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The Cyclicality of the Stepping-Stone Effect of Temporary Agency Employment

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ABSTRACT

The Cyclicality of the Stepping-Stone Effect of Temporary Agency Employment*

This paper investigates whether the stepping-stone effect of temporary agency employment varies over the business cycle. Using German administrative data for the period 1985-2012 and an estimation framework based on the timing-of-events model, we estimate in-treatment and post-treatment effects and their relationship to the aggregate unemployment rate. We find evidence of a strong lock-in effect of agency employment, particularly in tight labor markets. This suggests that firms do not use agency employment as a screening device when unemployment is low. Moreover, the positive post-treatment effect is noticeably larger in periods of high unemployment, indicating that workers might be activating networks they established while in treatment. We further document that the matching quality in terms of earnings improves for those leaving unemployment directly from agency employment. This gain is higher when unemployment is low.

JEL Classification: C41, J40, J64

Keywords: temporary agency employment, stepping-stone effects, cyclicality, Germany

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1. Introduction

A quarter of a century ago, most Western countries relaxed regulations on temporary agency employment to increase labor market flexibility and thus overall employment (Boeri, 2011; Jahn et al., 2012). The central idea of temporary agency employment is to lower hiring and firing costs for flexible jobs and thus allow firms to adjust the size of their workforce to the volatility of the business cycle. And indeed, it is well documented that the demand for agency work has a strong procyclical component (de Graaf-Zijl and Berkhout, 2007; Jahn and Bentzen 2012).

At the same time, temporary agency employment should act as a bridge to regular employment, especially for individuals with difficulties finding a job. Due to the high volatility of temporary agency employment over the business cycle, paired with the poor working conditions that prevail in this sector, the existence of a "stepping-stone effect" of temporary agency employment—that is, the ability of temporary agency jobs to pave the way to permanent employment—has become a central part of the debate on two-tier labor markets (Boeri, 2011; Jahn et al., 2012; OECD, 2013). While a growing body of literature has investigated whether agency work leads to stable jobs, there is still a dearth of evidence on whether the stepping-stone effect depends on the state of the economy. This represents an important gap in the literature, as knowledge about the cyclicality of the stepping stone effect is critical for policy makers deciding how best to regulate temporary agency employment. The present study therefore aims to provide systematic evidence on whether, and to what extent, the stepping-stone effect of agency employment depends on macroeconomic conditions.

The empirical literature investigating whether agency employment is a bridge into regular jobs has not yet come to a consensus, as shown in Table 1. While some studies find evidence of agency employment acting as a springboard into regular jobs, other studies find opposite results. Table 1 also shows that, compared to workers employed on a direct-hire fixed-term contract, agency workers are less likely to end up in regular jobs. One possible reason is that most firms hiring workers on a fixed-term basis aim to screen workers for permanent jobs or to prolong short probationary periods. Thus, one would expect that fixed-term contracts might be a pathway to regular jobs *a priori*. In contrast, for

firms hiring an agency worker, the screening function rarely plays an important role. The main motive for user firms is to adjust to unexpected increases in output demand (CIETT 2002). This buffer function of agency employment leaves open the question of whether, and to what extent, agency employment provides a bridge to regular jobs.

What the literature has largely neglected so far is that the pro-cyclical demand for temporary agency workers should also affect the transition from agency jobs to regular employment. If the stepping-stone effect of agency employment does indeed vary with the business cycle, this could explain why the empirical evidence on this effect is ambiguous.

So far, there is one study by Jahn and Rosholm (2014) investigating the cyclical behavior of the stepping-stone effect of agency employment with Danish data for the years 1997-2006. The study found no systematic evidence that the stepping-stone effect depends on the state of the economy. With respect to the effectiveness of active labor market programs over the business cycle, there is some scarce evidence. Using country variation in metadata sets, Kluve (2010) and Card et al. (2015) provide evidence that active labor market programs are most effective in slack labor markets. These results are line with the only two other papers on this issue using administrative data sets. First, Lechner and Wunsch (2009) investigate the cyclicality of training programs in Germany for unemployed people who entered a training program over a 10-year period (1986-1995). They provide evidence that negative lock-in effects are largest when training programs start in an upturn, while the positive long-run effects are largest in a downturn. Second, using Swedish administrative data, Forslund et al. (2011) compare the effectiveness of work practice and training programs for a six-year period (1999-2005), finding a clear countercyclical pattern for both programs.

In this study, we investigate the cyclical behavior of the stepping-stone effect of agency employment using administrative employer-employee data for West Germany, which has a long tradition with respect to agency employment. This allows us to investigate whether agency employment is a bridge to regular employment for the period 1985-2012, going beyond the contributions in the previous literature in two ways. First, the time frame of the three most relevant studies by Jahn and Rosholm (2014), Forslund et al. (2011), and Lechner and Wunsch (2009) span only

roughly one business cycle. In order to get enough variation for this short observation period, they rely on variants of the local annual unemployment rate during the observation period. However, using the regional unemployment rate mixes cyclical movements of unemployment over time with structural differences in unemployment across regions. Due to the long time span and high frequency of our data, we are able to access the cyclicality of the stepping-stone effect over a period of 28 years, which covers roughly three full business cycles.

Second, although there is already some empirical evidence on the quality of the jobs found in terms of post-unemployment earnings (see Table 1), we contribute to the literature by investigating whether the quality of jobs found after leaving unemployment depends the state of the economy itself.

Methodologically, we build on Abbring and van den Berg (2003a) and apply their timing-of-events model to an inflow sample into unemployment, controlling for time-invariant unobserved characteristics affecting selection into agency employment and the transition out of unemployment.

In order to investigate the mechanism through which agency employment provides a bridge into regular employment, we investigate the cyclicality of the in-treatment and post-treatment effect of accepting an agency job during a phase of unemployment. The in-treatment effect refers to the transition rate directly from agency employment into regular employment relative to the transition rate from open unemployment into regular employment. This allows us to investigate whether changes in labor market conditions affect the lock-in effect. The post-treatment effect investigates whether an agency job might have had a positive effect on the subsequent transition rate out of unemployment even if the worker fell back into open unemployment after holding the temporary agency job.

The literature on the stepping-stone effect of agency employment stresses three mechanisms through which agency employment may provide a pathway to a regular job. First, human capital acquisition while on assignment at a client firm may provide agency workers with skills that lead to regular jobs (e.g., Abraham, 1990, Autor, 2001). However, if the skill requirement of the agency job is below workers' qualification levels, they might not be able to gain much in terms of human capital (e.g., Segal and Sullivan, 1997). Second, search theory argues that agency workers might receive more

and faster information on open vacancies, which may facilitate rapid entry into stable jobs. This effect should be more pronounced if client firms use temporary staffing arrangements to screen workers to fill open vacancies (e.g., Houseman et *al.,* 2003). If client firms use agency work primarily as a buffer in an upturn, agency jobs crowd out direct job search and should thus have a strong lock-in effect (e.g., Autor and Houseman, 2010; Booth *et al.,* 2002; Boeri and Garibaldi, 2009; Heinrich *et al.,* 2005). Finally, signaling theory predicts that jobseekers can overcome negative stigma effects or signal high productivity by accepting an agency job (Autor, 2001). However, the acceptance of an agency job might also stigmatize jobseekers and could even signal low productivity by suggesting that the job seeker is not productive enough to be hired into a regular job. Which of these mechanisms dominates likely depends on the state of the economy.

How do we expect the in-treatment effect and post-treatment effects to vary over the business cycle? The lock-in effect of agency employment should be much more pronounced in an upturn, as there is less time for job search and vacant jobs are abundant. We thus expect that the in-treatment effect should be (more) negative in an upturn. The lock-in effect might be smaller in a downturn, when the job-finding rate is already low. On the other hand, if agency employment acts as a screening device, we would expect that the in-treatment effect becomes (more) positive in an upturn as firms might face a shortage of qualified workers. Hence, the cyclicality of the in-treatment effect is an empirical question.

In a recession, networks might play an important role for the post-treatment effect, i.e., job-finding after having held an agency job, as the few open vacancies might be filled by referrals from former co-workers (Glitz, 2016). The same holds with respect to the human capital effect: during a downturn, the expected unemployment duration is longer and agency employment might be a means to maintain or even increase human capital compared to searching for a permanent job from open unemployment. That said, we would expect a counter-cyclical post-treatment effect.

We find that agency work does not serve as a bridge into regular employment while workers are in treatment, i.e., the in-treatment effect is negative. However, we find a large positive post-treatment effect. In addition, we provide evidence that the in-treatment and post-treatment effects are highly

cyclical, the in-treatment effect tending to be less negative and the post-treatment effect more positive in downturns. The post-treatment effect is less volatile over the business cycle compared to the in-treatment effect. Taking these results together, we show that having had at least some agency experience during an unemployment episode might reduce unemployment duration. This effect is more pronounced in slumps. In upturns, however, long treatment durations do harm workers.

Regarding the quality of jobs found, we provide evidence that wages considerably improve for workers finding a regular job while working at an agency job. This effect is slightly more pronounced in an upturn. In contrast, match quality for workers finding jobs from open unemployment after an agency job does not differ compared to wages of workers without any agency experience.

The paper is organized as follows. Section 2 describes the temporary help sector and the unemployment insurance system in Germany. Section 3 explains our estimation strategy. Section 4 presents the data and main descriptive statistics. In Section 5, we discuss the results; Section 6 concludes.

2. Institutional setting

In Germany, all temporary agency workers are eligible for social benefits—including health insurance, holiday leave, and statutory pension plans—and are covered by Germany's relatively strict employment protection legislation after six months of employment. Like all other wage and salary workers, agency workers are eligible for unemployment benefits if they were employed for at least 12 months of the previous two years. The maximum entitlement duration is 12 months for workers below the age of 55, which is the group of interest in this paper.[1] If a jobseeker does not fulfill the eligibility criteria, he can claim unemployment assistance, which is means-tested.

Temporary agency employment has been regulated by national legal statutes since 1972. Since then, the law on temporary agency employment has been amended several times, while employment

[1] Further details about the unemployment insurance system in Germany and the changes made in the system as a result of the Hartz reforms can be found, e.g., in Lechner and Wunsch (2009) for the period before 2004 and in Dlugosz *et al.* (2014) for the post-2004 period.

protection legislation (EPL) for regular workers has remained by and large unchanged. Most reforms in the 1980s and 1990s aimed to increase the flexibility of the user firms by prolonging the maximum period of assignment. The major purpose of the post-2000 reforms was to decrease the sizable wage gap between agency workers and workers employed outside the agency sector (for an overview of the regulations, see Burda and Kvasnicka, 2006). However, the effects of these reforms were small. Although Antoni and Jahn (2009) find that the prolongation of the maximum period of assignment increased the employment duration of agency workers slightly, Jahn (2010) did not find any impact on the size of the pay gap. Moreover, the reforms did not significantly affect the growth of the temporary help service sector (Jahn and Bentzen, 2012).

Germany is one of the largest markets for agency work in Europe. In 2012, when our observation periods ends, about 900,000 workers, or 2.2% of the entire workforce, were employed by a temporary work agency. At the same time, the share of agency workers of the total European working population was approximately 1.2% (CIETT, 2017). Despite the relatively small size of the sector, agency employment is an important pathway out of unemployment. In 2012, roughly 54% of the agency workers were previously unemployed and 10% were previously out of the labor force (Federal Employment Agency, 2016).

Nevertheless, agency jobs are spot-market jobs that tend to be rather short: The median duration of an agency job is about 12 weeks. The high share of agency workers coming from unemployment, the concentration of low-skilled workers in the sector, and the poor working conditions in this sector have made the stepping-stone effect of agency employment a central topic of policy debates on temporary agency work in Germany.

Agency employment clearly acts as a buffer over the business cycle: During the recent economic crisis, there was a substantial drop in the number of agency workers. In 2008, about 800,000 workers were employed in the sector, while in 2009, only about 600,0000 were still employed at an agency. The Federal Employment Agency estimates that around 70% of the total job loss during the financial crisis in 2008 was due to lay-offs in the temporary help sector (Federal Employment Agency, 2012). After the crisis, the temporary help sector began to recover rapidly, and by 2010 it had recovered

completely. The number of agency workers reached its historic peak in 2017 at about one million workers.

The dynamic nature of agency work is also reflected in its volatility over the business cycle. The first differences of the log of the stock of agency workers and unemployed persons are shown in Figure 1, which confirms a clear pro-cyclical pattern.[2]

[Figure 1 about here]

Likely reasons for the importance of temporary agency employment in Germany are, first, the high matching efficiency of the temporary help sector compared to public employment services (Neugart and Storrie, 2006), and, second, considerable productivity gains for firms complementing their permanent workforce with temporary agency employment (Hirsch and Müller, 2012). These explanations are also in line with the idea that the extensive regulation of fixed-term contracts in Germany along with the country's strict employment protection legislation makes it attractive for user firms to utilize agency workers to adapt their workforce to changing economic conditions (Mitlacher, 2007; Venn, 2009). In contrast to the situation in southern European countries, fixed-term contracts only play a minor role for the flexibility of German firms (Bentolila et al., 2012). The share of workers in Germany with fixed-term contracts has increased only slightly since 1985 (Destatis, 2017), and about 56% of these workers are usually converted to permanent contracts (IAB, 2012).

3. Modelling the cyclicality of the treatment effects

3.1. Baseline Model

Our aim is to analyze the effect of taking an agency job during an unemployment spell on job search duration until a regular job is found. Accepting an agency job during an unemployment spell is not an exogenous, random event, so the econometric model should exploit sources of variation to distinguish the causal effects of agency employment from selection effects. We use the timing-of-events

[2] As high-frequency data contain some short-run noise, a centered, 12-period moving-average filter has been applied to the time series before differencing the data.

approach, formalized by Abbring and van den Berg (2003a). This strategy exploits random variation in the timing of the agency job to separate the causal effect of accepting an agency job from time-invariant selection effects. The agency job is thus considered a part of the unemployment spell. The counterfactual situation is one of continued unemployment until regular employment.

T_u is a continuous random variable measuring the time from inflow to unemployment until a regular job is found. T_u is censored for those who remain unemployed until the end of the observation period and for those making transitions into states other than employment. The transition rate into a regular job is specified as a Mixed Proportional Hazard (MPH):

$$h_u(t|x, in(t), post(t), v_u) = \lambda_u(t)\exp[x\beta_u + in(t)\gamma_1 + u * in(t)\gamma_2 + post(t)\delta_1 + u * post(t)\delta_2 + v_u\,] \quad (1)$$

The hazard function is the product of a baseline hazard, $\lambda_u(t)$, a scaling function depending on observed variables, x, an unobserved factor, v_u, and two time-varying indicators, one for being employed by an agency at time t, $in(t) = 1$, and one for having been an agency worker during the current unemployment spell before t but not an agency worker at t, $post(t) = 1$. The coefficients γ_1 and δ_1 thus capture the in-treatment and post-treatment effects of agency jobs on the hazard rate into regular employment, respectively. u is the quarterly unemployment rate centered around its sample mean. $u * in(t)$ and $u * post(t)$ are its interaction with the in-treatment and post-treatment effect, and γ_2 and δ_2 measure the effect of the business cycle and are the coefficients of primary interest in this paper.

The baseline hazard is specified as a flexible, piecewise-constant transition rate:

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

where $l = 0, \ldots, 11$ is a subscript for the time intervals measured in days, and $I_l(t)$ are time-varying indicator variables for elapsed duration t. We split the analysis period during the first six months into monthly intervals. From the seventh month on, we split the time axis into quarterly intervals up to two years, where after the transition rate is assumed constant.

The potential endogeneity of agency work is corrected for by explicitly modelling the time until an agency job is found, T_p. Note that if T_p is observed, it is always shorter than T_u by construction. Specifying once again a MPH function, the transition rate into agency jobs is:

$$h_p(t|x, v_p) = \lambda_p(t)\exp[x\beta_p + v_p] \tag{2}$$

As we have multiple unemployment spells for some jobseekers, the values of each unobserved heterogeneity term are assumed to be individual-specific, that is, constant across all unemployment spells experienced by the same individual.

An additional source of endogeneity could arise in the duration of the agency job. To deal with this, we explicitly model the treatment duration, i.e., the duration of the agency job, T_d. The agency job may end with a transition directly into regular employment, but since the agency job is considered as part of the unemployment spell, this transition is already modeled in equation (1) above. Hence, if this occurs, T_d is censored. T_d measures the time from the beginning of an agency job to a transition back into open unemployment. The treatment duration is modeled in the following way:

$$h_d(t|x, t_p, z, v_d) = \lambda_d(t)\exp[x\beta_d + f(t_p) + z\delta + v_d], \tag{3}$$

where $f(t_p)$ is a flexible function of the elapsed unemployment duration at the time when the agency job begins. It is specified as a step function, using essentially the same intervals as those used for the baseline hazard function. As extra control variables, z, we include the daily wage in the agency job and the occupation.

C_i indicates if spell i was completed with a transition into a regular job. The likelihood function for individual j with N unemployment spells is now

$$L(v_u, v_p, v_d) = \prod_{i=1}^{N} L_i(v_u, v_p, v_d), \tag{4}$$

where

$$\begin{aligned} &L_i(v_u, v_p, v_d) \\ &\quad = h_p[t_{pi}|x_i, v_p]^{I[t_{pi}<t_{ui}]} h_d[t_{di}|x_i, t_p, z, v_d]^{I[t_{pi}+t_{di}<t_{ui}]} h_u[t_{ui}|x_i, in(t_{ui}), out(t_{ui}), v_u,]^{C_i} \\ &\quad \exp\left\{-\int_0^{t_{pi}} h_p[s|x_i, v_p]ds - \int_0^{t_{di}} h_d[t|x_i, t_p, z, v_d]dt - \int_0^{t_{ui}} h_u[r|x_i, in(t), out(t), v_u]dr\right\} \end{aligned}$$

Since we use a 2% random sample of all agency job participants and only 0.5% of the nonparticipants (see next section), the likelihood contributions are weighted using the weighted exogenous sampling maximum likelihood estimation method (Manski and Lerman 1977) as in van den Berg and Vikström (2013).[3]

The distribution of unobserved variables is approximated non-parametrically by a trivariate discrete distribution with M mass points (Heckman and Singer 1984; Gaure *et al.* 2007). If the Akaike Information Criterion is satisfied, we proceed by adding another support point, and we continue to do so until the likelihood does not improve enough to satisfy the Akaike Information Criterion. This procedure allows for unrestricted correlation between the different unobserved variables and typically ends with six support points in the final estimation.

We subsequently simulate the expected remaining unemployment duration, measured from t_p, see Kyyrä *et al.* (2013):

$$\Delta(t_p, t_d) = E[T_u - t_p | T_p = t_p, t_d, T_u > t_p] - E[T_u - t_p | T_p = \infty, T_u > t_p] \quad (5)$$

$\Delta(t_p, t_d)$ measures the effect on the expected remaining unemployment duration of entering an agency job at t_p and holding it for (at most) t_d weeks.

3.2. Key identifying assumptions

There are three main assumptions underlying the timing-of-events model. The first of these is the MPH assumption, which is fairly standard, but nevertheless not innocuous. However, given that we have access to repeated spells of unemployment for the same individual, our results are not dependent on the MPH functional form assumption, and it is therefore not as critical as it would otherwise be; we observe each individual on average in 3.4 unemployment spells. This also implies that the distribution

[3] This sampling scheme is frequently used in economics. It provides a consistent but not fully efficient estimator. Ideally, we should have used the sandwich estimator for the covariance matrix. However, due to problems in calculating the numerical Hessian matrix, we used the inverse of the cross-products of the score vector.

of unobserved variables is well identified. Thus, identification does not rely entirely on the MPH assumption (e.g., Abbring and van den Berg 2003a, b; Brinch 2007; Gaure *et al.* 2007).

Second, under the assumption that unobserved characteristics are time-invariant and that there is no anticipation of treatment, random variation in the timing of the first agency job during the unemployment spell identifies the causal effect. That said, the non-anticipation assumption implies that the individual is asumed not to know more about when the agency job will start than is captured by the distribution of the duration. Anticipation in our model, and thus the risk of a change in behavior before the treatment starts, would occur if the jobseeker knew too far in advance precisely when he would start an agency job.

We believe that there are several sources of random variation in the timing of the treatment. (i) The jobseeker needs to know how to contact an agency and whether the agency has an open position requiring his qualifications. Differences in information about how to approach the right agency and whether there are available vacancies are sources of randomness. (ii) Agencies often advertise positions even when they do not have a current job offer from a user firm. The aim is to screen workers and to list them in their pool of available candidates. This pool is required, as agencies have to respond immediately when a request from a user firm comes in, as user firms often approach several agencies simultaneously when in need. As the jobseeker does not know whether he is applying for a real opening or is merely being screened and enlisted in the pool of available workers, there is random variation in the time from applying at the agency to possibly entering the pool of agency workers. (iii) Before entering an agency's pool, the jobseeker will be interviewed by an agency employee, who will evaluate his qualifications. The agency might also reject an applicant if it feels that the jobseeker might not be qualified to meet the flexibility needs of user firms. (iv) There is also some random variation in the timing of final assignment to a user firm, which depends on the demand side and is therefore random from the point of view of the worker. Typically, if there is a job offer from a user firm that is attempting to respond to an unexpected increase in demand for its services, the agency and the jobseeker have to react quickly, and the agency job usually starts within a few days. This procedure implies that there

is considerable variation in the timing of the first agency job, which can also be seen in Figure 2 displaying the transition rate from open unemployment to an agency job.

3.3. Measuring the quality of the stepping-stone effect

In order to assess the quality of the job found after leaving unemployment, we investigate whether holding an agency job affects the daily earnings in the subsequent job. We follow Arni *et al.* (2013) by modeling the post-treatment wage explicitly. However, in contrast to their approach, we specify a log-normal distribution for the post-unemployment wage, that is,

$$f(w|x, v_w) = \frac{1}{\sigma}\varphi\left(\frac{lnw - x\beta_w - in\gamma_{1,w} - u*in\gamma_{2,w} - post\delta_{1,w} - u*post\delta_{2,w} - v_w}{\sigma}\right), \quad (6)$$

where $\varphi(.)$ denotes the pdf of the standard normal distribution, σ is the standard deviation of the wage distribution, and *in-* and *post-* indicate whether the transition into the regular job took place directly from an agency job or from open unemployment after having held an agency job. As in equation (1) $u * in$ and $u * post$ are the interaction terms with the unemployment rate. The parameters of this model are then estimated jointly with those of the model specified in (1), again extending the distribution of unobservables. The advantage of this specification is that we are able to present estimates of the size of the wage advantage or disadvantage compared to the control group as well. The impact of an agency job on post-wages are identified given the same assumptions as those specified in subsection 3.2.

4. Data and descriptive statistics

In order to investigate the cyclicality of the stepping-stone effect of agency employment, we need detailed high-frequency data on unemployment durations and subsequent jobs over a long period of time, encompassing several business cycles. For our purposes, we combine two administrative data sets for the period 1980-2012: the Integrated Employment Biographies (IEB) and the Establishment History Panel (BHP) provided by the Institute for Employment Research (IAB).

The IEB comprises all wage and salary employees as well as all individuals registered as unemployed in the German social security system (for details, see Ganzer et al. 2017). This data set contains information on unemployment, job durations, and transitions reported on a daily basis. On top of that, it contains a rich set of worker characteristics and wages. Since the information of the IEB is used to calculate social security contributions and unemployment benefits, the data set is highly reliable and especially useful for the analysis of unemployment duration. With this data set, we merge the BHP, which also stems from the German social insurance system and provides information on firms and industry (for details, see Schmucker et al. 2016). We will focus here on individuals entering unemployment in West Germany (excluding Berlin) during the period 1985-2012 and further restrict it to males aged 20-55 years to circumvent selectivity issues regarding female employment and early retirement.[4]

We excluded East Germany to avoid confounding business cycle effects. This decision allows us also to exploit the full period of data available, as the dataset only contains information on East German workers from 1992 onwards.

We identify employment spells in temporary help agencies using an industry classification code. For the analysis, we use a 2% random sample of all individuals who were employed by a temporary work agency at least once during their unemployment career, and a 0.5% random sample of all other individuals for the period 1980-2012. The information for the period 1980 to 1984 is used to construct the previous employment history of the job-seekers.

The dependent variable is unemployment duration measured in days. An unemployment spell is defined as a sequence of days during which a person receives either UI benefits or unemployment assistance or is employed at an agency. Unemployment spells continuing until the end of the sample period are treated as independently right-censored observations (3.4% of all spells).[5] Regular

[4] Note that during our observation period the share of male agency workers is 77 % and about 70 % of the agency jobs are in the manufacturing sector.

[5] Due to sanctions or sickness there might be gaps between two unemployment spells without any further notification as workers do not receive unemployment benefits during these periods. If notification gaps exceeds 31 days we treat this as a new unemployment spell. We apply the same rule for transitions out of unemployment to regular employment.

employment is defined as being employed subject to social security contributions outside the temporary help service sector.[6]

In order to concentrate on workers who accept an agency job due to a lack of alternatives outside the sector, the following selection decisions are made. First, in order to insure that workers have at least some attachment to the labor market and to exclude students "temping" while completing their education, we require that the jobseeker must have been employed for at least six months during the past five years.

Second, due to identification of the agency workers by industry classifications, agency workers cannot be distinguished from the administrative staff of temporary work agencies. We do not expect this to affect our estimations, since our analysis focuses on agency workers who were unemployed before accepting an agency job. Nevertheless, we exclude individuals who hold management positions at temporary work agencies, as they are likely to belong to the staff of the agency. For the same reason, we exclude agency workers with an agency spell lasting more than two years.[7] After this sample selection, the sample consists of 78,973 individuals experiencing a total of 264,420 unemployment spells. Thus, we observe on average about 3.4 unemployment spells per person.

The following socio-demographic variables are used: age (three dummies), married, not having German citizenship, having a child in the household, and education (two dummies). In addition, we have information on whether the worker receives unemployment benefits or unemployment assistance. As a proxy for the human capital and employability of the worker, we use the employment history over the past five years: previously employed (two dummies, in the temporary help sector or as an apprentice), or outside the labor force. In this case regular employed is the reference category. Moreover, we control for the fraction of time spent in agency and regular employment during the past

[6] The data does not allow us to distinguish between employment on a direct fixed-term contract and an open-ended contract. However, as outlined in Section 2, the majority of fixed-term contracts are converted into regular contracts.

[7] Since 2012, the data set also contains information on whether the worker is an agency worker or belongs to the staff of the agency. This allows us to investigate how many unemployment spells of the treatment group were classified as treatments although the worker was actually working as a placement officer. It turns out that in 2012, roughly 0.8% of all ongoing spells involving at least one treatment were classified as treatments although the worker was employed at least once during his unemployment spell as a placement officer. Typically, the worker stayed in the position until the end of the unemployment spell. Thus, our results of the in-treatment effect might be biased slightly downwards (becoming more negative).

five years, the number of regular jobs held (three dummies, 2-3, 4-6, and 7 or more) and the number of agency jobs during the past five years. In the endogenous treatment duration, we also include five dummies for the occupation of the agency job and the log of the deflated daily earnings to control for the type of agency job, which might vary over the business cycle.

Finally, we include dummies for the year and quarter as well as the aggregate centered unemployment rate for West Germany.[8] All controls, except the two treatment indicators, the occupation dummies, the log wage during treatment, the year and quarter dummies, and the unemployment rate, are measured at the beginning of the unemployment spell. However, the time-invariant regressors may still vary over different unemployment spells for the same person.

Information on job durations and daily gross wages included in the data are highly reliable. However, as the agency is the legal employer, we do not know which user firms workers are assigned to and if an agency worker transitions to a former client firm. Moreover, the data only contain information on whether the worker is employed full-time or part-time. The post-earnings therefore refer to daily earnings. This might further justify restricting the sample to male workers, as most unemployed people exit unemployment to take regular full-time jobs (see Table A2 in the Appendix).

Table 2 presents key descriptive statistics for the treatment and the control group in upturns, i.e., for unemployment rates below the sample mean, and downturns, i.e., for unemployment rates above the sample mean, measured at the beginning of an unemployment spell. Unemployed people from the treatment group are about two years younger, and foreigners are clearly overrepresented in the treatment group. While about 30% of the treatment group received unemployment assistance at the beginning of the unemployment spell, this is only true for about 22% of the control group. During upturns, the share of workers receiving unemployment assistance is slightly larger. With regard to the previous labor force status, there are only minor differences. About half of the unemployed people in the treatment group were employed before registering for unemployment benefits or assistance,

[8] Using the regional unemployment rate would confound cyclical movements of unemployment over time and structural differences in unemployment across regions. We also experimented with including regional dummies to the estimations. It turned out that they do not affect the results. To lower the computational burden we dropped these dummies from the final estimations.

while 64% of the control group were previously employed. However, unemployed people from the treatment group more often held an agency job before becoming unemployed, that is, they went from regular employment or out of the labor force into agency employment and then into open unemployment. As the timing-of-events model does not allow for selection at time zero, inflow into unemployment always begins with an open unemployment spell.[9] Moreover, Table 2 shows that roughly 50% (60%) of the treated (control) group ultimately ended up in regular employment.

The median time until first accepting an agency job is about 4.7 months when the unemployment episode started in a downturn and three months when the unemployment started in an upturn. The median duration of an agency spell is about 2.7 months during a recession and three months during a boom. The average number of separate agency work spells during an unemployment spell (given that there is at least one) is 1.2.

Figure 2 displays the raw daily transition rate to temporary agency employment. The hazard rate to agency employment starts at about 0.08% per day and decreases over the first year of unemployment to a level of around 0.03%, and decreases only slightly thereafter. The large variation in the timing of entry to agency employment shows that there is a lot of variation in the time until treatment, some of which is likely to be exogenous.

[Figure 2 about here]

The transition rate into regular employment for the non-treated starts at a level of 0.45% and gradually decreases thereafter. Note that the transition rate jumps after one year. One likely reason is that unemployment benefits run out after a year for most workers. The hazard rate for the transition to regular employment for the treated starts much lower by construction, as they have been treated before leaving unemployment. After 18 months, the exit rate for the treated lies slightly above the exit rate for the non-treated. This pattern suggests that the dynamics of the job search process and the selection process are important.

[9] As a robustness check we also estimated our baseline model excluding those unemployment spells. The results are robust to these changes.

Finally, Table A2 in the Appendix investigates post-wages for the control group and the treatment group. For the latter group, we divide the post-wages by persons who left unemployment directly from treatment and those who left after falling back into open unemployment at least once. The table shows that post-wages are always higher for the treatment group, who left unemployment directly from treatment and lowest for the treatment group, who left the treatment group from open unemployment.

5. Results

5.1. Selection into agency employment and back into open unemployment

Full results from estimating the selection equation, the treatment duration equation, and the unemployment duration equation are shown in Table A1 in the Appendix. Duration dependence in the selection equation is negative. Young workers below the age of 25 (the reference group) have much higher transition rates into agency jobs than older workers. Being married is associated with a higher transition rate into agency jobs, but having children in the household lowers the probability of receiving treatment. The transition rate of workers without German citizenship is considerably higher than for Germans. Moreover, we find that high-skilled workers are less likely to take agency jobs than low- and medium-skilled workers, which is likely due to the low-skilled nature of most agency jobs. Workers receiving unemployment assistance have a lower probability of entering into an agency job than those receiving UI benefits. The transition probability to agency employment decreases in a downturn which is due to lower demand for agency workers in a slump.

The treatment duration equation measures the time from the start of an agency job until the worker enters open unemployment again. The duration dependence is negative. The transition rate back into open unemployment is highest for workers aged 45-55, workers with non-German background, with children in the household, and for high-skilled workers. A higher wage during treatment lowers the transition rate to open unemployment. The probability to transition back into open unemployment is highest for agency workers who accept manufacturing jobs (the reference

category). This is expected, as the manufacturing sector (automobile and aircraft) is one of the major users of agency workers to adjust their workforce to the highly volatile product demand over the business cycle.

5.2. Cyclicality of in-treatment and post-treatment effects

Table 3 displays the results for the treatment effects. In a first step, we estimate a basic duration model with a flexible baseline. In Model 1, we only include the two main explanatory variables, i.e., the in-treatment and post-treatment indicator but do not control for observable and unobservable heterogeneity and do not take into account selection out of the treatment into open unemployment. Model 1 in Table 3 suggests a significant negative in-treatment effect, i.e., that currently working for a temporary work agency significantly lowers the transition rate out of unemployment compared to jobseekers who seek a regular job from open unemployment. The post-treatment effect is positive and significant, indicating that having worked at least once during an unemployment spell for a temporary work agency increases the transition rate into regular jobs. The interaction terms between treatment indicators and the unemployment rate are not significant.

[Table 3 about here]

Next, we estimate the same basic duration model but add the covariates described in Section 4. After controlling for observed heterogeneity, the in-treatment effect slightly decreases in absolute terms, and the post-treatment effect increases by roughly 10 percentage points. Moreover, the interaction terms between the treatment indicators and the unemployment rate become positive and significant. An increase of the unemployment rate by one percentage point above the mean increases the transition rate into regular employment by 6% while in treatment and by roughly 3% after having received treatment at least once. The positive signs of both interaction terms thus confirm our theoretical expectations that the lock-in effect is less negative and the post-treatment is larger in a downturn.

Third, we estimate the timing-of-events model and take into account time-invariant unobserved heterogeneity. The results after adding six mass points are shown in Model 3, Table 3. Compared to

Model 2, the negative in-treatment effect increases considerably in absolute terms by 9 percentage points. The results also show that the in-treatment effect increases by about 6 percentage points (becomes less negative) if the unemployment rate increases one percentage point above the mean. The post-treatment effect decreases by 7 percentage points and the interaction term with the unemployment rate increases slightly. The considerable change of the in-treatment and post-treatment coefficients after controlling for time-invariant unobserved characteristics makes it clear that controlling for selection is crucial when investigating the stepping-stone effect of agency employment.

Finally, Model 4 presents the results adding the equation for the treatment duration. As argued in Section 3.1, by adding the treatment duration equation to the timing-of-events model, we control in addition for selection from agency work back into open unemployment. This might be important, as selection could vary over the business cycle. In the treatment equation we also control for the occupations and the log of the daily wage in order to also take into account the type of agency jobs, which might vary depending on the state of the economy. The treatment effects and their interactions with the unemployment rate do not react strongly to the inclusion of the treatment duration equation. This indicates that the endogeneity of the treatment duration is not very important, presumably because it is often exogenously determined by the user firm.

The negative in-treatment effect points to the presence of a lock-in effect. Taking an agency job during an unemployment spell lowers the transition rate out of unemployment by roughly 26%, i.e., a fairly strong lock-in effect. This result is in line with the findings of Kvasnicka (2009), who investigated the stepping-stone effect of agency employment for Germany based on a matching approach for an inflow sample for the years 1994-1996. However, the estimations are in contrast to the results of Jahn and Rosholm (2014), which provide evidence of a large positive in-treatment effect in Denmark using a similar methodological framework.

The negative in-treatment effect in Germany suggests that here, in contrast to Denmark, client firms use agency work to buffer their workforce. Agency employment seems to rarely be used as a screening device, and thus it reduces the transition rate to a regular job. This explanation is supported

by a comparison of employment protection legislation between the two countries. While dismissing workers in Germany typically involves long-lasting legal procedures, redundant workers in Denmark (especially those employed for short periods) can be laid off with barely any costs. Consequently, German firms have a much higher incentive to adjust their workforce over the business cycle by hiring agency workers, who can be dismissed easily when product demand declines. Finally, the large lock-in effect might be also a consequence of the comparably long median duration of agency jobs in Germany, which is about three months. In contrast, agency jobs in Denmark last only about six weeks (Jahn and Rosholm, 2014).

With respect to the counter-cyclical lock-in effect, our results are in line with the findings of Lechner and Wunsch (2009), who investigated the effectiveness of training programs over the business cycle. They also report that the lock-in effect is largest when unemployment is high. The finding of a more negative lock-in effect during a boom might be explained by reduced search efforts of agency workers. As a result of this, agency workers receive job offers less regularly, which lowers their transition rate to regular jobs compared to unemployed people seeking regular jobs from open unemployment. Conversely, in a downturn, taking an agency job during unemployment might harm the unemployed less, as job vacancies are scarce.

Having worked for a temporary work agency at least once earlier in the same unemployment spell leads to a large positive post-treatment effect. The transition rate to regular employment increases by about 35%. As with the in-treatment effect, we find a cyclical pattern in the sense that the post-treatment effect is larger in a downturn. The positive post-treatment effect suggests that agency workers might be able either to accumulate human capital during the agency spell or to gain job-search networks while employed at the agency. If the unemployment rate increases by one percentage point, the post-treatment effect increases by 3%. Thus, the cyclicality of the post-treatment effect is less pronounced than that of the in-treatment effect. That the post-treatment effect increases in a slump might be explained by search networks being expanded during an agency job—networks that are potentially more important when jobs are scarce. Evidence that co-worker networks play an important role in finding a new job in Germany has also been reported in a recent paper by Glitz (2016).

In a next step, we use the data to construct a quarterly time series of the long-run in-treatment and post-treatment effects by combining quarterly information on the centered unemployment rate, the treatment effects, and the interaction terms between the in-treatment effects and the centered unemployment rate.

[Table 4 about here]

Table 4 summarizes our estimates for the period 1985-2012 and shows that the aggregate unemployment rate varies considerably from 5.8 to 11.8% during our observation period. The long-run treatment effects also vary markedly over our observation period, with estimates for the in-treatment effect ranging from -43% to -5% and thus remaining negative. The post-treatment effect ranges depending on the state of the business cycle between 26% and 46% and is always positive. A plot of the time series of the treatment effects and the centered unemployment rate in Figure 3 illustrates this substantial cyclicality.

[Figure 3 about here]

5.3. Cyclicality of the treatment effects and the level of unemployment

Up to now, we have found evidence that both the in-treatment and post-treatment effects are cyclical. So far, we restricted the impact of the unemployment rate on the treatment effects to be linear. However, deteriorating labor market prospects might be felt more by workers when the labor market is tight than in a situation with already poor outside opportunities. In other words, the impact of the unemployment rate on the treatment effects might be less pronounced if unemployment is already high.

To test this hypothesis, we rerun the analysis, adding dummy variables for the unemployment rate and their interaction with the treatment effects as covariates to the model.

[Table 5 about here]

As is clear from Table 5, which presents the main results obtained from the modified model, the coefficients of the interaction of the unemployment rate and the in-treatment effect are always statistically significant. The unemployment rate indeed has the most adverse impact on the in-

treatment effect if unemployment is low. The strong negative in-treatment effect at low unemployment rates points again to the irrelevance of the screening hypothesis to the transition to regular employment, and underpins the importance of the lock-in effect and buffer function hypotheses. While the reduction of the in-treatment effect in absolute terms is moderate when the unemployment rate lies between 7% and 10%, once the unemployment rate reaches levels over 10%, the in-treatment effect becomes only slightly negative.

Turning to the post-treatment effect, we find that it does remain constant at low unemployment rates, staying close to 30%. At unemployment rates above 9%, the already high and positive post-treatment effect becomes even more pronounced. This supports our hypothesis that either network effects or the acquisition of human capital plays a role for the transition to a regular job.

Finally, we investigated the in-treatment and post-treatment effects by subgroups.[10] Foreigners have a significantly higher post-treatment effect than workers with German citizenship; unemployed people with university degree have a significantly lower negative in-treatment effect; and medium-skilled workers have a significantly higher negative in-treatment effect than low-skilled unemployed workers. The post-treatment effect for recipients of unemployment assistance is positive but smaller than that for the reference group receiving unemployment benefits. However, for all groups, we find no significant differences with respect to the cyclicality of the treatment effect compared to overall pattern.

5.4. Expected remaining unemployment duration

To get an impression of the economic relevance of the treatment effect, in a post-estimation step we calculate and compare the expected remaining unemployment durations for unemployed people with and without treatment following the approach outlined in Section 3.1. For different combinations of t_p and t_d, we calculate the effect of the treatment for all treated individuals in the sample and then take sample averages. We do this exercise for low unemployment rates (5-7%), median unemployment

[10] Results are available upon request.

rates (8-9%) and high unemployment rates (>10%). In order to interpret the results more easily, we display the treatment effects in days in absolute terms.

[Figure 4 about here]

In Figure 4, Panel A, the treatment duration varies in intervals of 15 days for the median time until entry into the first agency job, which is 111 days. In a recession with unemployment rates above 10%, the treatment effect on the expected remaining unemployment duration is largest. Taking an agency job during unemployment reduces the expected remaining unemployment duration for the treatment group by 154 days if the agency job lasts about two weeks. The gain from treatment is less pronounced if the duration of the agency job increases. But even if an agency job lasts about one year, the effect is still positive, i.e., the expected remaining unemployment duration for the treated is about 58 days shorter.

Once the business conditions improve, the gains from having received treatment become less pronounced. At unemployment rates between 8% and 9%, the gains are 109 days if the agency job lasts 15 days. This gain turns into an approximately three day longer unemployment duration in case of a treatment duration of one year. In tight labor markets, the treatment harms workers with treatment durations lasting longer than 240 days. The negative correlation between treatment effect and treatment duration again confirms our explanation that reduced search intensity is likely the reason for the negative in-treatment effect.

Panel B in Figure 4 investigates whether the treatment effect varies with the amount of time that elapses prior to entering the first agency job, evaluated at constant treatment durations of 91 days (median). Panel B shows that workers at the median treatment duration always benefit from having received treatment. The expected remaining unemployment duration decreases most when unemployment is high. The gain is largest for those who entered into treatment after having been unemployed for more than two years. In line with the results in Table 5, there are no differences for unemployment rates between 5.8% and 9%.

Taken together, these results point at the robustness of our main finding that both the in-treatment and post-treatment effects move counter-cyclically in the sense that the treatment effect is more

favorable in slack labor markets with high unemployment rates than in tight labor markets where lock-in effects impede workers' search for regular jobs.

5.5. The quality of the stepping-stone effect over the business cycle

Another point of concern in the debate on the stepping-stone effect of agency employment is the quality of the job found after treatment. Job search theory predicts that the match quality and thus the wage of the first regular job should improve if an unemployed person leaves directly after treatment: First, in contrast to jobseekers in the control group, at least some agency workers might have received training from the user firm or temporary work agency. The incentive for the agency to invest in training is not only to assign their staff to more tasks and responsibilities, but also to provide an incentive for user firms to hire the agency worker after completing the temporary job assignment. In the latter case, agencies typically charge the user firm a premium. Thus it is plausible that the treatment group should be able to accumulate more human capital in a given time interval compared to the control group seeking a regular job outside the sector (Autor, 2001).

Second, if the user firm continues to employ the worker, it is already informed about the productivity of the worker, which should result in a higher match quality. Moreover, having an agency job may provide the worker access to an additional network, for example via co-workers, that could be utilized in the job search. Finally, accepting an agency job during a spell of unemployment might prolong eligibility for unemployment benefits. Consequently, the treatment group might have higher reservation wages compared to workers who are at risk of receiving only unemployment assistance, which is considerably lower than unemployment benefits. Thus, we expect a higher post-wage for the treatment group exiting temporary agency work directly to a regular job. Moreover, in contrast to the transition rate out to regular employment, we expect that the post-wages should react pro-cyclically, as the bargaining position of the worker is stronger during upturns.

With respect to post-wages after falling back from treatment at least once into unemployment, the theoretical prediction is not as obvious. Still, workers might have gained some human capital. Due to the depreciation of human capital, the effect should be much lower compared to leaving directly after

treatment. Reductions of information asymmetries are no longer an important mechanism as workers have likely never worked for the new employer before. On top of that, falling back into open unemployment might negatively stigmatize the worker. If at all, we would therefore expect a slight positive effect on post-wages that is considerably below the effect after exiting to a regular job immediately after treatment. This also holds for the cyclicality of the post-wages as these jobseekers are equally productive compared to the control group from the perspective of prospective employers.

[Table 6 about here]

Table 6 presents the results when investigating the post-wages divided by in- and post-treatment effects. As we do not expect the effect to be linear as before, we interact the in-treatment and post-treatment with unemployment rate dummies. The interpretation of the in-treatment effect here is the effect on post-wages of leaving for a regular job directly from an agency job. In order to investigate the long-run effect on the match quality, we restricted our sample to the inflow to unemployment until 2010.[11] The results show that the match quality and thus the post-wages (i.e., daily earnings) of workers leaving while in treatment are considerably higher compared to workers searching for a job from open unemployment. The wage gain is about 18 log points after exit and decreases only moderately after 18 months to about 13 log points. The lower post-earnings after 18 months might be explained by the fact that some workers become unemployed again.

One possible explanation for the higher post-earnings could be that workers are more often employed full-time. Our data set does not provide information about the exact number of hours the worker is employed. However, our data do provide information on whether the worker holds a full-time or part-time job. Table A2 in the Appendix shows that the share of workers who found a full-time job always lies well above 90%, which is plausible as we are only investigating male jobseekers. In order to further investigate whether the number of hours might play a role, we ran a competing risk model investigating whether the treatment effects vary by transition to full-time and part-time employment. It turns out that the pattern is qualitatively the same.[12]

[11] The treatment effects for the slightly shorter observation period are almost identical. Results are available upon request.
[12] Results are available upon request.

Turning to the cyclicality of the post-wages after leaving unemployment to take a regular job, we find that post-wages are 5 log points lower at unemployment rates above 10%, when compared to the post-wages in an upturn. Still, the gain remains considerable at about 13 log points. One possible explanation for the pro-cyclicality of the post-wages is that the bargaining power of the worker deteriorates as soon as the economy enters a slump. That entry wages are indeed lower in a downturn has been recently documented by Stüber (2015) for Germany. Table 6 also shows that the pro-cyclical pattern of post-wages disappears with the time that elapses after leaving unemployment.

Finally, in line with search theory, post-wages are not affected for workers falling back into open unemployment at least once and we do not find any cyclical effect. As already discussed in Section 4, we are not able to observe if an agency worker is taken over by a former client firm and thus whether this is the reason for the higher post-wages for the in-treatment group. However, we observe the occupation of the worker while being in treatment and of the first regular job after leaving unemployment. To check whether a reduction in information asymmetries is a plausible explanation for the higher post-wages of workers exiting directly from the agency job to a regular job, we run a linear probability model using the sample of all treated jobseekers. In this case the dependent variable is a binary indicator which takes on the value one if the occupation of the agency job equals the occupation in the first regular job and zero otherwise. As explanatory variables we used the in-treatment indicator which is one if the worker is employed at an agency before leaving to a regular job and zero otherwise and the controls used in our preferred specification. The regression shows that the probability finding a regular job requiring the same occupation as the last agency job is significantly higher (coef. 0.141, se 0.010) compared to the treatment group exiting to a regular job from unemployment. This might support the surmise that these workers indeed found a job at a former client firm, which is already aware of the productivity of a worker and thus pays a higher wage.

6. Conclusion

The question whether temporary agency employment is a bridge into regular employment has been investigated thoroughly. The results of the empirical literature are ambiguous. While some studies find a positive stepping-stone effect, other studies provide evidence that agency employment is not a springboard into regular employment. However, the demand for agency employment is strongly cyclical, and thus we would expect the stepping-stone effect to be cyclical as well. We argue that the cyclicality of the stepping-stone effect of temporary agency employment could provide an explanation for the ambiguities in the literature on the stepping-stone effect up to now.

We find that the stepping-stone effect is indeed strongly counter-cyclical. The lock-in effect (in-treatment) is strongest during economic upturns when many outside offers are available. While employed at an agency, workers search less for regular jobs and thus receive fewer job offers. In a downturn, reduced job search might not harm workers, as there are few vacancies available. Moreover, taking an agency job during "good" times might negatively stigmatize a jobseeker, while taking such a job during "bad" times might signal high productivity.

We also find a large positive post-treatment effect, which moves counter-cyclically as well. Having had at least some employment experience during unemployment might benefit workers in periods with slack labor demand. It seems that workers in temporary agency jobs build networks of co-workers at the user firm. These networks might be particularly useful in economic downturns, when the unemployed have more difficulties finding a job.

Turning to the matching quality after leaving unemployment, those who left unemployment directly from an agency job (in-treatment) have a considerable earnings advantage over workers who found a job after open unemployment. Reductions of information asymmetries and firm- or industry-specific human capital effects are potential explanations for these results. Post-earnings after treatment show a pro-cyclical pattern, indicating better job matches in times of low unemployment.

During the past two decades, policy makers all over Europe have been promoting agency employment by lowering restrictions on the use of agency work. Not least because of the short-term

nature of agency employment and the poor working conditions in this sector, policy makers have become increasingly reluctant to support this employment form further if it does not indeed get the unemployed back into regular jobs. Our study contributes to this discussion by showing that promoting agency employment for unemployed people in tight labor markets, when demand for agency workers is high, will not pave the way to better jobs, whereas in bad times, when demand is low, encouraging the unemployed to accept such jobs may open up opportunities that will lead to stable employment in the future.

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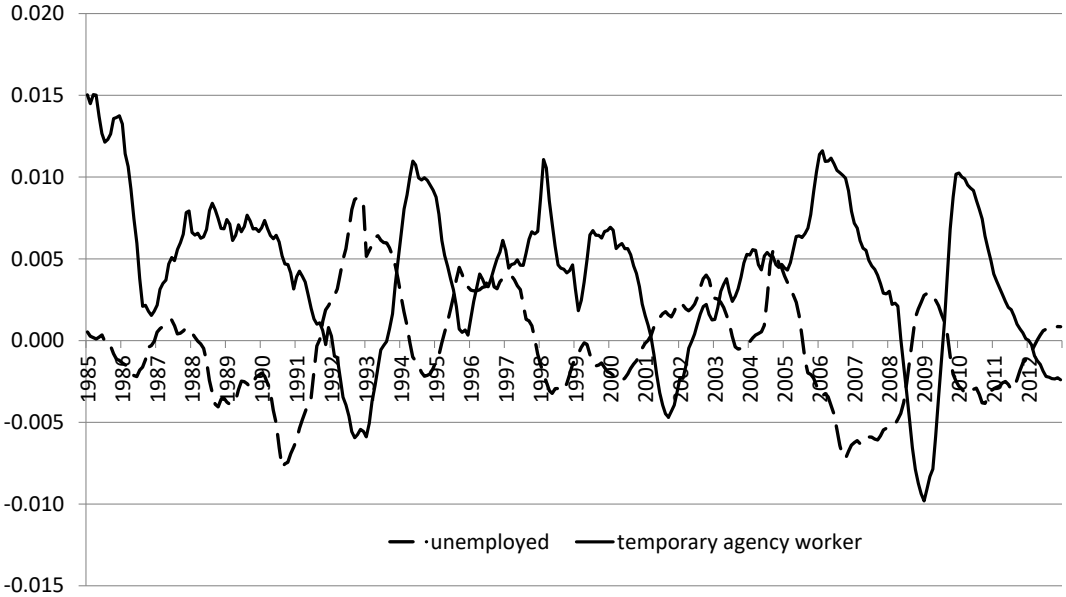
Tables and Figures

Figure 1: Cyclicality of temporary agency employment



Notes: Labor Placement Statistics and Unemployment Statsistics, Federal Employment Service: The level values of the variables are smoothed by an 12-period centered moving average; first differences of log values are displayed at the vertcal axis.

Figure 2: Smoothed Kaplan Meier hazard rates out of unemployment to employment and agency jobs

Figure 3: Cyclicality of the treatment effect

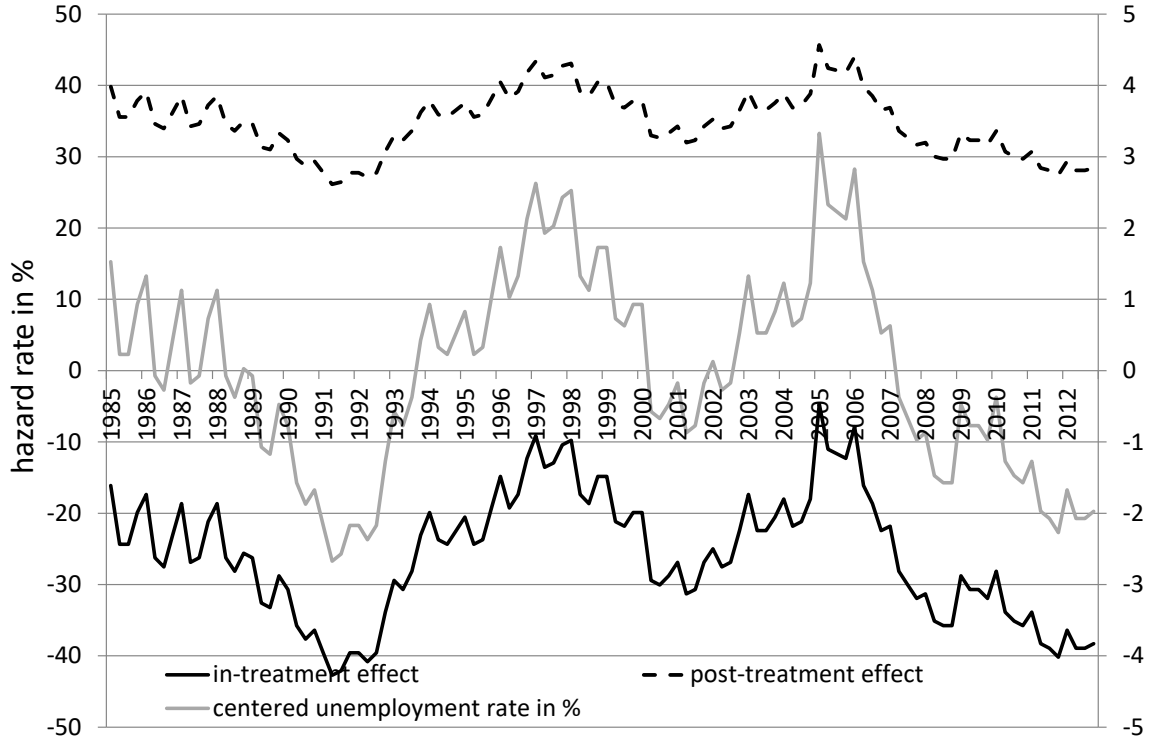


Figure 4: Average treatment effect on the treated in days

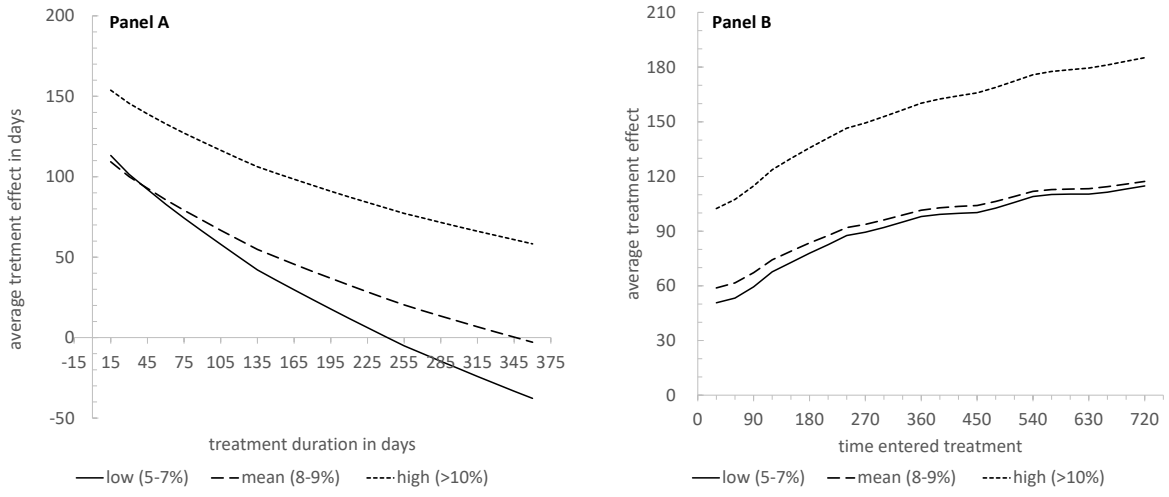


Table 1: The effect of temporary help employment on employment and earnings

Study	Sample	Outcome Variable	Method	Results
Amuedo-Dorantes et al. (2008)	Spain (1998-2004)	Employment	Matching	Agency workers are less likely to be hired on a permanent basis than workers on fixed-term contracts
Andersson et al. (2009)	US, five states (1993-2001)	Earnings	Fixed Effects	Positive effect on subsequent earnings; strong effect particularly for low-income workers
Autor and Houseman (2010)	US, Michigan (1999-2003)	Employment and earnings	Quasi Experimental setting, IV	Lower post-earnings, negative employment effect, higher welfare recidivism compared to direct-hire fixed-term workers
De Graaf-Zijl et al. (2011)	Netherlands (1988-2000)	Employment	Timing of events	No positive effect on contingent workers except for foreign workers
Givord and Wilner (2015)	France (2002-2010)	Employment	Multinomial logit	Fixed-term jobs provide a path to permanent employment, while agency employment has no positive effect
Heinrich et al. (2009)	US, Missouri (1997-1999 / 2001-2003)	Employment and earnings	Multinomial logit	Positive effect of agency employment on employment probability and post-earnings for TANF recipients
Heinrich et al. (2005)	US, Missouri (1990-1995/1995-1999) and North Carolina (1995-1999)	Employment and earnings	Multinomial logit, Selection Model	No effect on employment probability; earnings for agency workers are initially lower but increase faster than those in other industries
Hveem (2013)	Sweden (2001-2008)	Employment and earnings	Matching and DID	Negative effect on employment probability except for immigrants; positive effect on annual earnings in the long run
Ichino et al. (2008)	Italy, Tuscany and Sicily, 2001-2002	Employment	Matching	Positive effects of agency employment on employment probability for Tuscany but not for Sicily
Jahn and Rosholm (2013)	Denmark (1997-2006)	Employment	Timing of events	Positive employment effect for immigrants
Jahn and Rosholm (2014)	Denmark (1997-2006)	Employment and earnings	Timing of events	Positive employment effect and higher post-wages
Kvasnicka (2009)	Germany (1994-2001)	Employment	Matching	Negative effect in the short run, no effect in the long run, but lower unemployment risk
Lane at el. (2003)	US (1990-1993)	Employment and earnings	Multinomial logit, Matching	Positive effect on employment probability and earnings for unemployed
Malo and Muñoz-Bullón (2008)	Spain (1996-1999)	Employment	Sequence Analysis	Agency work has a positive effect on employment probability for unemployed workers, especially for young women.

Table 2: Selected sample statistics

	Control				Treatment			
	Downturn		Upturn		Downturn		Upturn	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Average age	34.047	9.250	34.439	9.565	32.498	8.609	33.399	9.286
Married	0.421	0.494	0.386	0.487	0.358	0.479	0.309	0.462
Child in household	0.371	0.483	0.347	0.476	0.335	0.472	0.307	0.461
Foreign	0.236	0.425	0.224	0.417	0.308	0.462	0.285	0.452
Low qualified	0.189	0.391	0.190	0.392	0.216	0.411	0.218	0.413
Medium qualified	0.767	0.423	0.764	0.425	0.757	0.429	0.752	0.432
High qualified	0.044	0.205	0.046	0.210	0.028	0.164	0.030	0.171
Unemployment assistance	0.217	0.412	0.235	0.424	0.293	0.455	0.318	0.466
Previous regular employed	0.639	0.480	0.648	0.478	0.548	0.498	0.541	0.498
Previous temp	0.023	0.150	0.039	0.194	0.093	0.291	0.149	0.356
Previous apprentice	0.006	0.078	0.005	0.073	0.007	0.084	0.009	0.095
Previously out of labor force	0.332	0.471	0.308	0.462	0.352	0.478	0.301	0.459
Spells ending in regular employment (%)	61.767		61.570		51.690		47.514	
Median duration of agency spell (months)					2.727		2.990	
Median time until first accepting an agency job (months)					4.699		3.055	
Mean number of agency spells					1.226		1.228	
No. of unemployment spells	124,842		110,964		12,461		15,973	
No. of persons [a)]		58,222				20,751		
No. of unemployment spells per person [a)]		2.885				4.640		
Share right-censored spells		2.801				9.099		

Notes: IEB V11.0, 1980-2012. [a)] The numbers of persons and unemployment spells per person refer to persons who have been treated at least once during the observation period. All events refer to the unemployment rate centered around its mean at the beginning of the unemployment spell. Further control variables are the fraction of time spent in regular and agency employment during the past five years, the number of agency jobs during the past five years, dummies for the number of regular jobs (2-3, 4-6, 7 or more) during the past five years, the time-varying centered quarterly unemployment rate for Western Germany, and year and quarter dummies.

Table 3: In-treatment and post-treatment effects

	Model 1		Model 2		Model 3		Model 4	
In-treatment	-0.164 **	(0.012)	-0.154 **	(0.012)	-0.247 **	(0.013)	-0.258 **	(0.014)
In-treatment x unemployment rate	0.011	(0.008)	0.064 **	(0.012)	0.061 **	(0.009)	0.063 **	(0.009)
Post-treatment	0.291 **	(0.014)	0.387 **	(0.014)	0.316 **	(0.014)	0.348 **	(0.015)
Post-treatment x unemployment rate	-0.016	(0.009)	0.024 **	(0.009)	0.033 **	(0.009)	0.033 **	(0.009)
Control variables	N		Y		Y		Y	
Unobserved heterogeneity	N		N		Y		Y	
Treatment duration	N		N		N		Y	

Notes: IEB V11.0, 1980-2012. Standard errors in parentheses. **/* denotes statistical significance at the 1/5 % level. The distribution of the unobservables is approximated non-parametrically by a bivariate discrete distribution with six mass points. The unemployment rate for West Germany is centered around its sample mean. In addition, Models 2 to 4 include three age dummies, two education dummies, a dummy for being married and having children, a dummy for having no German citizenship, the fraction of time spent in regular and agency employment during the past five years, the number of agency jobs during the past five years, dummies for the number of regular jobs (2-3, 4-6, 7 or more) during the past five years, dummy variables indicating whether the workers was previously an agency worker, an apprentice, or out of the labor force, year and quarter dummies, and parameters for the distribution of the unobserved characteristics. In Model 4, the endogenous treatment equation in addition controls for the type of occupation during the agency job (5 dummies) and the log of the daily wage during the agency job.

Table 4: Unemployment rate and treatment effects

	Mean	S.D.	Min	Max
Aggregate unemployment rate	8.5	1.4	5.8	11.8
In-treatment effect	-25.8	8.7	-42.7	-4.7
Post-treatment effect	34.8	4.5	26.1	45.7
Observations (quarters)		112		

Notes: IEB V11.0, 1980-2012. The in-treatment and post-treatment effects are estimated using the results from Table 3, Model 4.

Table 5: Treatment effects and the level of unemployment

In-treatment (ref: 5.8-7%)	-0.409	**	(0.024)
In-treatment x unemployment rate 7-8%	0.133	**	(0.033)
In-treatment x unemployment rate 8-9%	0.164	**	(0.038)
In-treatment x unemployment rate 9-10%	0.170	**	(0.034)
In-treatment x unemployment rate >10 %	0.310	**	(0.041)
Post-treatment (ref: 5.8-7%)	0.295	**	(0.027)
Post-treatment x unemployment rate 7-8%	0.037		(0.036)
Post-treatment x unemployment rate 8-9%	-0.014		(0.046)
Post-treatment x unemployment rate 9-10%	0.117	**	(0.038)
Post-treatment x unemployment rate >10 %	0.090	*	(0.046)

Notes: IEB V11.0, 1980-2012. Standard errors in parentheses. **/* denotes statistical significance at the 1/5 % level. The distribution of the unobservables is approximated non-parametrically by a bivariate discrete distribution with six mass points. The unemployment rate for West Germany is centered around its sample mean. The following controls are included in all estimations: three age dummies, two education dummies, a dummy for being married and having children, a dummy for having no German citizenship, the fraction of time spent in regular and agency employment during the past five years, the number of agency jobs during the past five years, dummies for the number of regular jobs (2-3, 4-6, 7 or more) during the past five years, dummy variables indicating whether the workers was previously an agency worker, an apprentice, or out of the labor force, year and quarter dummies, and parameters for the distribution of the unobserved characteristics. The endogenous treatment equation in addition controls for the type of occupation during the agency job (5 dummies) and the log of the daily wage during the agency job.

Table 6: Cyclicality of post-wages, after …

	Exit	6 months	1 year	18 months
In-treatment (ref: 5.8-7%)	0.180 **	0.162 **	0.145 **	0.133 **
	(0.013)	(0.010)	0.0113	(0.010)
In-treatment x unemployment rate 7-8%	-0.012	-0.013	0.001	-0.003
	(0.015)	(0.012)	(0.013)	(0.012)
In-treatment x unemployment rate 8-9%	-0.044 **	-0.033 *	-0.027	-0.022
	(0.016)	(0.013)	(0.015)	(0.013)
In-treatment x unemployment rate 9-10%	-0.065 **	-0.038 **	-0.027 *	-0.011
	(0.015)	(0.012)	(0.014)	(0.012)
In-treatment x unemployment rate >10 %	-0.050 **	-0.046 **	-0.020	-0.012
	(0.017)	(0.013)	(0.015)	(0.013)
Post-treatment (ref: 5.8-7%)	-0.012	-0.005	-0.010	-0.015
	(0.012)	(0.012)	(0.014)	(0.013)
Post-treatment x unemployment rate 7-8%	-0.020	-0.034	-0.029	-0.004
	(0.015)	(0.014)	(0.016)	(0.015)
Post-treatment x unemployment rate 8-9%	-0.016	0.011	0.015	0.031
	(0.017)	(0.017)	(0.019)	(0.018)
Post-treatment x unemployment rate 9-10%	0.000	-0.020	-0.014	0.000
	(0.015)	(0.015)	(0.017)	(0.016)
Post-treatment x unemployment rate >10 %	-0.006	-0.008	-0.025	-0.008
	(0.017)	(0.016)	(0.018)	(0.017)

Notes: IEB V11.0, 1980-2012. Standard errors in parentheses. **/* denotes statistical significance at the 1/5 % level. In order to investigate the long-term outcomes we have restricted the sample to the inflow for the years 1985-2010. The distribution of the unobservables is approximated non-parametrically by a bivariate discrete distribution with six mass points. The following controls are included in all estimations: three age dummies, two education dummies, a dummy for being married and having children, a dummy for having no German citizenship, the fraction of time spent in regular and agency employment during the past five years, the number of agency jobs during the past five years, dummies for the number of regular jobs (2-3,4-6, 7 or more) during the past five years, dummy variables indicating whether the workers was previously an agency worker, an apprentice, or out of the labor force, year and quarter dummies, and parameters for the distribution of the unobserved characteristics.

Appendix

Table A1: Full estimation results

	Selection equation		Treatment equation		Hazard equation	
	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.
0-28	-9.473	(0.362)	0.195	(0.562)	-3.245	(0.026)
28-56	-9.495	(0.362)	-0.179	(0.562)	-3.109	(0.026)
56-84	-9.548	(0.362)	-0.500	(0.562)	-3.082	(0.026)
84-112	-9.631	(0.362)	-0.743	(0.563)	-3.035	(0.027)
112-140	-9.683	(0.362)	-0.878	(0.563)	-3.167	(0.028)
140-175	-9.667	(0.362)	-0.897	(0.563)	-3.373	(0.028)
175-245	-9.719	(0.362)	-1.104	(0.563)	-3.451	(0.028)
245-364	-9.847	(0.362)	-1.124	(0.562)	-3.675	(0.028)
364-546	-10.091	(0.363)			-3.802	(0.028)
546-728	-10.349	(0.363)			-3.977	(0.030)
728-1092	-10.575	(0.364)			-4.089	(0.030)
1092-	-11.186	(0.364)			-4.727	(0.032)
Age 25-34	-0.452	(0.018)	0.051	(0.023)	-0.246	(0.008)
Age 35-44	-0.624	(0.021)	0.180	(0.026)	-0.438	(0.010)
Age 45-55	-0.955	(0.024)	0.251	(0.030)	-0.748	(0.011)
Married	0.030	(0.017)	-0.041	(0.021)	0.136	(0.007)
Child	-0.130	(0.016)	0.094	(0.020)	-0.009	(0.007)
Foreign	0.127	(0.015)	0.035	(0.019)	-0.112	(0.008)
Medium skilled	0.136	(0.017)	-0.037	(0.020)	0.214	(0.008)
High skilled	-0.332	(0.039)	0.041	(0.055)	0.065	(0.017)
Prev. agency employed	0.424	(0.021)	-0.025	(0.026)	-0.199	(0.016)
Prev. apprentice	0.307	(0.069)	-0.033	(0.088)	0.157	(0.034)
Prev. out of the labor force	-0.164	(0.015)	-0.078	(0.019)	-0.410	(0.006)
Fraction regular employed	-0.133	(0.028)	-0.185	(0.036)	0.156	(0.012)
Fraction agency employed	0.847	(0.052)	-0.563	(0.064)	0.168	(0.035)
Agency experience (dummy)	0.066	(0.015)	0.048	(0.019)	0.185	(0.008)
1 regular job	0.052	(0.019)	0.134	(0.024)	0.361	(0.009)
2-4 regular jobs	0.075	(0.032)	0.262	(0.043)	0.567	(0.011)
5+ regular jobs	0.124	(0.004)	0.070	(0.004)	-0.065	(0.004)
UA	-0.202	(0.015)	0.133	(0.019)	-0.173	(0.007)
Unemployment rate	-0.105	(0.019)	0.118	(0.023)	-0.135	(0.008)
Occ. personal services			-0.219	(0.056)		
Occ. commercial services			-0.252	(0.041)		
Occ. IT and natural sciences			-0.087	(0.093)		
Occ. other support services			-0.254	(0.024)		
Occ. Unknown			-0.142	(0.020)		
Daily wage (log)			-1.273	(0.023)		
In-treatment effect					-0.258	(0.014)
Post-treatment effect					0.348	(0.015)
In-treatment *unemployment rate					0.063	(0.009)
Po-treatment * unemployment rate					0.033	(0.009)
Points of support						
$ln\ \upsilon_1$	1.292	(0.384)	-0.739	(0.546)	-1.465	0.065
$ln\ \upsilon_2$	1.744	(0.350)	-0.598	(0.528)	-2.081	0.020
$ln\ \upsilon_3$	0.810	(0.351)	-0.207	(0.528)	-2.741	0.019
$ln\ \upsilon_4$	-0.819	(0.489)	1.871	(0.533)	-1.764	0.067
$ln\ \upsilon_5$	-0.972	(0.551)	-0.999	(0.701)	-1.111	0.024
Prbability masses (log transform)						
λ_1					-2.540	(0.173)
λ_2					0.049	(0.250)
λ_3					2.073	(0.143)
λ_4					2.006	(0.142)
λ_5					-0.972	(0.290)

Source: IEB V11.0, 1980-2012. Standard errors in parenthesis. The distribution of the unobservables is approximated non-parametrically by a bivariate discrete distribution with six mass points. The unemployment rate for West Germany is centered around its sample mean. In addition, the model includes year and quarter dummies.

Table A2: Sample statistics – employment quality

	Control		In-treatment		Post-treatment	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Daily wage (log)						
After exit	4.095	0.405	4.153	0.337	3.941	0.422
After 6 months	3.028	1.882	3.575	1.532	2.768	1.887
After 12 months	2.669	2.027	3.488	1.623	2.664	1.933
After 18 months	2.800	2.001	3.305	1.772	2.547	1.981
Full-time						
After exit	0.927	0.260	0.961	0.193	0.907	0.291
After 6 months	0.958	0.201	0.972	0.166	0.934	0.248
After 12 months	0.959	0.199	0.975	0.158	0.935	0.247
After 18 months	0.962	0.191	0.974	0.160	0.933	0.250
Observations	136.639		6.976		5.125	

Notes: IEB V11.0, 1980-2012. The number of observations in the in-treatment and post-treatment group can overlap, if a jobseeker who received more than one treatment exits after his last treatment.