East	0.144	0.838 **	0.352
	(0.150)	(0.272)	(0.257)
South	0.094	0.970 **	0.109
	(0.144)	(0.258)	(0.209)
Children			
Man with children at home	-0.213 *	0.531 **	1.365 **
	(0.131)	(0.179)	(0.278)
Woman with children at home	-0.252	-0.444 **	-0.233
	(0.173)	(0.179)	(0.161)
Partner			
Man with working partner	1.186 **	-0.482 **	-1.275 **
	(0.121)	(0.180)	(0.269)
Woman with working partner	0.817 **	0.373 **	0.152
	(0.138)	(0.188)	(0.139)
Man with non-working partner	0.720 **	-0.597 **	-1.533 **
	(0.111)	(0.160)	(0.369)
Woman with non-working partner	0.437 **	-0.025	
	(0.155)	(0.270)	
Vacancy to unemployment ratio	1.375 **	-0.130	0.972 **
	(0.170)	(0.199)	(0.239)
Desired number of working hours per week	0.178 **	0.249 **	0.252 **
	(0.065)	(0.080)	(0.118)
Temporary job preferred to regular job at start of unemployment	-0.467 **	-0.048	0.972 **
	(0.169)	(0.212)	(0.253)

Standard errors in parentheses. * indicates two-sided significance at a 10% level, ** at a 5% level

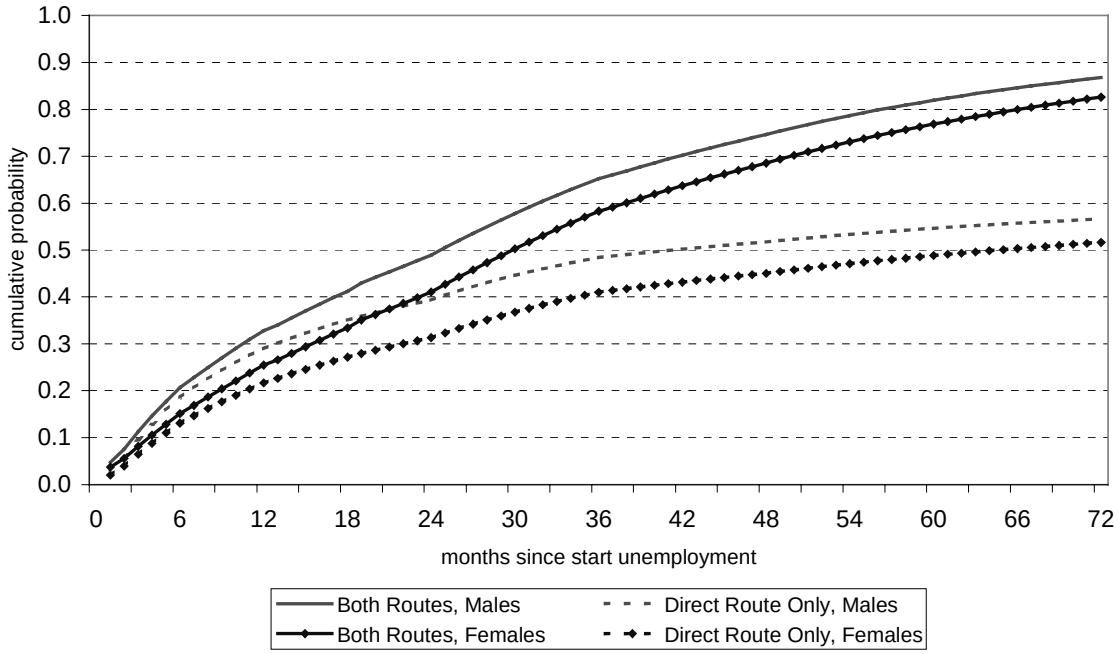
Table 2b shows that the direct transition rate to regular work is lower for ethnic minorities, while the transition rate from temporary to regular employment is much higher for them. This indicates a stepping-stone effect that is much higher than average and much higher than for natives. Note that the standard errors are large, and the estimated coefficients are insignificant. This may reflect the small number of ethnic minorities in the sample. However, we do observe a significantly negative coefficient for the transition rate into temporary work. So, because ethnic minorities do not get temporary jobs very often, they do not benefit from any stepping-stone effect. As a result, the over-all probability of moving into regular work is substantially lower than for natives. Clearly, this suggests that it may be interesting to study policy measures that stimulate the use of temporary work by ethnic minorities, for example by helping them to register at temporary work agencies.

Because of the interaction terms with gender in the parameterised model it is hard to draw conclusions on the difference between men and women from Table 2b. Therefore we resort to a graphical analysis analogous to Figures 3 and 4 above (see Figure 5, which is the analogue of Figure 3). There is little difference between men and women in the stepping-stone effect of temporary jobs. Females have lower probabilities of finding regular jobs, but the effect of having a temporary job is about the same, and so is the use of the temporary work channel.

Contrasting singles and individuals who live with a partner gives very pronounced differences in outcomes. As noted before, it is generally found in the literature that singles have a weaker labour market position, and this is reflected by the fact that they have a lower probability of moving directly into regular work. However, for singles the stepping-stone effect is much larger, and the probability that they benefit from it is also much larger, so that as a result they often obtain regular work through temporary work. Apparently, the flexibility associated with being single goes well together with the flexibility associated with temporary work.

Another informative characteristic concerns whether the individual prefers temporary work over regular work upon entering unemployment. If the latter holds then it takes more time to move directly into regular work, but the stepping-stone effect is very large. This is plausible: such individuals are presumably aware of the size of the effect.

Figure 5. Estimated probability of moving to regular work, directly or through temporary work, for men and women.



In general, despite the variation in the magnitude of the effect across workers, the effect is positive for virtually all types of workers that we can distinguish on the basis of observed characteristics, including those with a relatively weak labour market position.

4.3. Unobserved heterogeneity

Table 2c presents the estimates of the parameters of the unobserved heterogeneity distribution. These concern the general specification discussed in Section 3, allowing for realisations of all possible combinations of the value of the unobserved heterogeneity term in the transition rate from unemployment to temporary work on the one hand, and the values of the unobserved heterogeneity terms in the other transition rates on the other. This results in four types of individual values of the vector of unobserved heterogeneity terms (see Table

2c). Only two groups have a substantial size, and if we remove the negligible Types 1 and 4 we again obtain the basic specification that we discussed in Section 3.

Table 2c. Estimation results for unobserved heterogeneity

	Unemployment to regular (i=1, j=3)	Unemployment to temporary (i=1, j=2)	Temporary to regular (i=2, j=3)
Constants			
v_{ij1}	-4.665 **	-6.787 **	-2.183 **
	(0.522)	(0.693)	(0.792)
v_{ij2}	-0.761 **	-1.632 **	-3.658 **
	(0.379)	(0.489)	(1.100)
Probability			
Pr(v_{12}= v_{121}; v_{13}= v_{131}; v_{23}= v_{231}), Type 1		0.000009	
		(0.000012	
Pr(v_{12}= v_{122}; v_{13}= v_{131}; v_{23}= v_{231}), Type 2		0.382	
		(0.367)	
Pr(v_{12}= v_{121}; v_{13}= v_{132}; v_{23}= v_{232}), Type 3		0.617 *	
		(0.367)	
Pr(v_{12}= v_{122}; v_{13}= v_{132}; v_{23}= v_{232}), Type 4		0.000083	
		(0.000050	

Standard errors in parentheses. * indicates two-sided significance at a 10% level, ** at a 5% level.

As always in models with unobserved heterogeneity, the heterogeneity distribution estimates are difficult to interpret. First, they are determined by the set of included covariates. Secondly, the discrete heterogeneity distribution should be interpreted as an approximation of the true distribution. Keeping this in mind, note that Type 2 individuals have a lower probability to find regular work directly from unemployment but a higher probability to find temporary work, whereas for Type 3 it is the other way around. Type 2 individuals have a high stepping-stone effect. For Type 3 individuals $v_{23}<v_{13}$, so their stepping-stone effect is smaller, and for certain elapsed durations and covariates it is small in absolute value. The variances and correlations of the unobserved heterogeneity terms are all significantly different from zero. This implies that a model that does not take the selection into temporary work into account is misspecified and leads to incorrect inference on the stepping-stone effect.

In general, the main results are robust with respect to a range of model specification features like the set of included covariates, the duration dependence intervals, and the numbers of mass points of the heterogeneity distribution.

4.4. Quality of jobs found

A limitation of analyses of treatment effects on unemployment durations is that they typically ignore effects on the type and quality of the accepted job. Unfortunately, our data do not allow us to address this issue in detail either, since the wages that are earned, the hours worked, and the fringe benefits are not observed. The dataset only supplies job characteristics at survey dates of jobs held at survey dates, but it does not supply job characteristics at the moment of job acceptance, and it does not supply characteristics of jobs held in between survey dates. However, the data allow us to address the stability of the jobs. Ideally, this would have to be included in the duration model above. But our number of observations is limited, and inclusion of two other transitions, from temporary jobs to unemployment and from regular jobs to unemployment, is unfeasible. For this reason, we simply estimate duration models for the duration of the regular job, where the way it is found - directly or by way of temporary employment - is used as an explanatory variable (see Appendix 3).

The results indicate that the duration of the regular job does not depend on whether it is directly preceded by a temporary job or by unemployment. Simple t-tests also show that the reason why people separate from the regular job does not differ significantly between directly and indirectly found regular jobs. Regarding the exit state we do see a slight difference: jobs found by way of temporary employment end less often in unemployment and more often into a transition to another temporary job. However, this difference is not statistically significant. Together, this does not suggest that the jobs found by way of temporary work are very different from those found directly from unemployment.

5. Conclusion

Temporary work serves as a stepping-stone towards regular work. Having obtained a temporary job means that the transition rate into regular work is higher than in unemployment. The average effect is positive regardless of the durations at which it is evaluated. It increases in the time since flowing into temporary work, suggesting that being in a temporary job constitutes more than just a (positive) signal that one has been found

acceptable for such a job. All these results are obtained while correcting for selection effects associated with moving into temporary work.

The transition rate into temporary work is substantially lower than the transition rate from unemployment into regular work. Shutting down the temporary work channel does not affect many unemployed individuals, so there is no massive substitution towards the direct channel into regular work. However, those individuals who manage to move into temporary work in general face a very high subsequent transition rate into regular work. In sum, not many individuals move into temporary work, but those who do strongly benefit from it. As a result, the over-all probability of moving into regular work within say five years after entry into unemployment is substantially increased by the presence of temporary work.

The above effects are positive for virtually all workers, including workers with a relatively weak labour market position. Ethnic minorities have a high stepping-stone effect on the transition rate to regular work but they rarely flow into temporary jobs, so they do not benefit from the effect. This suggests that it may be interesting to examine policy measures that stimulate the use of temporary work by ethnic minorities, for example by helping them to register at temporary work agencies.

We should re-emphasize that we abstract from potentially negative effects of the existence of temporary jobs on the transition rate from unemployment directly into regular work (i.e. without intervening temporary job spell). We also abstract from equilibrium effects of a general increase in (the number of individuals in) temporary work. The introduction lists literature pointing towards beneficial equilibrium effects on profits and employment of policy interventions that facilitate the creation of temporary jobs. The effect of temporary work on the rate of moving to regular work may decrease if firms replace regular jobs by temporary jobs. Indeed, because of congestion, it may even decrease if both types of jobs are created but the number of workers in temporary jobs increases faster than the number of regular jobs.

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Appendix 1. Sample statistics of explanatory variables

Table A1. Sample averages of explanatory variables

variable	average
Age (at start unemployment)	33
Female	0.56
Ethnic minority	0.04
Education:	
Low	0.32
Medium	0.55
High	0.13
Region:	
Randstad	0.19
West	0.24
North	0.13
East	0.20
South	0.24
Children:	
No children at home	0.57
Man with children at home	0.15
Woman with children at home	0.27
Partner:	
Single	0.46
Man with working partner	0.12
Woman with working partner	0.29
Man with non-working partner	0.11
Woman with non-working partner	0.05
Desired number of working hours	32
Temp job preferred (at start unemployment)	0.07
Vacancies/Unemployment ratio	0.19

Appendix 2. The treatment effect on the probability of moving into regular work

Consider the model extension where θ_{23} depends on the time t since entry into temporary work as well as on the current time $\tau=t+t_{UE}$ since entry into unemployment, where t_{UE} denotes the moment of the transition into temporary work, so $\theta_{23}:=\theta_{23}(t,\tau)$. We define $S_{23}(t,t_{UE})$ as the survival function of the duration in temporary work if the transition into in temporary work occurs at t_{UE}, so

$$S_{23}(t,t_{UE}) = \exp(-\int_0^t \theta_{23}(z,t_{UE}+z)dz)$$

We have to modify expression (1) accordingly, to

$$\int_0^t \theta_{13}(\tau)S_{13}(\tau)S_{12}(\tau) + \theta_{12}(\tau)S_{12}(\tau)S_{13}(\tau)(1-S_{23}(t-\tau,\tau))\,d\tau \qquad (2)$$

Absence of treatment effects means that for all t and τ there holds that $\theta_{23}(t,\tau)=\theta_{13}(\tau)$. This implies that $S_{23}(t-\tau,\tau)= S_{13}(t)/S_{13}(\tau)$. If we substitute this into expression (2) and elaborate on this then we simply obtain $S_{13}(t)$. The latter is also obtained if we substitute into (2) that $\theta_{12}=0$. (Notice that the first parts of expressions (1) and (2) do not change when imposing that for all t and τ there holds that $\theta_{23}(t,\tau)=\theta_{13}(\tau)$.)

Appendix 3. Analysis of the quality of the regular job

Table A2. Duration analysis of regular jobs.

	Weibull		Exponential	
	estimate	standard error	estimate	standard error
Intercept	3.842	0.307	3.788	0.279
Female	-0.216	0.256	0.223	0.234
Ethnic minority	0.277	0.515	0.255	0.470
Job found indirectly	0.1946	0.181	0.173	0.165
Education				
Low	0.372 *	0.171	0.363 *	0.156
High	0.310	0.219	0.314	0.200
Region				
West	-0.599 *	0.295	-0.546 *	0.270
North	-0.621	0.337	-0.568	0.306
East	-0.495	0.296	-0.445	0.269
South	-0.292	0.289	0.239	0.262
Re-entrant	0.200	0.310	0.193	0.282
Children at home				
Man with children at home	0.109	0.291	0.111	0.266
Woman with children at home	0.589 *	0.236	0.562 *	0.216
Working partner				
Man with working partner	0.309	0.328	0.289	0.299
Woman with working partner	-0.096	0.420	-0.103	0.382
Man with non-working partner	0.307	0.290	0.278	0.264
Woman with non-working partner	-0.117	0.251	-0.094	0.228
Log Likelihood	-563.54		-565.26	

* significant at 5%-level

destination	Regular job found by way of temporary job	Regular job found directly from unemployment
Other regular job	67%	67%
Temporary job	23%	15%
Unemployed	4% *	12% *
Out of the labour force	4%	3%
Unknown	2%	4%

* difference significant at 5%-level

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