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Antoni, Manfred; Jahn, Elke J.

**Working Paper**

# Do changes in regulation affect employment duration in temporary work agencies?

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# Do changes in regulation affect employment duration in temporary work agencies?

MANFRED ANTONI AND ELKE J. JAHN

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# Do changes in regulation affect employment duration in temporary work agencies?*

Manfred Antoni[a] and Elke J. Jahn[b]

ABSTRACT: Over the past three decades Germany has repeatedly deregulated the law on temporary agency work by stepwise increasing the maximum period for hiring-out employees and allowing temporary work agencies to conclude fixed-term contracts. These reforms should have had an effect on the employment duration within temporary work agencies. Based on an informative administrative data set we use hazard rate models to examine whether the employment duration has changed in response to these reforms. We find that the repeated prolongation of the maximum period for hiring-out employees significantly increased the average employment duration while the authorization of fixed-term contracts reduced employment tenure.

ZUSAMMENFASSUNG: In den vergangenen drei Dekaden hat die deutsche Regierung das Leiharbeitsrecht mehrfach dereguliert. Betroffen hiervon waren vor allem die Überlassungshöchstdauer und die Erlaubnis, befristete Arbeitsverträge abzuschließen. Mit administrativen Daten untersuchen wir die Frage, ob die Reformen des Leiharbeitsrechts Einfluss auf die Beschäftigungsdauer in Leiharbeitsfirmen hatten. Mit der Überlassungshöchstdauer sind auch die Beschäftigungsdauern zunächst signifikant gestiegen, wohingegen die Zulassung von befristeten Arbeitsverträgen zu kürzerer Beschäftigung in Leiharbeit geführt hat.

KEYWORDS: temporary agency work, regulation, labor law, duration analysis

JEL-CLASSIFICATION: C41, J23, J40, J48, K31

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a Manfred Antoni, Institut für Arbeitsmarkt- und Berufsforschung der Bundesagentur für Arbeit, Regensburger Straße 104, D-90478 Nürnberg, manfred.antoni@iab.de

b Elke J. Jahn, Minda de Gunzburg Center for European Studies at Harvard University, 27 Kirkland Street, Cambridge, MA 02138, USA, ejahn@fas.harvard.edu.

# 1. INTRODUCTION

Whether temporary agency work can improve the labor market outcomes of the unemployed has recently become the subject of both policy and research interest. It is often argued that employment spells in temporary work agencies increase workers' human capital and provide the opportunity to gain work experience. While being on assignment, temporary agency workers can develop labor market contacts that lead to stable employment or at least to longer-term employment (Jahn 2005, Houseman et al. 2003). In contrast to this view, it may be argued that human capital effects cannot be strong since temporary work agencies primarily offer very short low-skilled jobs that are often below the qualification of the worker and that temporary agency work provides no significant possibility to develop productive job search networks (Segal/Sullivan 1997). Despite this objection Zijl et al. (2004) find evidence that temporary agency work in the Netherlands substantially reduces unemployment duration and increases subsequent job stability. Studies by Amuedo-Dorantes et al. (2005) and Ichino et al. (2006) also find positive employment effects for workers in Spain and Italy, respectively, even though these results apply most notably for specific labor market groups. García-Pérez and Muñoz-Bullón (2005) examine to what extent previous experience in temporary employment agencies affects workers' transition rates from unemployment in the Spanish youth labor market. They show that previous employment experience in a temporary employment agency reduces unemployment duration and has a positive impact for the short term unemployed on the likelihood of leaving unemployment. The results by Autor and Houseman (2005) for the USA and Kvasnicka (2005) for Germany are less encouraging. Both studies find no strong support for the stepping-stone function of temporary agency work.

One reason for these rather mixed results might indeed be that the employment duration in temporary agency work, which is strongly regulated in most OECD countries by law, is rather short. Regulations, which primarily affect the duration of a temporary work agency contract are the permission to conclude fixed-term contracts, the restriction on the number of renewals, the maximum cumulated duration of temporary work contracts as well as the maximum period for continuously hiring

out employees to a single user firm. Even though most OECD countries limit the length or the number of renewals of a temporary agency work contract (OECD 2004), only Germany (until 2003), Italy, the Netherlands (until 1999), Belgium, France, Luxembourg and Portugal limit the length of an assignment to a user firm (Arrowsmith 2006, Storrie 2002). Despite the continuing liberalization of the temporary help sector in most OECD countries over the last two decades, up to now, there has been no research regarding the effect of these reforms on the employment tenure within a single temporary work agency. Germany is an interesting case to analyze because its temporary help sector is still one of the most regulated among the OECD countries. All the more because temporary agency employment has substantially grown during the past decade with an annual growth rate of 10 percent, see Figure 1.

Over the past three decades the German government has repeatedly amended the law on temporary agency work. This process of deregulation started in 1985. One main focus of these reforms was the stepwise extension of the maximum period for hiring-out employees. Furthermore, in the mid 90s temporary work agencies obtained permission to conclude fixed-term contracts with their employees. All reforms were designed on the one hand to increase employment stability within the temporary work agency. On the other hand the deregulation was meant to increase flexibility and encourage firms to recourse to temporary agency workers rather than to internal adjustment instruments such as overtime when adjusting to variations in output demand. To some extent the strictness of the German regulation of temporary agency work might be responsible for the relatively small share of these workers to total employment when compared to other European countries. Nevertheless these legal changes should have had an effect on the employment duration within temporary work agencies. In this paper a mixed proportional hazard rate model is used to examine whether the employment duration in the German temporary help sector has changed in response to these reforms.

Lack of longitudinal data on individual employment histories for temporary agency workers has largely precluded empirical research on the employment duration of temporary agency workers in Germany. The only available study by Rudolph/Schröder (1997) merely addressed those aspects on a descriptive basis.

Schröder (1997) used event history techniques but limited her analysis to 1980-1990 and did not address the question whether the employment duration changed in response to the reform during her observation period. Brose et al. (1990) examined employment duration in temporary agency work using descriptive statistics but again without any special reference to the effect of the reforms.

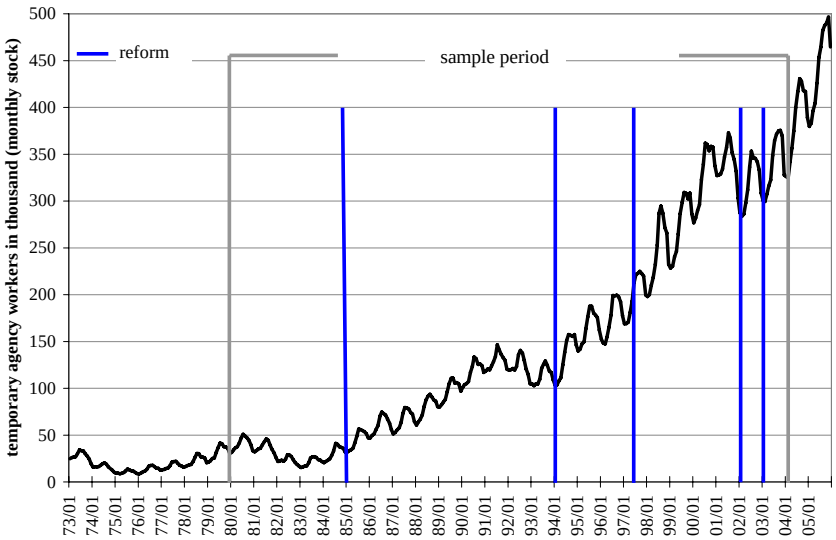
Recently an extended version of the IAB employment sample (IABS) has become available which now allows the analysis of such questions. The data set is of administrative nature and provides longitudinal and high quality information on the individual employment and unemployment history of temporary agency workers covering the reforms between 1980 and 2003. The central question of the paper is whether the amendments to the law affect the employment duration with a temporary work agency and whether the employment duration varies according to socio-economic characteristics. We do not address the question whether these legal changes have had an effect on the stepping-stone function of temporary agency work. The reason is that on average 30 percent of all temporary agency workers in Germany were out of the labor force prior to entry in temporary work agencies. For these workers we can not differentiate whether they accept agency work as a conscious choice to work in a dynamic environment or as a means to find permanent stable employment. Restricting our analysis to temporary agency workers who were previously unemployed would partly solve this problem but would heavily affect our results on employment duration.

The paper is organized as follows. The legal framework and the development of the temporary help sector in Germany are described in Section 2. Section 3 outlines our main hypotheses. Section 4 describes the data, discusses the explanatory variables and provides an explorative analysis. Section 5 is devoted to our estimation strategy and the results. Section 6 presents the results of our sensitivity analysis. Section 7 concludes.

## 2. TEMPORARY AGENCY WORK IN GERMANY

By international standards, the German labor market is highly regulated (OECD 2004). One consequence is that Germany is suffering from a high and still increasing unemployment rate while economic growth is modest. In contrast, the German temporary help service industry has reasonably steadily grown for the last three decades. The number of temporary agency workers increased from 47,000 in 1980 to about 454,000 in 2005, see Figure 1. Despite an average annual growth rate of about 9 percent between 1980 and 2005, the share of temporary agency workers reached only 1.2 percent of total employment in 2005. Nevertheless, the actual labor market flows give the temporary agency work sector an even greater importance than any stock figure or its share of total employment would suggest. In 2005 on average about 444,000 workers were employed by the temporary help service industry but 738,000 new temporary work contracts were concluded and 724,000 terminated. Therefore the dynamics of this labor market segment are all but negligible.

**Figure 1: Development of the temporary help sector since 1973, Germany**




Source: Labor Placement Statistics, Federal Employment Agency

Various reasons for the rising demand for temporary agency workers have been proposed. These include the reluctance of firms to increase their labor force on a permanent basis during the economic cycle and idiosyncratic variation of output demand in particular; reduction of labor costs to circumvent the wages bargained

in sectoral collective agreements; savings in direct labor costs, including continued payment of wages for sickness; reduction in administrative costs and immediate responses to sudden changes in work requirements. Firms also use temporary agency work to circumvent the relatively strict German employment protection legislation. The primary advantages are claimed to be that employment contracts may be terminated without notice, firing costs can be reduced and labor disputes can be avoided. Last but not least the stepwise deregulation of the quite strict regulation of temporary agency work may be one reason for the expansion of the temporary agency work sector.

In Germany, temporary agency work is regulated by the Labor Placement Act, which came into force in 1972. Since then, agencies must register and receive authorization by the German Federal Employment Agency. Legislation on temporary agency work has been amended repeatedly over subsequent years. Some of the changes were tentative at the outset, see Table 1.

In most countries temporary agency work is associated with a fixed-term contract. In contrast, Germany allowed temporary agency work at first only on the basis of an open ended contract. During periods without assignment the temporary work agency is obliged to continue wage payments and contributions to the social security system. The maximum period of assignment to the user firm was limited to three months. In this way, several successive assignments should be combined to a long lasting and stable employment relationship between the temporary agency worker and the temporary work agency. Furthermore, client firms should be prevented from substituting regular employees by temps. In order to prevent temporary work agencies from circumventing legal regulations concerning the requirement of an open ended contract, legislation on temporary agency work included a ban on re-employment and a ban on synchronization. The ban on re-employment prohibits the agency from terminating the contract and then repeatedly re-employing the worker within a three-month period. This regulation permits a one-time termination and re-employment. However, this rule does not apply if the worker quits. The ban on synchronization requires that the employment contract to exceed the length of the initial placement. As a rule of thumb, case law determined that this requirement is fulfilled if the employment duration exceeds the first as-

signment by at least 25 percent. This rule does not apply if the first assignment is followed by a second (short) assignment.

**Table 1: Major Reforms of the Labor Placement Act**

| Period | Regulation | Expected effect on employment tenure |
|---|---|---|
| from May 1, 1985 | Extension of the maximum period of assignment to a client firm from 3 to 6 months until December 31, 1989, prolongation in 1990 until 1995 | positive |
| from Jan 1, 1994 | • Extension of the maximum period of assignment to a client firm from 6 to 9 months until 2000,<br>• Elimination of the synchronization ban for hard-to-place unemployed assigned by the Federal Employment Agency | positive |
| from April 1, 1997 | • Extension of the maximum period of assignment to a client firm from 9 to 12 months,<br>• Acceptance of synchronization of initial assignment to a client firm and employment contract with the temporary agency worker,<br>• Acceptance of a one-time fixed-term contract without objective reasons,<br>• Renewal of fixed-term-contracts with the same temporary agency worker is possible if the new contract follows the previous contract immediately | negative |
| from Jan 1, 2002 | • Extension of the maximum period of assignment to a client firm from 12 to 24 months,<br>• Principle of equal treatment after 12 months | no effect |
| from Jan 1, 2003 | • Elimination of the synchronization and re-employment ban and the maximum period of assignment to a client firm,<br>• Liberalization of the ban of temporary agency work in the construction sector,<br>• Principle of equal treatment, unless a collective bargaining agreement specifies otherwise | negative |

Source: Jahn (2004)

In the following years, a number of legal reforms were passed. The maximum period of assignment was expanded from three to six months in 1985, from six to nine months in 1994 and again in 1997, this time from nine to twelve months. In 1997 fixed-term contracts and the synchronization of the first contract between an agency and a temporary worker were allowed. A fixed-term contract could be prolonged or renewed three times until the total employment duration added up to 24 months. The option to renew a fixed-term contract was later restricted by the Act on Part-Time and Fixed-Term Contracts in 2001. Accordingly, such contracts had to be open-ended after a first limited contract period unless the personal characteristics of the worker or objective reasons, as e.g. the replacement of an employee on maternity leave, justified otherwise.

In 2002 the maximum period of assignment increased up to 24 months. From the 13$^{th}$ month of an assignment on, the principle of equal treatment applied. The tem-

porary agency worker had the right to the same remuneration and equivalent working conditions as comparable employees directly employed at the user firm.

The Labor Placement Act was again modified in 2003.[1] Since then, the temporary work agency has been allowed to assign an agency worker without any time limits. The ban on synchronization and the ban on re-employment were abolished. However, fixed-term contracts continued to be regulated by the provisions of the Act on Part-time and Fixed-term Contracts. At the same time, the rights of temporary agency workers were further strengthened as the principle of equal treatment was in effect from the very first day of an assignment. This can be avoided by the agency for up to 6 weeks if the hired employee has previously been unemployed. In this instance, the temporary work agency is permitted to remunerate the worker with a net pay rate equal to the recent unemployment benefits. The contracting parties may also circumvent the principle of equal treatment if a sectoral collective agreement applies. As a result numerous collective agreements were concluded in the temporary work sector during 2003. Consequently, the principle of equal treatment has no practical effect for most temporary agency workers. In addition, the new legislation governing temporary agency work established a new instrument of active labor market policy. Starting in 2003, the public employment service has used subsidized temporary agency work as part of its job placement activities. The aim of the so called “Personnel-Service-Agencies” is to get the unemployed back into regular work by transition through temporary work.[2]

## 3. HYPOTHESES

Given that our data set covers the period from 1975 to 2004, we are able to examine the effects of the reforms of the Labor Placement Act since it came into effect. Due to the stepwise prolongation of the maximum period of assignment we expect

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[1] The reform of 2003 guaranteed a transition period of one year for the temporary work agencies. A detailed description of the development of the Labor Placement Act is given in Jahn (2002).

[2] Since 2003 each local employment agency has been obliged to establish at least one Personnel-Service-Agency. For details on the characteristics of this instrument of active labor market policy, see Jahn/Ochel (2005).

the duration of the assignment periods to have increased. As a consequence employment duration with the agency should have increased for the following reasons. In order to minimize periods without assignment, and therefore the staffing costs, temporary work agencies have an incentive to conclude employment contracts that do not exceed the assignment period with the client firm. This strategy is first of all of benefit when there are fluctuations or uncertainties with respect to the demand for their services, and secondly, if user firms request specialized workers, for which the temporary work agency can hardly find a subsequent assignment with similar qualification requirements, and third if user firms occasionally request a large contingent of workers. In the latter case, a temporary work agency will not search for suitable workers until a specific request is on-hand. Such workers will then be hired specifically for that request on a temporary basis.

Until 1997 it was the aim of the Labor Placement Act to prevent the synchronization of the employment contract with the first assignment. Nevertheless, several legal loopholes allowed the temporary work agencies to circumvent the principle of open-ended contracts. For instance, a temporary work agency could easily dismiss and re-employ a worker once within the probationary period of six months. After an interruption of three months re-employment was possible. Furthermore, a renewal of the employment contract was allowed if the previous one had been terminated at the request of the worker herself. Moreover, the ban on synchronization did not prohibit a very short assignment of e.g. one day's duration after the primary one. In doing so, the agencies could circumvent this regulation as well. Therefore we hypothesize that the employment duration at the temporary work agency rarely exceeded the assignment periods.

The Dismissal Protection Act allows the employer to dismiss an employee during the probationary period with a notice period of two weeks without requiring justification. As a result, temporary work agencies were essentially free to terminate all contracts within the trial period. Given that the probationary period was equal to or longer than the maximum period of assignment prior to 1994, most temporary work agencies might have taken advantage of the opportunities of the Dismissal Protection Act. Consequently, we expect that the employment duration increased significantly due to the reform in 1985.

In 1994 the government again raised the maximum period of assignment, this time from six to nine months. As soon as an employment contract exceeds the probationary period, the termination of a contract requires a justification. If the demand for a temporary worker is longer than six months firms can circumvent employment protection legislation by requesting a temp. Thus we propose that the demand for temps should have increased. However, hiring a temp is expensive due to a mark-up factor of 2.5 on gross wages. The advantage of temporary agency work for the client firm lies primarily in the immediate adjustment to unexpected fluctuations in product demand (Bellmann 2004, Boockmann/Hagen 2001). If a firm expects a long-term increase of additional staff, it may be more economical to directly recruit a temporary worker. As a rule of thumb the breakeven point at which it is cheaper to hire a temporary worker is approximately six months (Schröder 1997). Thus, we suppose that the second reform had a positive effect on the employment duration with the agencies as well. However, we expect the impact to be less pronounced than that of the reform in 1985.

In 1997 the maximum period of assignment was extended up to 12 months. Given that even today most placements still last less than six months, this deregulation is unlikely to have fundamentally increased employment duration (Bellmann et al. 2003, Kvasnicka 2004). In addition, the synchronization ban was relaxed by allowing temporary work agencies to conclude a fixed-term contract for the duration of the first assignment. Therefore, it is not likely that the third extension of the maximum period of assignment had a prolonging effect on the employment duration. The overall effect of this reform on employment duration might even have been negative.

The maximum period of assignment was again extended in 2002, this time from 12 to 24 months. As mentioned before, if a client firm has a need for additional staff for such a long period it may be cost minimizing to hire staff on a fixed-term basis instead of repeated recourse to temporary agency work. The principle of equal treatment which applied from the 13$^{th}$ month of an assignment on may also not have encouraged longer employment periods because it increased the cost of

temporary staff. However, the overall effect of this reform remains ambiguous as well, and we do not expect a noticeable effect on employment duration.

The recent reform in 2003 nearly abolished all regulations and left the parameters of the employment contract subject to collective bargaining. Therefore we expect a pronounced reduction of employment duration. Our hypotheses are summarized in Table 1.

## 4. DATA AND DEFINITION OF VARIABLES

### 4.1 DATA

We use an extended version of the IABS, which permits analyses at the individual level[3]. The IABS contains a two percent random sample of all German employees registered with the social security system. Supplementary information on registered unemployment spells at the employment office is added to the sample. Being of administrative nature the IABS provides longitudinal and high quality information on the employment and unemployment history of employees. Temporary agency workers are identified by an industry classification code, which allows us to identify those workers covered by the social security system in professional temporary work agencies. Firms that place their employees only on a sporadic basis (so-called mixed firms) can not be identified by this code. Therefore about 87 percent of all placed temps in our sample are included in the analysis (Jahn/Wolf 2005). The missing information on temporary agency workers employed in mixed firms has no effect on our results because the reforms of the Labor Placement Act are likely to affect primarily the employment behavior of professional agencies.

Each employment and unemployment spell contains starting and ending date and provides accurate information on the timing of transitions from temporary agency

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[3] The original IABS records data for the period 1975 to 2001. By adding employment spells of individuals included in the original data set administered by the Federal Employment Agency for 2002 to 2004, the reform of 2003 can be analyzed as well. A description of an earlier version of the data set can be found in Bender et al. (2000) and Hamann et al. (2004).

work to another labor market status. Using an inflow sample over the period 1980 to 2003 with censoring on December 2004, we can investigate and compare the effects of the five reforms between 1985 and 2003. For administrative reasons approximately 85 percent of the employment spells are updated for 2004. We suppose that register information is particularly incomplete for new employment relationships. To avoid any distorting effects we therefore excluded all spells starting in 2004. The reference to employment spells rather than workers implies that temporary agency workers with multiple completed temporary agency spells within the same firm or with another employer in a given period are included repeatedly. If a temporary agency spell is followed by a new spell without interruption at the same employer employment duration of these two spells are added.

Nevertheless, the IABS also has disadvantages. First, temporary agency workers cannot be distinguished from the permanent administrative staff of the agencies, which accounted for about 7 percent in 2003 (Jahn/Wolf 2005). Second, as the source of the employment data is social security administration records, no information on the number and duration of placements and the client firm is available. Finally, as long as a jobseeker is not registered with the employment agency or at the social security system, their employment history is interrupted. That implies that, although a worker might be looking for a job but is not registered with the employment agency, the jobseeker will be considered as out of the labor force.

Information for East Germany is available since 1992. In order to investigate the effect of the reform in 1985 as well we concentrate our analysis on West German workers. Furthermore, we restrict our analysis to full-time employees aged between 15 and 64. Contrary to the US, temporary agency jobs in Germany rarely are second jobs. Due to lack of information on the number of hours worked, we exclude part-time employees, trainees, interns and home-workers. In light of the low number of cases, we exclude temporary agency workers in agriculture and mining as well.

## 4.2 Definition of variables

Our dependent variable is the employment duration within the temporary work agency. The five regulatory regimes are coded as dummy variables. Temporary agency work contracts still in effect on the date of legal change are attributed to the preceding period, as we assume that the specific contract is influenced by the legal framework in place while concluding the contract.

To identify the reform effects we control for individual characteristics as well as for macroeconomic variables. As macroeconomic variables we use first, the real annual growth rate of the GDP, as the demand for temporary agency work varies with the economic cycle, second, dummy variables at the regional level indicating the tightness of the regional labor market, and finally, the average annual unemployment rate.[4] All macroeconomic indicators are attributed at the end of a spell because we assume that the prolongation of a contract might depend on the actual macroeconomic environment.

As socio-demographic variables, sex, age and nationality are available but no valid information on the family composition and the marital status. To measure the skill level of temporary agency workers we use the variable education and vocational training. We define three categories: without vocational training, with vocational training and with a university degree. In addition we coded the potential work experience.

Although our data set provides rich information at the individual level, we assume that there is unobserved heterogeneity, such as in motivation and social skills, influencing individual job stability. We use the recent employment history as a proxy to control for these characteristics. The IABS distinguishes between periods of employment and registered unemployment. There may be no notification in the

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[4] A description of the estimated index of the regional labor market tightness can be found in Blien et al. (2005). As the index is correlated with the regional unemployment rate we included the time varying annual unemployment rate for West Germany. We estimated our models with the lagged GDP growth rate as well. But the lagged GDP variable is not significant. This is plausible because the increase in demand for temporary agency workers is seen as a leading macroeconomic indicator.

data set for persons that have previously been outside the labor force, for pupils and students on vacation work, persons currently fulfilling a military service, self-employed and jobseekers that are not registered with the employment agency. We coded these persons as well as workers without a notification for more than 30 days before entrance into temporary agency work as not in the labor force. In addition, we used the categories previously registered as unemployed, employed in temporary agency work, and otherwise employed.

Employment duration in a temporary employment agency may not only be influenced by the regulatory framework but also by other reasons for terminating employment. Our data set contains no information on whether the worker or the temporary employment agency has terminated the employment relationship. Particularly workers who have found a regular job after the temporary agency work spell may have quit the temporary job. As a proxy for the termination decision of the worker we include in our sensitivity analysis in Section 6 a variable indicating whether a worker has found a regular job within 30 days after leaving the temporary work agency.

In addition we control for the following job variables: The occupational status is an indication of which assignments a temporary agency worker may be best qualified for. We can distinguish between unskilled blue-collar workers, skilled blue-collar workers and white-collar workers. It might be assumed that this classification corresponds closely to the level of education. However, the data only show a slight correlation between these two variables. A temporary agency worker may have vocational training, but due to a previous period of long term unemployment or lack of employment experience, he might be placed as an unskilled blue-collar worker.

The IABS provides detailed information on the predominant occupation. Because the activities of a temporary agency worker may vary between assignments, we use a broad classification und differentiate between six occupational groups: Technical occupations (engineer, mathematician, chemist), with high skilled workers, service and clerical occupations. Manufacturing occupations are divided into three variables for the following reason: In Germany there is some indication that

especially the metal industry (e.g. automobile and aircraft industry) uses temps to circumvent the high bargained wages in this industry. Therefore we first of all pool typical occupations used in the metal industry in the dummy variable “manufacturing occupations in metal branch”. According to our assumptions these workers are used as substitutes for regular workers and should therefore have longer employment spells. Second, we aggregate laborers without specific occupation, which belong to the manufacturing occupations as well, in a separate dummy variable.[5] The remaining workers are aggregated in the variable other manufacturing occupations. We expect that especially temps working as laborers and in service jobs do not require long training periods and should have therefore short employment duration.

In order to control for human capital we included the remuneration of the temporary agency workers. Wages are censored by the social security contribution ceiling. Since the remuneration of temporary agency workers in Germany is very low and gross wage differentials between temporary agency workers and regular employees are approximately 41 percent (Jahn/Rudolph 2002) it is likely that this limit is of no impact for our analysis. A consistent consumer price index for the observation period is not available. Therefore we deflated the wages by the GDP deflator. Spells with implausibly low daily wages and spells with wages above the social security contribution ceiling are excluded. We do not observe information on the type of contract, that is whether a worker holds an open-ended or a fixed-term contract.

To account for heterogeneity among the agencies, we included the size of the temporary help agency. The capability of a temporary work agency to deal with short-term demand shocks depends on the number of its client firms and on the extent of diversification between the clients’ economic branches. Thus, there will most likely be a positive correlation between the firm size and the job stability in the respective firm. Some temporary work agencies are specialized in market niches that primarily employ university graduates. We hypothesize that such spe-

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[5] One might expect that there is a close positive correlation between unskilled blue-collar workers and laborers. But it turns out, that the correlation is rather weak.

cialized temporary work agencies will provide employment contracts of longer duration. In order to account for this effect, we defined the variable fraction of employees with a university degree within the temporary work agency.

Changes of covariates during a temporary agency spell are not reported as soon as they take place. Therefore, we use the covariate values at the beginning of a spell and assume that they are time invariant.

### 4.3 Descriptive statistics

Table 2 provides some descriptive statistics of the inflow of all temporary agency workers given in our data from 1980 to 2003 differentiated by socio-economic characteristics. The corresponding median employment duration during the respective regulatory regimes can be found in Table 3. The data refer to employment spells; right censored spells are included. We are able to identify 50,241 temporary agency workers and 91,160 temporary agency work spells in total; 1,446 temporary agency spells are censored. This leads to an average of 1.8 temporary agency work spells per person during our observation period and may be an indication that temporary work agencies indeed are able to terminate an employment contract at the end of an assignment and to rehire a worker when a new client request is at hand.

Table 2 shows that most temporary agency workers are male. This is true for our entire observation period. The proportion of non-German workers nearly doubled from 10 percent to 19 percent. Compared to the share of non-German workers in overall employment, which amounted to 7 percent in 2003, ethnic minorities are overrepresented in temporary agency work. With respect to the age distribution of temporary agency workers, we find the well known international pattern (e.g. Storrie 2002). The age group below 35 years is clearly over-represented. However, their proportion decreased appreciably from 74 percent between 1980 and 1984 to around 62 percent in 2003. This is primarily attributable to the decline of the share of the age group from 15 to 24, which decreases from 40 percent to 28 percent during our analysis period. The fraction of workers aged 45 to 64 nearly doubled

up to 15 percent in 2003, but they are still underrepresented compared to their proportion of total employment (33 percent in 2003).

**Table 2: Sample statistics of explanatory variables in %, West Germany**

| | 1980-1984 | 1985-1993 | 1994-1996 | 1997-2001 | 2002 | 2003 |
|---|---|---|---|---|---|---|
| Sex (Male) | 74.8 | 76.4 | 76.6 | 72.2 | 73.4 | 74.1 |
| Nationality (Non German) | 9.9 | 14.9 | 24.8 | 24.1 | 19.3 | 18.7 |
| Age (Average in years) | 29.4 | 29.9 | 30.6 | 31.1 | 31.7 | 32.5 |
| 15-24 | 39.9 | 37.6 | 32.3 | 32.8 | 30.8 | 28.0 |
| 25-34 | 33.7 | 34.9 | 38.2 | 34.6 | 33.4 | 34.3 |
| 35-44 | 18.1 | 17.8 | 19.0 | 20.4 | 22.6 | 22.5 |
| 45-64 | 8.3 | 9.8 | 10.5 | 12.3 | 13.1 | 15.1 |
| Education and vocational training | | | | | | |
| No vocational training | 19.1 | 21.6 | 25.5 | 30.6 | 26.9 | 22.0 |
| Vocational training | 78.4 | 75.8 | 70.3 | 64.6 | 68.3 | 73.6 |
| University degree | 2.5 | 2.6 | 4.2 | 4.8 | 4.8 | 4.4 |
| Occupational status | | | | | | |
| Unskilled blue-collar worker | 38.8 | 45.1 | 54.1 | 60.9 | 63.7 | 62.2 |
| Skilled blue-collar worker | 40.7 | 37.4 | 30.2 | 20.1 | 19.8 | 22.0 |
| White-collar worker | 20.4 | 17.5 | 15.6 | 19.0 | 16.5 | 15.9 |
| Occupation | | | | | | |
| Technical | 3.0 | 2.5 | 1.8 | 1.6 | 1.2 | 1.9 |
| Manuf. other | 19.4 | 12.5 | 10.3 | 8.6 | 8.4 | 9.0 |
| Manuf. metal | 39.2 | 41.3 | 33.5 | 23.3 | 19.2 | 20.8 |
| Laborer | 9.8 | 16.1 | 26.2 | 34.6 | 39.8 | 38.8 |
| Service | 10.9 | 12.6 | 14.7 | 15.6 | 17.7 | 17.3 |
| Clerical | 17.7 | 15.0 | 13.4 | 16.3 | 13.7 | 12.2 |
| Previous labor force status | | | | | | |
| Unemployed | 24.2 | 23.8 | 31.2 | 28.6 | 33.5 | 42.8 |
| Regular employed | 21.9 | 21.2 | 15.4 | 17.2 | 15.5 | 13.5 |
| Employed in TAW | 12.4 | 14.3 | 13.7 | 17.3 | 21.1 | 23.2 |
| Not in the labor force | 41.4 | 40.7 | 39.7 | 36.9 | 29.9 | 20.5 |
| Regular employed after TAW | 32.6 | 38.2 | 35.4 | 33.2 | 23.7 | 21.2 |
| Still in TAW spell after … months in % | | | | | | |
| 1 | 68 | 75 | 77 | 74 | 67 | 65 |
| 3 | 37 | 47 | 51 | 46 | 42 | 40 |
| 6 | 20 | 27 | 33 | 28 | 26 | 25 |
| 9 | 13 | 18 | 24 | 20 | 19 | 17 |
| 12 | 9 | 13 | 17 | 15 | 13 | 13 |
| No. of spells | 6,451 | 23,654 | 12,321 | 34,024 | 7,004 | 7,706 |
| No. of individuals | 4,542 | 15,155 | 9,112 | 22,086 | 5,528 | 5,859 |

Source: IABS, Institute for Employment Research

Workers without vocational training, who usually are on short-term assignments, are over-represented in temporary agency work compared to their share in overall employment. Workers with a university degree are less likely to be in temporary agency work. 62 percent of all temporary agency work spells in 2003 are done by

unskilled blue-collar workers, while the fraction of skilled blue-collar workers had nearly halved since 1980. Two thirds of all temporary agency workers are employed in manufacturing or as laborers. This pattern has been stable since 1980, even though service jobs have become more important in the last few years. In 2003 one among five temps has been previously out of the labor force and is probably only loosely attached to the labor market. Due to the economic downturn beginning in 2001 the share of the previously unemployed increased markedly from nearly 29 percent between 1997 and 2001 to 43 percent in 2003. Whereas about 22 percent of temporary agency workers were previously otherwise employed before 1985, this proportion declined to about 14 percent in 2003. The reform of 1997, which permitted fixed-term contracts and relaxed the synchronization ban, generated a sudden increase in temporary agency workers previously employed in temporary agency work from about 14 percent before 1997 to 17 percent between 1997-2001 and even 23 percent after 2003. Table 2 shows that only 67 percent of the temporary agency workers who started their jobs in 2002 are still employed one month after entry and only 13 percent one year later. Obviously employment tenure in temporary agency work is rather short.

Table 3, which shows the median of the employment duration, confirms that the employment tenure in temporary work agencies of two to three months is indeed very short. These figures are roughly consistent with earlier findings in the Netherlands and other western European countries (Zijl et al. 2004, Dekker/Kaiser 2000). Lane et al. (2003) show that temporary agency workers in the US had a median tenure of six months, Segal/Sullivan (1997) estimate an average of about six months as well. Moreover Table 3 shows that employment tenure is increasing with the maximum period for hiring out employees until 1994-96. This is totally in line with our hypothesis. After the marked deregulation in 1997 and 2003 the median tenure decreases again. Note, that we receive this pattern for all socio-economic variables.

**Table 3: Median employment duration in months, West Germany**

| | 1980-1984 | 1985-1993 | 1994-1996 | 1997-2001 | 2002 | 2003 |
|---|---|---|---|---|---|---|
| Total | 2.0 | 2.8 | 3.2 | 2.7 | 2.2 | 2.1 |
| Sex | | | | | | |
| Male | 1.9 | 2.7 | 3.2 | 2.7 | 2.2 | 2.1 |
| Female | 2.4 | 3.1 | 3.4 | 2.6 | 2.2 | 2.1 |
| Nationality | | | | | | |
| German | 2.0 | 2.8 | 3.4 | 2.9 | 2.3 | 2.2 |
| Foreign | 2.5 | 2.7 | 2.7 | 2.2 | 1.9 | 1.7 |
| Age | | | | | | |
| 15-24 | 1.8 | 2.1 | 2.3 | 1.9 | 1.8 | 1.7 |
| 25-34 | 2.0 | 3.0 | 3.3 | 2.8 | 2.2 | 2.0 |
| 35-44 | 2.4 | 3.4 | 4.4 | 3.5 | 2.5 | 2.5 |
| 45-64 | 2.5 | 4.0 | 4.9 | 4.1 | 3.1 | 2.7 |
| Education and vocational training | | | | | | |
| No vocational training | 1.5 | 1.8 | 2.3 | 1.9 | 1.6 | 1.6 |
| Vocational training | 2.1 | 3.1 | 3.6 | 3.1 | 2.5 | 2.2 |
| University degree | 3.4 | 4.1 | 4.4 | 4.0 | 2.9 | 3.5 |
| Occupational status | | | | | | |
| Unskilled blue-collar worker | 1.5 | 1.9 | 2.4 | 2.0 | 1.8 | 1.7 |
| Skilled blue-collar worker | 2.2 | 3.4 | 4.3 | 3.9 | 2.8 | 2.7 |
| White-collar worker | 3.1 | 4.8 | 5.4 | 4.1 | 4.1 | 3.6 |
| Occupation | | | | | | |
| Technical | 3.8 | 6.1 | 7.3 | 7.7 | 6.4 | 8.8 |
| Manuf. other | 1.5 | 2.2 | 2.7 | 2.4 | 2.0 | 1.7 |
| Manuf. metal | 2.2 | 3.2 | 4.3 | 3.5 | 2.8 | 2.6 |
| Laborer | 1.6 | 1.8 | 2.2 | 2.0 | 1.7 | 1.7 |
| Service | 1.5 | 1.9 | 2.4 | 2.3 | 2.1 | 1.9 |
| Clerical | 3.0 | 4.4 | 5.2 | 4.0 | 4.1 | 3.4 |
| Previous labor force status | | | | | | |
| Unemployed | 2.7 | 3.5 | 4.2 | 3.7 | 2.3 | 2.1 |
| Regular employed | 2.2 | 3.1 | 4.0 | 3.0 | 2.8 | 3.6 |
| Employed in TAW | 1.9 | 2.7 | 3.1 | 2.5 | 2.1 | 1.9 |
| Not in the labor force | 1.7 | 2.3 | 2.5 | 2.0 | 2.0 | 1.9 |
| Regular employed after TAW | 2.6 | 3.8 | 4.9 | 4.0 | 3.5 | 2.9 |
| No. of spells | 6,451 | 23,654 | 12,321 | 34,024 | 7,004 | 7,706 |
| No. of individuals | 4,542 | 15,155 | 9,112 | 22,086 | 5,528 | 5,859 |

Source: IABS, Institute for Employment Research

# 5. EMPIRICAL STRATEGY AND ESTIMATION RESULTS

## 5.1 ECONOMETRIC MODEL

In order to identify the reform effects a Difference in Difference approach could be an estimation strategy. The purpose is to estimate the causal effect of an interven-

tion by comparing differences in outcomes before and after the change for groups affected by the intervention (temporary agency workers) to the same difference for unaffected groups (regular workers). In this case we have to assume that hiring and firing of regular workers and therefore their employment tenure is not affected by the changes in the law. But this assumption is too strong because client firms use temporary agency workers among other reasons to screen workers and to circumvent employment protection legislation for regular workers (Autor 2003, Houseman et al 2003). In an environment with strict regulation of temporary agency work, these workers would probably have been hired on a regular contract. An indication that client firms have indeed changed their hiring strategy at the margin is the increasing demand for temporary agency workers in Germany since 1980, which goes hand in hand with the deregulation of the Labor Placement Act, see Figure 1.

A second estimation strategy to estimate the effect of the legal changes on employment dynamics in temporary agency work is to adopt a hazard rate model.[6] To identify the effects of the changes in the law we included macroeconomic covariates as well as individual covariates as described in Section 4. In our context, the model specifies the transition rate out of temporary agency work. Since our longitudinal data set contains daily flow information on employment episodes, we use a continuous time model. We do not differentiate between various destination states and therefore adopt a single risk framework. The hazard rate $h(t)$ is defined as the rate at which an individual exits from a state, given the individual survived there until time *t*. For the transition out of temporary agency work we use a mixed proportional hazard model for multiple-spell data (van den Berg 2001, Hamerle 1989). The vector of explanatory variables is denoted by *x*, the baseline hazard by $\lambda(t)$. The influence of the observed characteristics is given by

(1) $$h_0(x) = \exp(x'\beta).$$

To control for neglected covariates not given in our data set we introduce an unobserved heterogeneity term denoted by $\nu$. Thus, the mixed proportional hazard model is denoted by

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6 See Kiefer (1988) and Lancaster (1990) for an introduction to survival analysis.

(2) $$h(t|x,\nu) = \lambda(t) \cdot h_0(x) \cdot \nu .$$

The multiplicative heterogeneity term $\nu$ is assumed to be constant across different spells of a given individual and to follow the Gamma distribution as proposed in Abbring/van den Berg (2006). For the sake of identifiability we assume the unobserved heterogeneity to have a mean of one and a finite variance $\theta$. As $\nu$ is unobservable, it cannot be estimated by the data. It is integrated out and only the variance $\theta$ is estimated and given in our results[7].

For the baseline hazard rate we adopt a piecewise constant exponential model (see Blossfeld/Rohwer 2002). To gain flexibility we split analysis time during the first year of each episode into weekly intervals. Within each interval, the baseline hazard is constant as it follows the exponential distribution. From the 13th month on we split the time axis into monthly intervals as the number of observations lasting longer than one year is too little to continue the weekly intervals.

The splitting of the time axis can be described as follows:

(3) $$0 = \tau_1 < \tau_2 < \tau_3 < ... < \tau_L .$$

Assuming that the point in time $\tau_{L+1} = \infty$ and $l = 1,...,L$, we get *L* intervals with

(4) $$I_l = \{t \mid \tau_l \le t < \tau_{l+1}\}.$$

We now introduce a vector of period-specific coefficients denoted by $\alpha$. These are constant throughout the respective interval. Equation (1) therefore changes to

(5) $$h_0(x) = \exp(\alpha + x'\beta).$$

The coefficients are estimated by a maximum likelihood method using the Newton-Raphson algorithm. The estimates are presented in hazard ratio form which means a value below one indicates a covariate with a prolonging effect on employment duration.

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[7] A description of hazard rate models with unobserved heterogeneity implemented in Stata can be found in Gutierrez (2002) and Cleves et al. (2002).

### 5.2 Results of the legal changes on employment duration

Table 4 presents the parameter estimates for the reform dummies and the observable covariates. Compared to the reference period 1980-1984, the transition rates out of temporary agency work in Model 1, which is our preferred specification, differ significantly and are lower after the first (1985) and second (1994) change in the law. This is in line with our hypothesis in section 3. Obviously the prolongations of the maximum period of assignment have increased employment duration in temporary agency work. We take the longer employment duration as an indication that the strict regulation may have dampened the demand for temporary agency workers by the user firms. Although user firms primarily request temps for a short time period there may be a critical time period, until a temp has accustomed herself to the new job and is productive in the user firm. The prolongations of the maximum period of assignment might have improved the chances for the client firms to amortize the initial transaction costs.

The transition rate after the reform of 1997, which allowed fixed-term contracts and relaxed the ban of synchronization is significantly higher than the transition rate of the previous regime. This result confirms our hypothesis in Section 3 as well. It is likely that the temporary work agencies have transferred the risk and the costs associated with periods without assignment to the temporary agency workers and, if they are eligible, to the unemployment insurance system.

Surprisingly, the reform in 2002, which introduces the principle of equal pay after being on assignment for 12 months and increased the maximum period of assignment up to two years, went hand in hand with a further reduction in employment duration. With respect to our hypotheses in Section 3 this result is unexpected and may be explained as follows: Temporary agency work has long been subject to controversial discussions in Germany. The trade unions have been particularly vociferous in opposition to the flexible employment type. The objections were based on the general absence of collective bargaining agreements on temporary agency work in Germany prior to 2003. Furthermore critics of temporary agency work express concern about the quality of flexible jobs. Temporary agency work is said to be associated with a lack of training possibilities and opportunities for career advancement. Consequently, there normally are long and controversial

policy debates before a new legislation comes into effect. At the same time, the temporary help sector is seen as highly flexible and adjusts to legal changes without delay. We therefore presume that this is an anticipation effect resulting from the most recent reform that came into effect in 2003 and left regulation of the temporary help sector subject to collective agreements. Expert interviews with temporary help agencies have confirmed this presumption. In 2003, when collective agreements were successfully bargained, agencies systematically terminated ongoing contracts, which were concluded under the former legal regime and re-employed workers afterwards.

As expected the transition rate after the reform of 2003, which abandoned nearly all regulations and left regulation of the temporary help sector subject to collective agreements, increased markedly. This result is expected and confirms the hypothesis in Section 3.

**Table 4: Exit rates of temporary agency workers, West Germany**

| | Model 1 | Model 2[a)] | Model 3[b)] | Model 4[c)] | Model 5[d)] |
|---|---|---|---|---|---|
| Reform period (ref.: 1980 – 1984) | | | | | |
| 1985 – 1994 | 0.723*** | 0.796*** | 0.733*** | 0.724*** | 0.730*** |
| | (-16.48) | (-15.72) | (-16.27) | (-16.46) | (-15.99) |
| 1994 – 03/1997 | 0.660*** | 0.751*** | 0.668*** | 0.660*** | 0.665*** |
| | (-17.44) | (-16.32) | (-17.33) | (-17.42) | (-17.14) |
| 04/1997-2001 | 0.690*** | 0.816*** | 0.674*** | 0.690*** | 0.690*** |
| | (-17.45) | (-13.43) | (-19.15) | (-17.44) | (-17.50) |
| 2002 | 0.790*** | 0.934*** | 0.742*** | 0.790*** | 0.778*** |
| | (-9.26) | (-3.62) | (-12.03) | (-9.26) | (-9.82) |
| 2003 | 0.872*** | 1.042** | 0.814*** | 0.872*** | 0.848*** |
| | (-5.24) | (2.14) | (-8.13) | (-5.23) | (-6.29) |
| Sex (male) | 1.070*** | 1.133*** | 1.076*** | 1.070*** | 1.055*** |
| | (4.98) | (13.41) | (5.61) | (5.00) | (3.95) |
| Nationality (foreign) | 1.106*** | 1.111*** | 1.096*** | 1.134*** | 1.094*** |
| | (7.57) | (12.18) | (7.19) | (5.75) | (6.76) |
| Potential work experience | 0.973*** | 0.985*** | 0.976*** | 0.973*** | |
| | (-14.59) | (-11.69) | (-13.80) | (-14.53) | |
| Age (ref.: 15-24) | | | | | |
| 25-34 | | | | | 0.917*** |
| | | | | | (-6.29) |
| 35-44 | | | | | 0.776*** |
| | | | | | (-16.00) |
| 45-64 | | | | | 0.706*** |
| | | | | | (-18.39) |
| Education (ref.: no vocational training) | | | | | |
| Vocational training | 0.991 | 1.094*** | 0.990 | 0.988 | 1.009 |
| | (-0.72) | (9.99) | (-0.81) | (-0.93) | (0.72) |
| University degree | 1.149*** | 1.276*** | 1.138*** | 1.128*** | 1.273*** |
| | (4.87) | (12.02) | (4.68) | (3.80) | (8.34) |

**Table 4 (continuation)**

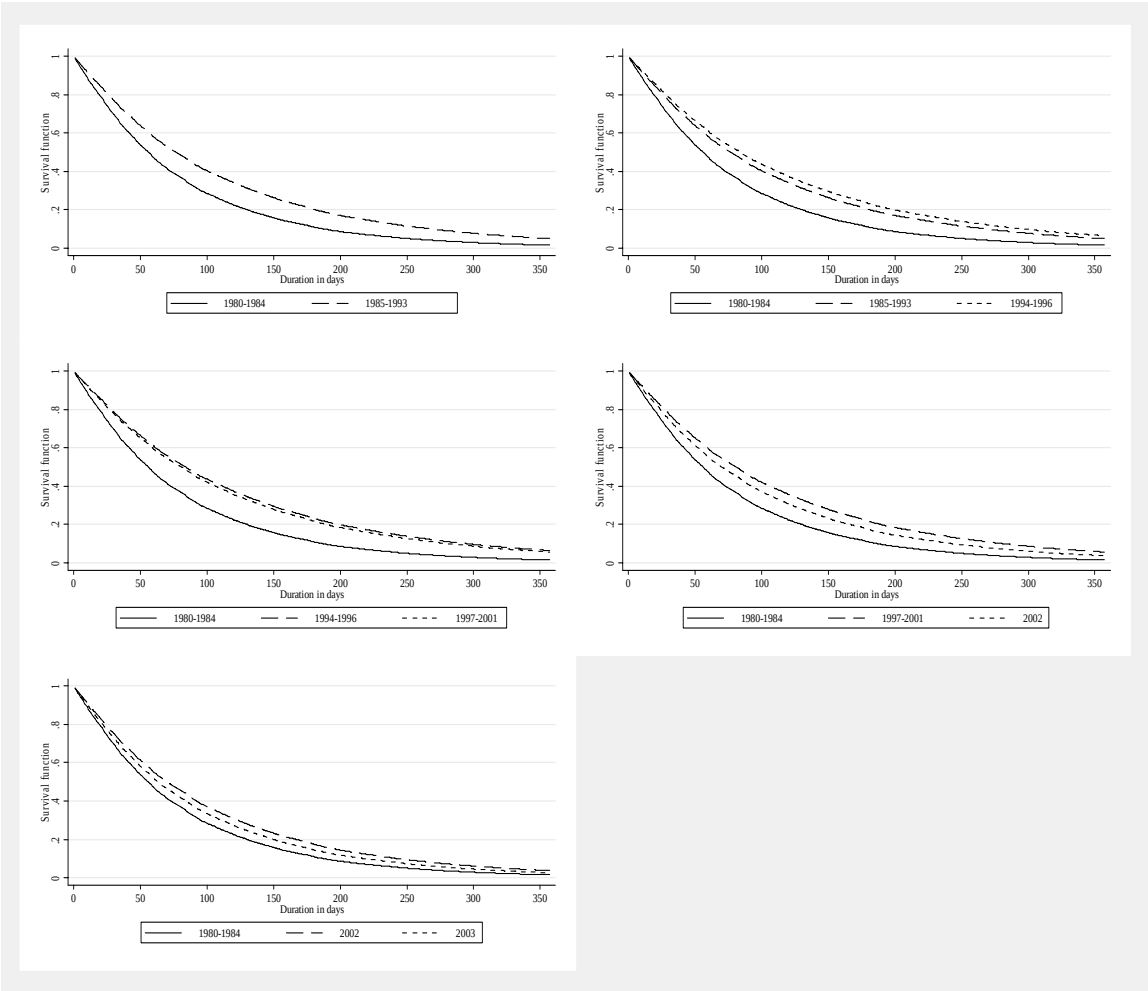
| | | | | | |
|---|---|---|---|---|---|
| Fraction: employees with univ. degree | 0.805** | 0.912 | 0.880 | 0.811** | 0.850* |
| | (-2.56) | (-1.41) | (-1.54) | (-2.47) | (-1.93) |
| Log. deflated daily wage | 0.327*** | 0.334*** | 0.337*** | 0.327*** | 0.334*** |
| | (-78.17) | (-98.60) | (-77.52) | (-78.07) | (-76.62) |
| Occupational status (ref.: white-collar worker) | | | | | |
| Unskilled blue-collar worker | 1.212*** | 1.187*** | 1.189*** | 1.214*** | 1.195*** |
| | (6.18) | (7.19) | (5.70) | (6.17) | (5.73) |
| Skilled blue-collar worker | 1.125*** | 1.094*** | 1.114*** | 1.121*** | 1.109*** |
| | (3.66) | (3.63) | (3.44) | (3.54) | (3.23) |
| Occupation (ref.: manuf. other) | | | | | |
| Technical | 0.718*** | 0.729*** | 0.734*** | 0.720*** | 0.722*** |
| | (-7.59) | (-9.45) | (-7.25) | (-7.54) | (-7.47) |
| Manuf. metal | 0.869*** | 0.870*** | 0.876*** | 0.869*** | 0.872*** |
| | (-8.18) | (-11.25) | (-8.00) | (-8.20) | (-8.02) |
| Laborer | 0.911*** | 0.902*** | 0.918*** | 0.910*** | 0.918*** |
| | (-5.43) | (-8.00) | (-5.09) | (-5.45) | (-4.98) |
| Service | 0.904*** | 0.882*** | 0.908*** | 0.903*** | 0.912*** |
| | (-5.38) | (-8.92) | (-5.25) | (-5.42) | (-4.92) |
| Clerical | 0.862*** | 0.864*** | 0.864*** | 0.862*** | 0.882*** |
| | (-4.36) | (-5.66) | (-4.42) | (-4.36) | (-3.69) |
| Previous labor force status (ref.: unemployed) | | | | | |
| Otherwise employed | 1.030** | 1.031*** | 1.036*** | 1.030** | 1.051*** |
| | (2.27) | (3.01) | (2.79) | (2.27) | (3.85) |
| Employed in TAW | 1.146*** | 1.274*** | 1.161*** | 1.146*** | 1.167*** |
| | (10.46) | (22.98) | (11.61) | (10.46) | (11.83) |
| Out of the labor force | 1.156*** | 1.172*** | 1.157*** | 1.156*** | 1.136*** |
| | (13.15) | (18.38) | (13.48) | (13.13) | (9.94) |
| Termination by the employee | | | | | 0.797*** |
| | | | | | (-24.50) |
| Firm size | 0.999*** | 0.999*** | 0.999*** | 0.999*** | 0.999*** |
| | (-18.68) | (-23.60) | (-18.42) | (-18.65) | (-18.25) |
| Fraction: employees w. univ. degree | 0.805** | 0.912 | 0.880 | 0.811** | 0.850* |
| | (-2.56) | (-1.41) | (-1.54) | (-2.47) | (-1.93) |
| Growth of GDP (West) | 1.022*** | 1.025*** | 1.018*** | 1.022*** | 1.026*** |
| | (7.53) | (10.90) | (6.37) | (7.53) | (8.88) |
| Unemployment rate (West) | 0.941*** | 0.911*** | 0.948*** | 0.942*** | 0.942*** |
| | (-14.25) | (-27.90) | (-12.74) | (-14.22) | (-14.21) |
| Interactions | | | | | |
| Univ. degree * unskilled worker | | | | 1.085 | |
| | | | | (1.33) | |
| Foreign * unskilled worker | | | | 0.963 | |
| | | | | (-1.47) | |
| Previously out of the labor force * age (15-24) | | | | | 1.075*** |
| | | | | | (3.92) |
| ln(θ) | 0.405*** | | 0.340*** | 0.405*** | 0.404*** |
| | (-63.53) | | (-67.17) | (-63.52) | (-63.91) |
| AIC | 110,670 | 125,140 | 105,527 | 110,671 | 110,220 |
| No. of observations | 91,160 | 91,160 | 90,469 | 91,160 | 91,160 |

Source: IABS, Institute for Employment Research

Note: [a)] model without control for unobserved heterogeneity, [b)] model excluding observations lasting longer than 5 years, [c)] model including interactions, [d)] model with age groups and termination by the employee.
Further controls: potential work experience squared, firms size squared, regional dummies. z-statistics in brackets. ***, **, * denote significance at the .01, .05, .10 levels, respectively.

Figure 2 shows the predicted survival functions based on Model 1. In the respective graphs consecutive legal regimes are compared over the first 365 days of employment duration in temporary agency work. For comparison we depict the survival function of the reference period as well. As indicated by the estimation results the strongest prolongation occurred after the reform of 1985. The highest employment duration and the beginning decline following 1997 are reflected in the second graph. Finally, the survival probabilities of contracts concluded in 2003 show only small differences to those concluded between 1980 and 1984.

**Figure 2: Predicted survival functions for an average individual**




Source: IABS, Institute for Employment Research

## 5.3 Covariate effects

The transition rates out of temporary agency work for male workers do significantly differ from that of female workers. Model 1 in Table 4 shows that the transition rate out of temporary agency work for ethnic minorities is higher. One reason might be that they are not well informed about their legal rights and it is therefore easier for the agencies to circumvent legal regulations. This presumption is confirmed if we calculate the number of consecutive contracts for ethnic majorities (1.9) which is higher than that of the German workers (1.8). Potential work experience increases the employment duration in temporary agency firms. It is reasonable to expect that temporary workers with long job experience will be easier to place than new entrants, who intend to gain their initial work experience in temporary agency work.

One might expect that workers with higher qualification levels will be assigned to positions that require a longer time to become fully proficient at the job at hand. In this case the length of an assignment and thus the duration of the contract period should increase. The estimation does not confirm our expectation that vocational training lengthens the duration of employment as the coefficient is not significant. At first sight it may be surprising that the employment duration of temporary workers with a university degree is shorter than that of the reference group. This initially unexpected result is explained as follows: The temporary agency work market in Germany is highly segmented. Large temporary work agencies predominantly place unskilled and seasonal workers. However, some temporary work agencies specialize in particular industry sectors and specific market niches that primarily require university graduates. This includes specifically skilled workers in information technology, engineers and, most recently, also economists, who process complete projects with a limited time horizon. We hypothesize that such specialized temporary work agencies will provide employment contracts of durations that are well above average. In order to account for this effect, we used the variable fraction of employees with a university degree in a temporary work agency. The use of this variable is based on the hypothesis that temporary agency workers with university degrees employed in temporary work agencies of this type are more likely to obtain assignments that match their qualification. The results show that the hazard ratio of this variable indeed indicates a significant prolonging effect.

However, university graduates with degrees, for example, in philosophy or performing arts who work for non-specialized temporary work agencies at levels below their qualification must accept a shorter employment spell.

The results in Table 4 indicate that the duration of a temporary agency job does depend on the previous labor force status. The reference group is the prior unemployed. Employment duration for workers coming from regular employment is shorter. Probably they bridge the gap between two jobs. For workers with immediate prior experience in temporary work agencies we would expect a longer employment spell. But the estimation results show that the employment duration is shorter. One reason might be that temps who have repeatedly accepted temporary agency jobs have developed productive job search networks and quit as soon as they have found regular employment. The employment duration of temps coming from out of the labor force is significantly lower. The reason may be that they are only loosely attached to the labor market.

In order to include the heterogeneity of the temporary work agencies, beyond the fraction of university graduates among its employees, our regressions include firm size. Large temporary work agencies can pool jobs across client firms more easily. Therefore they can offer workers more stable employment, even if specific assignments with client firms are temporary. The employment duration indeed increases with the size of the agency. The transition rates out of temporary work are sensitive to business cycle fluctuations and are higher in tight labor markets with low unemployment rates. This result is in line with the study of Zijl et al. (2004) and may be attributed to a stepping-stone effect.

Table 5 shows the predicted survival probabilities for an average person in our data set. The probability of staying employed in an agency for a given time rises until 1997. From that year on survival probabilities start to decline again. We also simulated this development for females, for foreigners and for workers with a clerical occupation. As already noted before, female workers or those with a clerical occupation experience more stable employment relationships in agency work. The reverse is true for foreign agency workers.

**Table 5: Predicted survival probabilities in %, West Germany**

| | 1980-1984 | 1985-1993 | 1994-1996 | 1997-2001 | 2002 | 2003 |
|---|---|---|---|---|---|---|
| Average person[a] | | | | | | |
| 1 month | 69.5 | 76.9 | 78.7 | 77.8 | 75.1 | 72.9 |
| 3 months | 31.3 | 43.1 | 46.4 | 44.8 | 39.9 | 36.3 |
| 6 months | 10.4 | 19.5 | 22.5 | 21.0 | 16.8 | 13.9 |
| 12 months | 1.4 | 4.5 | 5.8 | 5.1 | 3.3 | 2.3 |
| Female | | | | | | |
| 1 month | 70.8 | 77.9 | 79.6 | 78.8 | 76.1 | 74.0 |
| 3 months | 33.1 | 45.0 | 48.2 | 46.6 | 41.8 | 38.2 |
| 6 months | 11.7 | 21.1 | 24.2 | 22.7 | 18.3 | 15.4 |
| 12 months | 1.7 | 5.2 | 6.7 | 5.9 | 4.0 | 2.8 |
| Foreign | | | | | | |
| 1 month | 67.2 | 75.0 | 76.9 | 76.0 | 73.1 | 70.7 |
| 3 months | 28.0 | 39.8 | 43.2 | 41.5 | 36.6 | 33.0 |
| 6 months | 8.4 | 16.7 | 19.5 | 18.1 | 14.2 | 11.6 |
| 12 months | 0.9 | 3.3 | 4.5 | 3.9 | 2.4 | 1.6 |
| Clerical occupation | | | | | | |
| 1 month | 70.7 | 77.8 | 79.5 | 78.7 | 76.0 | 73.9 |
| 3 months | 33.0 | 44.8 | 48.1 | 46.5 | 41.6 | 38.0 |
| 6 months | 11.6 | 21.0 | 24.1 | 22.6 | 18.2 | 15.2 |
| 12 months | 1.6 | 5.1 | 6.6 | 5.9 | 3.9 | 2.8 |

Source: IABS, Institute for Employment Research

Note: a) The average person is calculated by the sample averages given in the period 1980 to 1984.

## 6. SENSITIVITY ANALYSIS

In order to investigate the effect of different model specifications we perform a number of sensitivity analyses, see Model 2 to 5 in Table 4. In all specifications the effects of the reforms are robust. Model 2 tests whether we receive different results if unobserved heterogeneity is ignored. Table 4 shows that the estimations of the last two reform dummies change. Compared to Model 1, the hazard ratios of the respective reform periods increase. This is an indication that we have indeed to deal with unobserved heterogeneity of the workers and that hazard rates are overestimated if unobserved heterogeneity is neglected. The decision to include an unobserved heterogeneity term is also supported by the lower Akaike information criterion (AIC) and the significant heterogeneity term in column 1 (Cleves et al. 2002).

Our data set includes the permanent administrative staff. However, we assume that their employment duration is not affected by the reforms and that their contract duration should on average last longer than those of the temporary staff. In

Model 3 we therefore exclude observations lasting longer than five years. Again, the hazard ratios change only in size.

The specification is extended by interaction terms in Model 4. As a proxy for highly qualified workers who are on assignments that are well below their educational level an interaction term for university degree and the occupational status unskilled worker is included. This dummy yields no significant effect. Furthermore, we presume that particularly unskilled foreign workers have a weak labor market position, see Section 4, and should therefore have shorter employment duration. To test this hypothesis we included an interaction term for this group as well. Again, our estimations show no significant effect.

One shortcoming of our administrative data set is the lack of information on the reasons for job terminations. Therefore we cannot identify whether a temp has been dismissed or has quit the job. However, the reform effects we analyze are assumed to influence the behavior of the temporary work agencies and not that of their employees. To circumvent this shortcoming Model 5 assumes that a termination by a temp occurred if we observe a direct transition into regular employment. Model 5 replaces the potential work experience by age groups as well. The reason is that younger temps are often recruited among students or pupils, who use agency employment to bridge the vacation gap. As they intend to end their employment relationship after a predefined short time period anyway, we assume that regulatory changes hardly affect their employment duration. The results of Model 5 support that assumption as all the age groups above 24 yield significantly lower hazard rates.

To test whether the results are robust with respect to the chosen time intervals we estimated Model 1 with monthly and two-weekly intervals respectively instead of weekly intervals. These estimations (not presented in Table 4) confirm that the reform effects do not change due to different time intervals[8].

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[8] The results are available on request.

# 7. Conclusions

Most OECD countries have liberalized the regulation of temporary agency employment over the last two decades. To our knowledge, up to now there has been neither national nor international research regarding the changes in employment duration of temporary agency work accompanying these changes in the law. We used a mixed proportional hazard rate model to estimate the changes following the reforms of the Labor Placement Act in Germany since 1980. The stepwise deregulation of the legal framework governing temporary agency work in Germany was intended to let firms respond more quickly to changes in output demand. The rapid growth of the temporary help sector in Germany has raised concerns because many view temporary agency jobs as “bad jobs”. Our first key finding is that labor turnover in the temporary work agency sector is indeed remarkably high. There is also some indication that temporary agency jobs increasingly lead to a repeating cycle between temporary jobs. Consequently, employment in temporary work agencies normally is only a short transitory period in the employment histories of the workers. It offers employment options particularly for male workers and disadvantaged groups, notably for poorly qualified workers, unemployed persons, foreigners, and young workers and is primarily used in manufacturing.

Our second key finding is that there are sizeable changes in the employment duration of temporary agency workers after the changes in the Labor Placement Act, which are in line with our theoretical predictions. As expected, the first two reforms, which increased the maximum period of assignment, have had a positive impact on the length of employment in temporary work agencies. When fixed-term contracts were allowed and the synchronization ban was relaxed in 1997 the average employment duration dropped markedly. Obviously agencies shifted the risk of not being able to place a worker in a user firm to the temporary agency worker or the unemployment insurance system. This may have increased the precarious situation of temporary agency workers that many opponents feared. On the other hand the change in the law may explain why temporary agency work has increased in Germany as much as it has since 1997. Obviously client firms have responded to the stimuli by increasing their demand of temporary agency workers. But we do not know yet whether these are additional jobs or whether firms have

substituted regular with flexible jobs. Surprisingly, the reform in 2002, which introduced the principle of equal pay and increased the maximum length of assignment, was followed by a reduction of the employment duration as well. We presume that this is an anticipation effect resulting from the most recent reform that came into effect in 2003 and left regulation of the temporary help sector subject to collective agreements. The exit rates out of temporary agency work for workers with a relatively weak labor market position as non-German workers, low skilled workers with no education, and the youngest age group are very high. The previous state in the labor market has a significant effect on employment duration. Workers who prior to temporary agency work were not in the labor force leave the temporary help sector more quickly than workers coming from employment or unemployment.

The evidence from our study provides insights into the potential important role of different kinds of regulation on the employment stability within the temporary help sector and we believe the subject warrants further research. One important question is whether the changes in the law have affected the transition of unemployed workers into regular work. We leave this issue for the moment subject to further research.

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