

Employment of temporary agency workers and industrial relations - panel evidence from the British Workplace Employment Relations Survey *

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Abstract

We use new British data from the Workplace Employment Relations Survey (WERS), where we observe firms at two different dates, 1998 and 2004. We focus on private sector firms and document the extent of non-standard employment. These data allow a unique assessment of the reasons for the hire of temporary agency workers, and other forms of atypical employment, over time.

The use of agency work over time will depend on the reasons for hiring agency workers. If cost cutting is the main reason for the use of agency workers, then we do not expect a change in the use of agency workers over time; if however agency workers are employed to compensate for a temporary shortage of workers, we will expect the use of agency work in a particular firm to decrease over time. In the case of specialisation, (small) firms may initially decide to hire specialists only temporarily as demand dictates, but as the firm expands, it might be more efficient to employ the specialist directly.

Trade Unions are most critical of the use of agency workers (e.g. TUC, 2003). Trade unions' influence on the use of temporary agency work is not clear a priori. Cully et al. (1999) show that the main aspect of trade union consultation with management is over pay and workplace conditions. If the trade unions achieve an above-market wage for permanent workers in the firm, the management might be more likely to resort to agency workers to keep costs low. However, some 20 per cent of union representatives negotiate or are being consulted over recruitment decisions. Such involvement may lead to a lower likelihood of the hiring of temporary agency workers if such employment is, or is perceived as, to replace current workers.

For our sample of British workplaces in the private sector, we find that the number of firms employing agency workers has declined between 1998 and 2004. Our estimation results indicate that the reasons for the hire of agency workers are short-term adjustments to the work-force. The single most important factor to the hiring of temporary agency worker is the size of the establishment, with large workplaces being more likely to hire temps than small workplaces. In addition, the number of part-time workers in an establishment is associated with a lower probability of hiring temporary agency workers, while firms with more workers who are on fixed-term contracts are associated with a higher probability of using temporary agency workers. Our results also indicate that the provision of "family-friendly" working arrangements tends to decrease the use of agency workers, and we do find some evidence that trade union activity (work councils, collective disputes) is associated with the prevalence of hiring agency workers.

Keywords: temporary work agency, non-standard employment, WERS
JEL classification:

1 Introduction

Most contributions concerning the consequences of atypical employment have focused on workers who work in non-standard employment contracts.¹ Concerns relate to the workers' psychological well-being (Bardasi and Francesconi, 2004) and their sub-sequent career prospects (e.g. Addison and Surfield, 2006; Booth, Francesconi and Frank, 2002).

Why do firms use atypical jobs? Several studies have stressed the importance of cost reduction (e.g. Abraham and Taylor, 1996; Houseman, 2001), the increase in flexibility (Autor, 2003; Gramm and Schnell, 2001), the response to shortage of (skilled) workers, and the role of management style (e.g., to reduce Trade Union power). Recently, Heywood, Siebert and Wei (2006), also using data from the Workplace Employment Relations Survey panel (WERS) (DTI, 2005), argued that the demand for agency workers is also determined by the existence of family-friendly work practices.

Apart from aggregate trends, which point to an increase in atypical employment over time, little is known about the development of atypical employment. We use new British data from the Workplace Employee Relations Survey panel (WERS) (DTI, 2005), where we observe firms at two different dates, 1998 and 2004. We focus on private sector firms and document the extent of non-standard employment. These data allow a unique assessment of the reasons for the hire of temporary agency workers, and other forms of atypical employment, over time.

The use of agency work over time will depend on the reasons for hiring agency workers in the first place. If cost cutting is the main reason for the use of agency

¹Atypical employment is a broad category of "non-standard" employment contracts and include short-term contracts, dependent self-employment. See Storrie (2002) for a detailed account.

workers, then we do not expect a change in the use of agency workers over time, all other factors constant. If however agency workers are employed to compensate for a temporary shortage of workers, we will expect the use of agency work in a particular firm to decrease over time. In the case of specialisation, (small) firms may initially decide to hire specialists only temporarily as demand dictates, but as the firm expands, it might be more efficient to employ the specialist directly.

Trade Unions are most critical of the use of agency workers (TUC, 2003). Trade unions' influence on the use of temporary agency work is not clear *a priori*. Cully, Woodland, O'Reilly and Dix (1999) show that the main aspect of trade union consultation with management is over pay and workplace conditions. If the trade unions achieve an above-market wage for permanent workers in the firm, the management might be more likely to resort to agency workers to keep costs low. However, some 20 per cent of union representatives negotiate or are being consulted over recruitment decisions. Such involvement may lead to a lower likelihood of the hiring of temporary agency workers if such employment is, or is perceived as, to replace current workers.

If concerns about the increase of atypical employment over the past decade is warranted depends on the reasons for such a development. If the reason for temporarily contracting outside workers is mainly cost-cutting, then we will expect income differentials to grow over time. If, however, the use of outside workers is motivated by specialisation and the exploitation of economies of scale, then these concerns are probably less justified (Abraham and Taylor, 1996). The benefits from using atypical employment may come at a cost, for example, the loss of firm-specific human capital if turnover in core staff increases, a decrease in productivity if production depends on continuous cooperation of workers, and

possibly more antagonistic Trade Unions. Whether costs are greater or smaller than the benefits is ultimately an empirical issue which we address below.

For our sample of British workplaces in the private sector, we find that the number of firms employing temporary agency workers has declined between 1998 and 2004. Our estimation results indicate that the reasons for the hire of temporary agency workers are most likely short-term adjustments to the work-force. The single most important factor to the hiring of temporary agency worker is the size of the establishment, with large workplaces being more likely to hire temps than small workplaces. In addition, the number of part-time workers in an establishment is associated with a lower probability of hiring temporary agency workers, while firms with more workers who are on fixed-term contracts are associated with a higher probability of using temporary agency workers. Our results also indicate that the provision of “family-friendly” working arrangements tends to decrease the use of agency workers, and we do find some evidence that trade union activity is associated with the prevalence of hiring agency workers.

2 Background

Temporary employment, i.e. fixed-term contract and temporary agency work has increased throughout Europe over the last decade. Table 1 gives details over the development. While the overall employment in temporary jobs has increased throughout the 1990s, it seems to have levelled out in the first years of the 2000s. Britain is a country with relatively little use of temporary workers, these numbers indicate some 7 percent of the total labor force were employed in temporary jobs in 2001. Table 2 documents the extent of employment in temporary work agencies (TWA) in Europe by the end of the last century.² About 1 percent of Britain's labour force is employed in temporary working agencies compared to 1.2 percent in the European Union.

The development has prompted the European Commission to propose a directive to safeguard temporary agency workers' working conditions. On 20 March 2002, the Commission issued a proposal for a European Parliament and Council Directive on working conditions for temporary agency workers ([European Commission, 2002](#)). The directive aims to improve the quality of temporary agency work by ensuring that temporary workers are not discriminated against. Temporary workers shall receive at least as favourable a treatment as a regular comparable worker in the firm where she or he is posted.³

The concern about temporary work agencies comes from widespread evidence that workers in TWA face worse working conditions than comparable workers

²[Storrie \(2002\)](#) gives a detailed account. See [ETUI \(2000\)](#) for a survey on the legal frameworks in EU member countries. See [Blank \(1998\)](#) for the USA.

³The relevant dimensions are the basic working and employment conditions, including duration of working time, rest and holiday periods, time of work, and seniority. Differences in treatment must be justified, however, different treatment is justifiable on pro rata grounds. Exemptions are possible for workers who have a permanent contract with a TWA and who continue to receive a wage in between postings. Temporary workers should not be charged any fee by the temporary agency for arranging for their recruitment by a user undertaking.

in the placement firm. For example, [Forde and Slater \(2005\)](#) report a penalty of about 11 percent for men and 6 percent for women in TWA in contrast to comparable workers in the UK. (See also [TUC \(2003\)](#).) Data from the 2004 spring Labour Force Survey show that almost 50 percent of men who work in temporary agencies could not find a permanent job, and about 20 percent chose to work for a temporary work agency. See [Table 3](#). The reasons are more evenly distributed for female workers, with 36 percent stating that they could not find a permanent job and 38 percent stated that they did not want to have a permanent job.

The pay differential has been the main argument for the use of agency employment (e.g. [Abraham and Taylor, 1996](#); [Houseman, 2001](#)). Agency employment may be cheaper than standard employment, for example, in the case of a unionized firm where wages are above market wages. High wages may also result from efficiency wage considerations and a firm may choose to pay its core workers above-market efficiency wages. If a firm cannot compensate core and peripheral workers differently, that is a efficiency-wage compensation scheme for core workers and a market clearing wage for all other workers, it could be rational to contract workers from a temporary work agency. Such wage restrictions may result from equity considerations of internal wage differentials or because of Trade Union activity. In such a situation it is likely that the firm will continue to employ workers from a temporary work agency, as long as internal wage considerations do not allow for the in-house provision of the outsourced services.

Flexibility in responding to fluctuations in labour demand is another argument that has been brought forward to explain the rise of atypical employment ([Autor, 2003](#); [Gramm and Schnell, 2001](#)). While the volatility of business cycles has not increased as much as agency employment, the number of workers may

fluctuate more because of a secular change in the working conditions offered by firms. For example, the number of workers will fluctuate more, if the workplace offers “family-friendly” working conditions, e.g. extended parental leave, leave for the care of family members, et cetera. For example, workplace nurseries are associated with a lower likelihood of hiring agency workers and leave days are associated with a higher likelihood of hiring agency workers (Heywood et al., 2006). In addition, the average age of the workforce might also increase turn-over, where a relatively young workforce will probably fluctuate due to family formation and a relatively old workforce will fluctuate because of retirement decisions.

Skill-biased technical change has been blamed for the recent rise in wage inequality. (See Card and DiNardo (2002) for a critical assessment.) If the supply of skilled workers is fixed in the short-term, a firm that faces a shortage of skilled workers may resort to temporary work agencies to satisfy its demand. Over time, with more skilled workers entering the market due to the higher returns to education, the temporarily hired workers are likely being replaced with permanent staff. The use of agency workers should therefore decrease over time.

Neugart and Storrie (2002) develop an equilibrium unemployment model of the labour market to analyse the macro-economics effects of temporary work agencies and suggest that because agencies improve job matching unemployment may be reduced. Ichino, Mealli and Nannicini (2006) stress that a firm may use temporary employment to screen for permanent workers. A firm has an incentive to use this channel if firing costs are high, or if there is concern about the reputation as an employer. Screening and selection through a temporary work agency is thought to avoid the appearance of a “hire-and-fire” employer. However, such a use of temporary employment is more likely to decrease than to

increase the hiring of agency workers over time if the screening results in good employer-employee matches.

Agency workers may be hired as a response to soured Industrial Relations or as an attempt to curb Trade Union power. The most extreme example is probably the hiring of replacement workers, either temporarily or permanently (which is permitted in the US), during a strike, but the use of replacement workers does not often occur ([Singh and Jain, 2001](#)). Trade unions may have an ambiguous relationship with the use of temporary agency work. Trade unions may increase wages and thus increase the likelihood of the employment of temporary agency workers. In an analysis for the UK, [Cully et al. \(1999\)](#) show that although the main aspect of trade union consultation with management is over pay and workplace conditions, some 20 per cent of union representatives negotiate or are being consulted over recruitment decisions. Such involvement may lead to a lower likelihood of the hiring of temporary agency workers if such employment is, or is perceived as, to replace current workers.

These reasons for hiring workers from temporary work agencies are closely linked to the industry and type of establishment that hires the workers. If labour costs are the reason for hiring temporary agency workers then we expect establishments with high wages to be more likely to hire outside workers than those who pay low wages. Specialisation will make small firms more likely to hire temporary agency workers as some services may not be provided economically within that establishment. For Britain, there does not appear to be a difference between small and large firms in the provision of family-friendly work practices ([Cully et al., 1999](#)), but large firms tend to hire younger workers than small firms.

Given a firm has decided to employ atypical workers, what development over time would we expect? If the motivation for the hire of atypical workers was cost-cutting, e.g. to replace expensive specialists, then we would expect to see little change over time, all other factors being equal.

However, if demand fluctuations are the cause for temporarily expanding the workforce, we might expect that atypical employment varies with the business cycle.

The benefits from hiring atypical workers may come at a cost, for example, the loss of firm-specific human capital if turnover in core staff increases, a decrease in productivity if production depends on continuous cooperation of workers, and possibly more antagonistic Trade Unions.

3 Data

We use British data from the Workplace Employment Relations Surveys (WERS) 1998 and 2004 (DTI, 1999, 2005) to analyse the determinants of firms' use of temporary agency workers. WERS is a nationally representative survey of private and public sector firms. The 1998 survey sampled firms with ten or more employees and the 2004 survey additionally covered firms with five to nine employees.⁴ It provides data on employment relations and working life in Britain from three different perspectives, from the workplace managers, employee representatives and a random sample of up to 25 employees. We use cross-sectional data from the 1998 and 2004 survey of workplace managers and data from the 2004 panel survey. The panel is a random sub-sample of workplaces that have participated in the 1998 survey of workplace managers and were submitted to fewer questions in 2004 than those in the cross-sectional sample.

3.1 Atypical employment in Britain—descriptive evidence from WERS

The following descriptive statistics on workplaces' use of temporary agency workers was calculated using data from the WERS and are based on workplaces with 10 or more employees, to ensure comparability between the two cross-sections. Table 4 provides an overview on the extent of the use of atypical work in British workplaces in 1998 and 2004. In both years, the extent of atypical work was greater in the public sector than in the private sector. The sub-contracting of services is the category of atypical work that has been used by most workplaces,

⁴We employ the post-stratification weights provided by WERS to ensure comparability between the 1998 and 2004 surveys.

between 85 percent and 91 percent of workplaces used sub-contracting. While sub-contracting was pervasive, the next largest category, homeworkers, have been employed by about 30 percent of private sector workplaces and about 40 percent of public sector workplaces. The most striking difference between the private and the public sector is in the use of fixed-term contract workers in about 25 percent in the private sector and about 60 percent of workplaces in the public sector.

Whereas freelance workers and zero-hours contracts are only moderately used, temporary agency workers are found in about 15 percent of private and in more than 20 percent of public sector workplaces. Over time, the percentage of public sector workplaces employing temporary agency workers has increased from 22 to 28 percent, whereas the percentage of private sector workplaces has slightly decreased from 17 to 14 percent. The overall use of temporary agency workers has decreased from 18 percent of workplaces in 1998 to 16 percent in 2004.

In 1998, agency workers were most likely to be employed by workplaces engaged in Electricity, gas and water, in Transport and communications, in Financial Services and in Other business services. Since then, workplaces in the Public administration, Education, Other community services, Manufacturing and Construction sectors have increased their use of agency workers, whereas a decrease can be observed in those sectors where workplaces were most likely to employ temporary agency workers in 1998.

The change in the type of industry of workplaces using temporary agency workers since 1998 has been accompanied by a change in occupations where agency workers were predominantly employed. In 1998, about 60 percent of workplaces using agency workers employed them as administrative and secretarial workers, 17 percent as professional workers and 17 percent in elementary

occupations, whereas agency workers were least likely to be employed as managers and in sales and customer service occupations (both 2 percent). By 2004, the percentage of workplaces using agency workers in administrative and secretarial occupations has almost halved, but agency work has increased in occupations related to personal services, sales and customer services, and as process, plant and machine operatives. Moreover, in both years, temporary agency workers were frequently hired in the occupation that had the largest share in the workplace.

Workplaces where white-collar workers constitute the majority of the workforce decreased their use of temporary agency workers from 30 percent in 1998 to 22 percent in 2004. In contrast, the percentage of workplaces employing mainly blue-collar workers remained constant at 12 percent. Temporary agency workers are more likely to be used by workplaces with a majority of white-collar workers in both years.

As argued above, trade unions may have an ambiguous relationship with the use of temporary agency workers. On the one hand, workplaces that employ temporary agency workers may offer higher wages and more favourable working conditions to their core workforce, but on the other hand, they may replace part of their current workforce by agency workers. Descriptive evidence for 1998 and 2004 shows that in both years workplaces where managers confirm to have collective bargaining with trade unions have hired relatively more agency workers than those where pay has been set by management without consultation.

Table 3 presents the managers' responses as to why workplaces use agency workers. In both years, the mostly cited reason was "short-term replacement" for staff absences or vacancies (60 percent) followed by "adjustment of staffing levels" to peaks in demand (37 percent). Additionally, managers stated that

workplaces used temporary agency workers to cover for long-term absences such as maternity or annual leave (16 percent). Some 20 percent of workplaces employed temporary agency workers because they were unable to fill vacancies and 10 percent satisfied their demand for specialist skills by using agency workers. In 1998, 12 percent of workplaces employed agency workers because of a freeze on permanent staff numbers, whereas in 2004 only 4 percent of workplaces mentioned this reason. Although cost reduction has not been explicitly cited as a reason for employing agency workers, a freeze on permanent staff numbers may be the consequence of a tight budget (high wages) or indicate that the workplace is currently restructuring.

Privatisation in the public sector and pressures to reduce permanent staff numbers in the public sector in the 1990s possibly lead many managers in the public sector to turn to agency workers. In addition, the National Health Services, among others, has created its own “in house” organisation for the supply of temporary cover ([TUC, 2003](#)). We focus on the private sector in the detailed analyses below.

3.2 Empirical strategy

The available data allow a detailed analysis of the firms that hire workers from temporary agencies. We focus on private sector workplaces and present evidence for the reasons discussed in the previous section. We estimate probit models for the 1998 and 2004 cross-sectional samples and compare the determinants of firms’ use of temporary agency workers over time. In addition, we are also able to identify about 600 private sector establishments in the two waves of the panel sample. After excluding observations with missing values, the samples consist

of 1,144 observations in the 1998 cross-section, 1,200 observations in the 2004 cross-section and 524 observations in the panel sample.

As discussed above, firms may use temporary agency workers for various reasons, such as to increase flexibility, to reduce cost or to adjust staffing levels to peaks in demand. If a reduction in labour cost is an important reason for using agency workers we expect that high-wage firms are more likely to hire them than low-wage firms. We include variables that measure the percentage of high-wage and middle-wage workers in the workplace and expect a negative association between these variables and the likelihood of hiring agency workers.⁵

Firms may also save labour cost by excluding some workers from non-wage benefits, such as occupational pension plans and health insurance (Houseman, 2001). We include a variable in our regressions that details whether the managers and/or the largest occupational group are entitled to an employer pension scheme and private health insurance or not.

Trade union activity is included by investigating whether or not any trade union is recognised for collective bargaining reasons and whether there has been a collective dispute over pay or working conditions or any industrial action such as strikes, overtime bans, etc. in the last 12 months. Collective bargaining may lead to above-market wages and thus increase the likelihood of hiring agency workers. On the other hand, higher trade union activity within the workplace may indicate higher opposition to the use of flexible working arrangements in general, if trade unions fear that temporary agency workers may replace current workers or lead

⁵Note that the exact definition of these variables varies between the 1998 and 2004 cross-sectional samples. In 1998, the variables are derived from annual earnings of full-time workers measured in six categories, whereas in 2004 the variables are derived from hourly earnings of full-time and part-time workers measured in four categories. We are confident that we control for most of this difference in measurement because we include the percentage of part-time workers in the workplace.

to a deterioration of working conditions. The same arguments may be true for the existence of work or joint consultative councils which aim at discussing work- and pay-related issues between managers and employees. Since work councils also exist in non-unionised firms we expect that this variable mainly captures the effect of employee involvement in non-unionised firms.

We include several variables to account for a firm's need of flexibility in responding to fluctuations in their workforce.

The provision of "family-friendly" working conditions, such as parental leave to look after children may increase the number of temporary absences and the firm's need of flexibility, thus should lead to a higher likelihood of using temporary agency workers (Heywood et al., 2006). In contrast, workplace nurseries and financial help or subsidies for child care may help to decrease worker absence due to family reasons and should be associated with a lower likelihood of employing temps. Further variables measuring the "family-friendliness" of a workplace include whether workers may work from home in normal working hours, may reduce their working hours (e.g. from full-time to part-time) and whether the firm offers job sharing schemes or term-time only contracts.

The same ambiguity is expected for flexible working time arrangements, some of which may increase the firm's flexibility, while others may increase the firm's need of flexibility. We include variables that indicate whether workers regularly work more than 48 hours per week and whether the firm offers annualised working hours, zero-hour contracts, flexitime agreements⁶ or a 9 day fortnight/4.5 day week. The prevalence of shift working may indicate that a workplace has a production-line technology with high setup costs or provides services that are

⁶Flexitime means that the employee has an agreement to work a certain number of hours but no fixed start or finish time.

available day and night such as hospitals or security firms. In both instances, worker absences may have worse consequences than for firms with normal business hours, thus firms where work is organised in shifts may rely more on temporary agency workers to replace for absences.

Furthermore, we expect that firms with a higher percentage of female workers and especially female-part time workers are more likely to hire agency workers because female workers have higher absence rates than male workers (Ichino and Moretti, 2006) due to their family responsibilities. Since female part-time work may be an indicator for the existence of children we expect a high percentage of female part-time workers to increase the likelihood of a firm's use of temporary agency workers.

Other types of atypical workers such as fixed-term contract employees, freelance workers or part-time workers may either be complementary to or substituted by temporary agency workers. Since certain factors may inhibit the substitution of the core workforce by temporary agency workers we include two variables measuring whether workers in the largest occupational group are easily substituted or not. If core workers need more than six months training to be able to do their job as well as experienced workers and if they work in formally designated teams we expect that firms are less likely to use agency workers.

Since firms respond that obtaining specialist skills is another reason for hiring temporary agency workers we include a variable that indicates whether the firm prefers internal applicants when filling vacancies. Since the skills of internal applicants are known within the firm, this variable may capture the importance of skills in the recruitment decision. Temporary agency workers and internal applicants have in common that they have already been screened either by the agency

or by the firm itself. Thus, we expect that firms preferring internal applicants are more likely to hire temporary agency workers. We use another two variables to control for the importance of specific versus general human capital, i.e. whether the firm conducts personality or attitude test and performance or competency tests when recruiting new workers.

Having a policy of guaranteed job security or no-compulsory redundancies for the current workforce may imply higher firing cost, which are expected to decrease a firm's response to an increase in demand ([Bentolila and Saint-Paul, 1992, 1994](#)). Since firms may be more reluctant to increase their permanent staff numbers in case of high firing cost, they are expected to have a higher likelihood of hiring agency workers.

Furthermore, we control for labour turnover, i.e. the percentage change in the number of workers since the last year, and the percentage of workers who have left the workplace since last year, either because they resigned voluntarily, were dismissed or were made redundant. Given labour turnover, a higher percentage of workers who have left the workplace may increase a firm's use of agency workers because permanent staff is being substituted by agency workers. Of course, the causality could be in the other direction where firms that use more agency workers offer less favourable working conditions and have therefore higher quit rates.

Apart from factors that changes a firm's need for flexibility, we expect that the current market situation determines whether a firm is using agency workers or not. Since higher competition results in more pressure to reduce costs, we expect firms having many competitors to employ relatively more temporary agency staff. We include variables measuring whether or not the firm has no competitors or

dominates the market, it has five or less competitors, and whether or not it faces competition from more than five competitors (control group).

The introduction of a new product (service) is associated with more uncertainty about demand for this good (service) and may cause a more volatile demand. Since temporary agency workers can be used to adjust staffing levels to demand fluctuations, we expect firms that have launched a technologically new or significantly improved product (service) in the two years prior to the interview to be more likely to hire agency workers than those firms that did not.

We also control for the industry in which the workplace operates, the size of the workplace, whether or not the workplace is under foreign ownership (51% or more), whether it is an single independent establishment or belongs to a larger organisation and whether or not it operates in the non-trading sector. The non-trading sector comprises all workplaces that either provide goods or services to other parts of a larger organisation or that are an administrative office of an organisation. To account for the skill distribution within the workplace we add controls for the occupational distribution, i.e. the percentage of workers in each of the nine SOC major groups.⁷

⁷To account for a shortage in labour supply we will control for the regional unemployment rate and the average vacancy rate in a further version of this paper. Unfortunately, regional identifiers are part of the restricted data files of WERS 2004 and are not available until April 2007.

4 Estimation results

We first present cross-sectional evidence for the probability of hiring any agency worker as more information is available for the cross-section sample of workplaces than for the panel sample. Table 8 presents the marginal effects (and standard errors) from probit estimations of the use of temporary agency workers in the private sector for the 1998 cross-section.⁸

4.1 Cross-sectional estimates

We estimate four different models to demonstrate the robustness of our results. Our first model, Model (1), focuses on the association between trade union activity and the likelihood of hiring agency workers, controlling for industry, workplace size, ownership, and the wage distribution. The second model uses a range of indicators for workplace flexibility, in addition to the size and industry controls, such as the number of part-time workers. Model (3) instead focuses on the market situation of the workplace by controlling for whether the workplace has no or many competitors or a new product. Our preferred model, Model (4), combines all four specifications.

All four models consistently estimate a large positive association, which is statistically significant at a p -value of less than 0.01, between the size of the workforce and the likelihood of hiring temporary agency workers. This result is not unexpected, as large firms may have more potential—or need—to hire agency workers than small firms. We also find that firms which are under foreign ownership have a higher probability of hiring temporary agency workers. Estab-

⁸These regressions correct for the complex sampling scheme by using the stratification and weights variables provided with WERS.

lishments that are not part of a larger organisation have a lower probability of hiring temporary agency workers than those that belong to a group of establishments. This again underlines the association between size of an establishment and the likelihood of hiring temporary agency workers.

We do find some statistically significant evidence for an association between trade union activity and the likelihood of hiring temporary agency workers. Although collective bargaining, or the absence thereof is not estimated statistically significantly to be different from zero, firms that had a collective dispute over pay or conditions in the last 12 months are significantly less likely to hire temps in both cross-sections, and the presence of work councils significantly increases the likelihood of hiring temps at a p -value of less than 0.05.

Although we do not find any statistically significant association between the proportion of high-wage workers and the use of temps, firms that offer non-wage benefits are more likely to hire agency workers, thus save labour cost by excluding some workers from benefit payments.

We estimate that workplaces that provide “family-friendly” working conditions tend to hire less temporary agency workers, e.g the 1998 results show a negative association between the provision of child care subsidies and the likelihood of hiring temps. This result could indicate that “family-friendliness” pays off because unexpected worker absences are reduced.

Workplaces having more flexible working arrangements are more likely to hire agency workers. This is confirmed by the positive, and statistically significant marginal effect on the number of fixed-term employees, another form of non-standard employment. Furthermore, firms that have changed their working time arrangements in the last 5 years are more likely to hire temps. In addition, we

estimate that the more part-time workers are in a workplace, the less likely the workplace is to hire agency workers. Although there is no statistically significant association between the number of women amongst the workers and the probability of hiring agency workers, there is some suggestion that the more women are working part-time, the more likely is the hiring of agency workers. This would be consistent with the view that female workers choose part-time employment to be able to combine work and family and, in consequence, are more likely to take leave to care for family members. These results again confirm that flexibility in staffing matters for the hiring of agency workers.

In firms, where firm-specific human capital is relatively more important than general human capital, the cost of training or of integrating agency workers into teams may lower the incentive to hire agency workers. This is confirmed by our data. We estimate that firms where training for the largest occupational group lasts for six months (or more) hire less agency workers than other workplaces. The negative association between the use of personality tests in recruitment and the hiring of agency workers also points to the relative importance of specific over general workers' skills.

We estimate that firms that have (some) market power in the goods (service) market are more likely to hire agency workers. In particular, Model (3) yields statistically significant marginal effects for workplaces with few competitors, and those who (successfully) launched a new product or service two years before the interview. (The statistical significance is increased (reduced) for few competitors (new product) in Model (4).)

Table 9 presents the results from the 2004 cross-section. Differences to the 1998 sample are the negative association between the presence of freelance workers

and the likelihood of hiring agency workers, the positive effect of the possibility to reduce working hours and the negative effect of teamworking, job sharing schemes, workplace nurseries and the possibility of working from home in normal working hours. In addition, we estimate that market power, the variable detailing the number of competitors, is negatively associated with the probability of hiring.

4.2 Panel estimates

Our main interest is the development of atypical employment within firms over time. Table 10 details the changes in the use of agency work between 1998 and 2004. We see that the use of agency work is relatively volatile over time, almost 60 percent of firms that used agency workers in 1998 did not use such workers in 2004. In addition, only about 13 percent of firms that did not hire agency workers in 1998 did so in 2004.

The panel estimates are tabulated in Table 11. Because of small sample sizes we have decided to estimate a probit on the pooled data, rather than estimating a fixed-effects model (or on the likelihood of starting/stopping agency work).

The main results from the previous estimates appear also for this sample, although we yield fewer statistically significant (marginal) effects. We estimate that the size of the workplace, “family-friendly” and flexible working (time) arrangements, and the market structure influence the use of agency work. Large workplaces, those which are part of a larger organisation, where there are few part-time jobs, many fixed-term employees, and where there are few competitors are in particular more likely to hire agency workers than comparable workplaces. Firms offering child care subsidies are less likely to hire agency workers, and the presence of flexible working time arrangements seem to increase the use of temps.

We see no association between trade union activity, be it collective bargaining or the presence of work councils, with the hire of agency workers.

5 Summary

We use new data from the Workplace Employment Relations Survey 2004 (WERS) which provides a cross-section on British firms. In addition, the data provide information on a sub-sample of establishments that were surveyed in 1998, thus allowing the analysis of the first two waves of an establishment panel. We focus on private sector firms and investigate the extent of non-standard employment in these establishments, in particular, the hiring of staff from temporary work agencies.

Our empirical analyses show that the use of temporary agency worker has decreased in the two cross-sectional samples and it has remained stable in the panel sub-sample. Managers' responses indicate that the main reasons for the hiring of temporary agency workers have remained fairly stable over time. Judging from the panel sub-sample, there is considerable volatility in the use of temporary agency workers as about 60% of establishments that used such workers in 1998 did not hire them in 2004. Some 13% of establishment that did not use such workers in 1998 did hire them in 2004.

Using regression analysis, we find that short-term adjustment to the workforce is the main reason for using temporary agency workers. Our results from the panel sample indicate that the size of the establishment has a strong positive effect on the use of temporary agency workers. Furthermore, workplaces with less part-time and more fixed-term employees hire more agency workers. In the 1998 cross-sectional sample we find some evidence that firms that pay non-wage benefits and firms having work councils are more likely to use agency workers, whereas increased trade union activity within the firm in form of collective disputes is negatively associated with the probability of hiring agency workers. Results from

both cross-sectional and the panel sample indicate that the provision of “family-friendly” working arrangements tends to decrease the use of agency workers.

Tables

Table 1: Temporary employment in Europe, percent of total labour force.

	1990*	1998	2001
Spain	30.30	33.10	31.70
Finland	18.20	17.40	16.40
Portugal	16.10	17.50	20.60
Greece	15.00	12.10	12.60
Denmark	10.60	9.90	9.20
France	10.40	14.00	14.90
Germany	10.20	12.40	12.40
Ireland	8.50	7.30	3.70
Sweden	8.30	11.90	13.50
Austria	8.00	7.90	8.10
Netherlands	7.60	12.50	14.30
Italy	7.10	8.60	9.80
Belgium	5.30	8.20	9.00
UK	5.00	7.50	6.80
Luxembourg	3.30	4.90	5.80
EU15	9.20	13.10	13.40

Note: *Value for Germany is for 1991. *Source:* EU Commission, 2002.

Table 2: Temporary agency work in Europe, percent of total labour force.

	1999*	2000**
Netherlands	4.0	2.5
Luxembourg	3.5	
France	2.7	3.3
Belgium	1.6	2.6
Portugal	1.0	0.4
UK	0.9	2.3
Spain	0.8	2.4
Sweden	0.8	0.5
Austria	0.7	1.7
Denmark	0.7	0.9
Germany	0.7	0.6
Finland	0.6	0.3
Ireland	0.6	5.5
Italy	0.2	5.0
Greece		4.4
EU	1.2	2.3

*Note: Source: Storrie (2002).**European Foundation for the Improvement of Living and Working Conditions (various sources).**Estimates from the Third European Survey on Working Conditions (Paoli and Merllié, 2001). The 1999 figures should be interpreted with caution since they are based on national reports. The 2000 figures may provide an upper limit.

Table 3: Reasons for temporary agency work, employees (per cent of temporary agency workers).

	Men	Women
Could not find permanent job	48.28	35.96
Did not want permanent job	20.26	37.72
Contract includes training	2.16	2.19
Some other reason	29.31	24.12
All	100	100
N	232	228

Source: Labour Force Survey, Spring 2004 (ONS, 2004).

Table 4: Atypical employment in the private and public sector, % of workplaces in 1998 and 2004.

	1998		2004	
	Private	Public	Private	Public
<i>Cross-sectional sample</i>				
Sub-contract one or more services	85.3	91.1	86.0	87.2
Homeworkers	29.5	37.3	34.3	41.8
Fixed-term contract employees	24.9	57.9	23.1	59.7
Temporary agency workers	17.3	22.1	14.1	27.7
Freelance workers	13.3	5.0	11.1	8.4
Zero-hour contract employees	4.5	2.8	4.8	4.5
N	1496	669	1455	537
<i>Panel sample</i>				
Sub-contract one or more services	90.2	91.4	93.0	96.4
Homeworkers	32.8	33.3	54.8	55.0
Fixed-term contract employees	31.6	62.0	23.6	63.5
Temporary agency workers	20.1	19.7	20.1	35.5
Freelance workers	12.4	3.1	14.1	9.6
Zero-hour contract employees	4.0	1.6	5.2	3.8
N	581	337	620	298

Note: Data from WERS 1998 and 2004. Workplaces with 10 or more employees. Weighted estimates using the stratification and workplace weight variables provided by WERS.

Table 5: Reasons for use of temporary agency workers (management responses), % of workplaces in 1998 and 2004.

<i>Cross-sectional sample</i>	1998	2004
Short-term cover for staff absence/vacancies	60.6	57.7
Matching staff to peaks in demand	36.8	37.2
Unable to fill vacancies	18.2	23.8
Cover for maternity leave or annual leave	15.0	16.9
Freeze on permanent staff numbers	12.1	4.2
Obtain specialist skills	12.4	9.0
N	820	800

Note: Data from WERS 1998 and 2004. Workplaces with 10 or more employees. Weighted estimates using the stratification and workplace weight variables provided by WERS.

Table 6: Summary statistics - 1998 and 2004 Cross-section.

	1998		2004	
	Mean	SD	Mean	SD
Temporary agency workers (prop.)	0.172		0.131	
<i>Employment conditons</i>				
Employment (ln)	3.258	0.026	3.205	0.017
Wage distribution				
High-wage workers (prop.)	0.064	0.009	0.111	0.007
Middle-wage workers (prop.)	0.712	0.018	0.696	0.013
Low-wage workers (prop.)	0.224	0.018	0.194	0.012
Pension and health benefits (managers or log)	1.193		1.126	
Part-time employees (prop.)	0.276	0.017	0.305	0.011
Female employees (prop.)	0.475	0.017	0.487	0.012
Female part-time employees (prop.)	0.216	0.015	0.239	0.010
Employees left since last year (prop.)	0.281	0.017	0.229	0.010
Change in employment since last year (prop.)	0.073	0.025	0.090	0.018
Personality test	0.212		0.209	
Performance test	0.463		0.429	
Internal applicants preferred	0.277		0.251	
<i>Sector, industry, occupation</i>				
Non-trading sector	0.140		0.031	
Industry				
Manufacturing	0.195		0.142	
Electricity, gas, water	0.002		0.002	
Construction	0.067		0.054	
Wholesale and retail	0.244		0.260	
Hotels and restaurants	0.083		0.114	
Transport and communication	0.058		0.049	
Financial services	0.044		0.053	
Other business services	0.136		0.155	
Education	0.032		0.012	
Health	0.097		0.110	
Other community services	0.041		0.050	
Occupational distribution				
Managers, administrators (prop.)	0.124	0.008	0.131	0.004
Professional (prop.)	0.077	0.008	0.055	0.005
Associate professional, technical (prop.)	0.043	0.006	0.063	0.006
Administrative, secretarial (prop.)	0.154	0.010	0.130	0.007
Skilled trades (prop.)	0.166	0.016	0.089	0.007
Caring, leisure, personal service (prop.)	0.059	0.008	0.078	0.007
Sales, customer service (prop.)	0.167	0.016	0.209	0.012
Process, plant, machine operatives (prop.)	0.095	0.012	0.108	0.009
Elementary occupations (prop.)	0.114	0.012	0.138	0.008
<i>Flexibility</i>				
Parental leave	0.259		0.371	
Working at or from home	0.100		0.229	
Term-time only contracts	0.078		0.121	
Reduce hours (full-time to part-time)	0.365		0.671	
Job sharing schemes	0.144		0.236	
Workplace nursery	0.013		0.022	

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Table 6 — continued from previous page.

	1998		2004	
	Mean	SD	Mean	SD
Child care subsidy	0.033		0.040	
Annualised hours	0.022		0.039	
Regularly working more than 48 hours	0.114		0.424	
Flexitime	0.144		0.330	
Shift working	0.269		0.313	
Zero-hour contracts	0.041		0.047	
9 day fortnight/4.5 day week	0.023		0.147	
Changed working time arrangements in last 5 years	0.344		0.256	
Fixed-term contract employees	0.240		0.222	
Freelance workers	0.142		0.102	
Teamworking (members of log)	0.712		0.685	
Training >6 months (members of log)	0.171		0.153	
Policy of guaranteed job security	0.074		0.096	
<i>Industrial relations</i>				
Collective bargaining	0.167		0.102	
Work council	0.178		0.110	
Collective dispute over pay or conditions in last 12 months	0.051		0.039	
Industrial action in last 12 months	0.009		0.013	
<i>Industrial organisation</i>				
Competition:				
Monopolist (no competitors)	0.026		0.046	
Oligopolist (<6 competitors)	0.253		0.357	
Many competitors	0.581		0.567	
New product/service in last 2 years	0.514		0.320	
Single independent establishment	0.442		0.390	
Foreign owned/controlled	0.073		0.113	
N	1144		1200	

Note: Data from WERS 1998 and 2004. Weighted estimates using the stratification and workplace weight variables provided by WERS.

Table 7: Summary statistics - 2004 Panel.

	1998		2004	
	Mean	SD	Mean	SD
Temporary agency workers (prop.)	0.203		0.188	
<i>Employment conditions</i>				
Employment (ln)	3.385	0.059	3.472	0.069
Part-time employees (prop.)	0.272	0.026	0.295	0.027
Female employees (prop.)	0.484	0.023	0.478	0.023
Female part-time employees (prop.)	0.207	0.020	0.223	0.022
Performance test	0.423		0.549	
Internal applicants preferred	0.267		0.233	
<i>Sector, industry, occupation</i>				
Non-trading sector	0.206		0.206	
<i>Industry</i>				
Manufacturing	0.158		0.159	
Electricity, gas, water	0.002		0.003	
Construction	0.049		0.048	
Wholesale and retail	0.222		0.219	
Hotels and restaurants	0.135		0.140	
Transport and communication	0.036		0.041	
Financial services	0.055		0.053	
Other business services	0.168		0.164	
Education	0.026		0.025	
Health	0.111		0.111	
Other community services	0.038		0.036	
<i>Occupational distribution</i>				
Managers, administrators (prop.)	0.129	0.009	0.122	0.008
Professional (prop.)	0.100	0.016	0.088	0.017
Associate professional, technical (prop.)	0.039	0.005	0.062	0.011
Administrative, secretarial (prop.)	0.187	0.021	0.177	0.022
Skilled trades (prop.)	0.095	0.014	0.093	0.014
Caring, leisure, personal service (prop.)	0.075	0.017	0.148	0.024
Sales, customer service (prop.)	0.179	0.028	0.148	0.024
Process, plant, machine operatives (prop.)	0.105	0.021	0.098	0.018
Elementary occupations (prop.)	0.091	0.010	0.063	0.009
<i>Flexibility</i>				
Parental leave	0.287		0.706	
Working at or from home	0.127		0.241	
Term-time only contracts	0.072		0.179	
Reduce hours (full-time to part-time)	0.385		0.583	
Job sharing schemes	0.176		0.297	
Workplace nursery	0.011		0.027	
Child care subsidy	0.031		0.079	
Annualised hours	0.043		0.081	
Regularly working more than 48 hours	0.110		0.269	
Flexitime	0.136		0.205	
Shift working	0.250		0.347	
Zero-hour contracts	0.043		0.041	
9 day fortnight/4.5 day week	0.011		0.063	
Fixed-term contract employees	0.310		0.221	

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Table 7 — continued from previous page.

	1998		2004	
	Mean	SD	Mean	SD
Freelance workers	0.121		0.138	
Teamworking (members of log)	0.694		0.692	
Policy of guaranteed job security	0.087		0.107	
<i>Industrial relations</i>				
Collective bargaining	0.142		0.213	
Work council	0.185		0.188	
<i>Industrial organisation</i>				
Competition:				
Monopolist (no competitors)	0.020		0.056	
Oligopolist (<6 competitors)	0.251		0.275	
Many competitors	0.524		0.669	
Single independent establishment	0.402		0.356	
Foreign owned/controlled	0.093		0.127	
N	526		526	

Note: Data from WERS 1998 and 2004. Weighted estimates using the stratification and workplace weight variables provided by WERS.

Table 8: Probit estimations of firm's use of temporary agency workers - 1998 Cross-section.

	(1)	(2)	(3)	(4)
	Marg. effect (SE)	Marg. effect (SE)	Marg. effect (SE)	Marg. effect (SE)
Employment (ln)	0.0714** (0.0115)	0.0889** (0.0183)	0.0904** (0.0121)	0.0619** (0.0149)
Single independent establishment	-0.0306 (0.0220)	-0.0524* (0.0227)	-0.0645** (0.0250)	-0.0284 (0.0189)
Foreign owned/controlled	0.1265+ (0.0675)	0.1410* (0.0702)	0.1475+ (0.0781)	0.0961+ (0.0529)
Competition:		Many competitors omitted		
Monopolist (no competitors)			0.0602 (0.0736)	0.0320 (0.0508)
Oligopolist (<6 competitors)			0.0610+ (0.0330)	0.0654* (0.0323)
New product/service in last 2 years			0.0572* (0.0277)	0.0241 (0.0194)
Wage distribution:		Prop. low-wage workers omitted		
High-wage workers (prop.)	0.0353 (0.1003)			0.0486 (0.0850)
Middle-wage workers (prop.)	0.0112 (0.0464)			-0.0240 (0.0440)
Pension and health benefits (managers or log)	0.0351* (0.0169)			0.0429** (0.0162)
Collective bargaining	0.0654 (0.0483)			0.0664 (0.0414)
Work council	0.0873* (0.0396)			0.0774* (0.0359)
Collective dispute over pay or conditions in last 12 months	-0.0623**			-0.0392*
Industrial action in last 12 months	(0.0161) -0.0321*			(0.0189) -0.0547**

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Table 8 — continued from previous page.

	(1)	(2)	(3)	(4)
	Marg. effect (SE)	Marg. effect (SE)	Marg. effect (SE)	Marg. effect (SE)
Part-time employees (prop.)	(0.0251)	-0.4871 * (0.2040)		(0.0194) -0.4399*
Female employees (prop.)		-0.0464 (0.0646)		(0.1872) -0.0176
Female part-time employees (prop.)		0.3454+ (0.2089)		(0.0581) 0.2904
Employees left since last year (prop.)		0.0324 (0.0331)		(0.1962) 0.0465
Change in employment since last year (prop.)		-0.0135 (0.0382)		(0.0291) -0.0147
Parental leave		-0.0165 (0.0236)		(0.0332) -0.0106
Working at or from home		0.1254+ (0.0696)		(0.0211) 0.1015+
Term-time only contracts		0.0083 (0.0404)		(0.0613) 0.0143
Reduce hours (full-time to part-time)		-0.0218 (0.0246)		(0.0371) -0.0187
Job sharing schemes		0.0177 (0.0353)		(0.0223) -0.0039
Workplace nursery		0.0159 (0.0648)		(0.0265) -0.0007
Child care subsidy		-0.0620** (0.0222)		(0.0462) -0.0505*
Annualised hours		0.0113 (0.0511)		(0.0200) 0.0164
Regularly working more than 48 hours		0.0176 (0.0331)		(0.0494) 0.0387

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Table 8 — continued from previous page.

	(1) Marg. effect (SE)	(2) Marg. effect (SE)	(3) Marg. effect (SE)	(4) Marg. effect (SE)
Flexitime		0.0148 (0.0303)		0.0196 (0.0253)
Shift working		-0.0310 (0.0229)		-0.0190 (0.0200)
Zero-hour contracts		0.0176 (0.0770)		0.0041 (0.0586)
9 day fortnight / 4.5 day week		0.0451 (0.0765)		0.0264 (0.0610)
Changed working time arrangements in last 5 years		0.0777** (0.0300)		0.0567* (0.0256)
Fixed-term contract employees		0.0956* (0.0404)		0.0769* (0.0330)
Freelance workers		-0.0333 (0.0218)		-0.0301 (0.0190)
Teamworking (members of log)		-0.0420 (0.0326)		-0.0519 (0.0325)
Training >6 months (members of log)		-0.0532* (0.0220)		-0.0458* (0.0188)
Personality test		-0.0428* (0.0203)		-0.0426* (0.0168)
Performance test		0.0243 (0.0219)		0.0295 (0.0194)
Internal applicants preferred		0.0624* (0.0295)		0.0580* (0.0268)
Policy of guaranteed job security		0.0819 (0.0639)		0.0662 (0.0516)
Non-trading sector	-0.0304 (0.0234)	-0.0459* (0.0208)	-0.0173 (0.0296)	-0.0323+ (0.0188)
Industry:		Manufacturing omitted		

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Table 8 — continued from previous page.

	(1)	(2)	(3)	(4)
	Marg. effect (SE)	Marg. effect (SE)	Marg. effect (SE)	Marg. effect (SE)
Electricity, gas, water	-0.0347 (0.0352)	-0.0023 (0.0521)	-0.0212 (0.0416)	-0.0034 (0.0513)
Construction	-0.0691** (0.0160)	-0.0580** (0.0198)	-0.0671** (0.0182)	-0.0302 (0.0242)
Wholesale and retail	-0.0690** (0.0254)	-0.0463 (0.0291)	-0.0636* (0.0296)	-0.0382 (0.0253)
Hotels and restaurants	-0.0731** (0.0223)	-0.0023 (0.0644)	-0.0703** (0.0261)	0.0065 (0.0609)
Transport and communication	0.0752 (0.0978)	0.1124 (0.1072)	0.1273 (0.1248)	0.1031 (0.0924)
Financial services	-0.0620** (0.0217)	-0.0247 (0.0410)	-0.0453 (0.0342)	-0.0381 (0.0264)
Other business services	-0.0438 (0.0289)	-0.0221 (0.0355)	-0.0431 (0.0322)	0.0007 (0.0369)
Education	-0.0690** (0.0171)	-0.0318 (0.0459)	-0.0696** (0.0209)	-0.0255 (0.0407)
Health	-0.0332 (0.0361)	0.0447 (0.0761)	-0.0358 (0.0391)	0.1258 (0.0968)
Other community services	-0.0828** (0.0181)	-0.0740** (0.0230)	-0.0884** (0.0186)	-0.0621** (0.0200)
Occupational distribution:		Elementary occupations omitted		
Managers, administrators (prop.)	0.5954** (0.1384)	0.5045** (0.1494)	0.6798** (0.1523)	0.3719** (0.1205)
Professional (prop.)	0.1649 (0.1022)	0.0969 (0.0988)	0.1986* (0.1002)	0.0396 (0.0828)
Associate professional, technical (prop.)	0.0760 (0.0874)	0.0053 (0.1044)	0.1293 (0.0944)	-0.0550 (0.0858)
Administrative, secretarial (prop.)	0.1459* (0.0714)	0.1363+ (0.0787)	0.1790* (0.0744)	0.1333+ (0.0693)

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Table 8 — continued from previous page.

	(1)	(2)	(3)	(4)
	Marg. effect (SE)	Marg. effect (SE)	Marg. effect (SE)	Marg. effect (SE)
Skilled trades (prop.)	0.0468 (0.0788)	-0.0013 (0.0845)	0.0659 (0.0883)	-0.0517 (0.0744)
Caring, leisure, personal service (prop.)	0.1023 (0.0687)	0.1174 (0.0734)	0.1027 (0.0700)	0.0685 (0.0642)
Sales, customer service (prop.)	-0.0144 (0.0628)	0.0276 (0.0729)	-0.0049 (0.0665)	0.0198 (0.0631)
Process, plant, machine operatives (prop.)	-0.0395 (0.0687)	-0.0383 (0.0658)	-0.0162 (0.0710)	-0.0742 (0.0598)

Note: Data from WERS 1998. N=1144. ** p<0.01, * p<0.05, + p<0.10. Weighted estimates using the stratification and workplace weight variables provided by WERS. Marginal effects evaluated at the 2004 cross-section mean of the dependent variable.

Table 9: Probit estimations of firm's use of temporary agency workers - 2004 Cross-section.

	(1)	(2)	(3)	(4)
	Marg. effect (SE)	Marg. effect (SE)	Marg. effect (SE)	Marg. effect (SE)
Employment (ln)	0.0677** (0.0101)	0.0691** (0.0108)	0.0768** (0.0089)	0.0604** (0.0109)
Single independent establishment	0.0158 (0.0286)	0.0083 (0.0191)	0.0039 (0.0257)	0.0196 (0.0192)
Foreign owned/controlled	0.0738+ (0.0444)	0.0348 (0.0307)	0.0847+ (0.0468)	0.0392 (0.0300)
Competition:		Many competitors omitted		
Monopolist (no competitors)			-0.0541*	-0.0239 (0.0194)
Oligopolist (<6 competitors)			(0.0222)	-0.0153 (0.0154)
New product/service in last 2 years			(0.0238)	0.0355+ (0.0212)
Wage distribution:			0.0443 (0.0274)	
High-wage workers (prop.)	0.0477 (0.0683)			0.0187 (0.0544)
Middle-wage workers (prop.)	0.0349 (0.0490)			0.0109 (0.0339)
Pension and health benefits (managers or log)	0.0180 (0.0187)			0.0136 (0.0126)
Collective bargaining	0.0067 (0.0299)			0.0212 (0.0268)
Work council	0.0529 (0.0329)			0.0326 (0.0235)
Collective dispute over pay or conditions in last 12 months	-0.0441+			-0.0309+
Industrial action in last 12 months	(0.0233) 0.1559			(0.0158) 0.1519

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Table 9 — continued from previous page.

	(1)	(2)	(3)	(4)
	Marginal effect (SE)	Marginal effect (SE)	Marginal effect (SE)	Marginal effect (SE)
Part-time employees (prop.)	(0.1507)	-0.5572** (0.1407)		(0.1394) -0.5150**
Female employees (prop.)		-0.0505 (0.0517)		(0.1283) -0.0509
Female part-time employees (prop.)		0.4920** (0.1750)		(0.0507) 0.4642**
Employees left since last year (prop.)		0.0803+ (0.0428)		(0.1572) 0.0744+
Change in employment since last year (prop.)		-0.0043 (0.0137)		(0.0407) -0.0016
Parental leave		-0.0113 (0.0157)		(0.0130) -0.0088
Working at or from home		-0.0296+ (0.0166)		(0.0146) -0.0333*
Term-time only contracts		-0.0001 (0.0264)		(0.0151) -0.0030
Reduce hours (full-time to part-time)		0.0384* (0.0167)		(0.0241) 0.0344*
Job sharing schemes		-0.0296* (0.0147)		(0.0159) -0.0261+
Workplace nursery		-0.0333* (0.0164)		(0.0138) -0.0327*
Child care subsidy		-0.0235 (0.0193)		(0.0156) -0.0153
Annualised hours		-0.0004 (0.0282)		(0.0210) -0.0159
Regularly working more than 48 hours		0.0155 (0.0170)		(0.0222) 0.0176

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Table 9 — continued from previous page.

	(1) Marginal effect (SE)	(2) Marginal effect (SE)	(3) Marginal effect (SE)	(4) Marginal effect (SE)
Flexitime		-0.0095 (0.0158)		-0.0130 (0.0142)
Shift working		-0.0049 (0.0174)		-0.0073 (0.0168)
Zero-hour contracts		0.0155 (0.0337)		0.0106 (0.0325)
9 day fortnight / 4.5 day week		0.0174 (0.0267)		0.0133 (0.0243)
Changed working time arrangements in last 5 years		0.0172 (0.0199)		0.0121 (0.0178)
Fixed-term contract employees		0.0176 (0.0188)		0.0191 (0.0185)
Freelance workers		-0.0398** (0.0118)		-0.0379** (0.0114)
Teamworking (members of log)		-0.0532* (0.0270)		-0.0573* (0.0260)
Training >6 months (members of log)		-0.0520** (0.0123)		-0.0502** (0.0116)
Personality test		-0.0022 (0.0173)		-0.0051 (0.0164)
Performance test		0.0133 (0.0181)		0.0105 (0.0169)
Internal applicants preferred		0.0058 (0.0206)		0.0001 (0.0187)
Policy of guaranteed job security		0.0174 (0.0298)		0.0086 (0.0260)
Non-trading sector	0.0664 (0.0647)	0.0559 (0.0511)	0.0449 (0.0621)	0.0472 (0.0493)
Industry:		Manufacturing omitted		

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Table 9 — continued from previous page.

	(1)	(2)	(3)	(4)
	Marginal effect (SE)	Marginal effect (SE)	Marginal effect (SE)	Marginal effect (SE)
Electricity, gas, water	-0.0154 (0.0582)	0.0746 (0.0975)	0.0127 (0.0665)	0.0439 (0.0803)
Construction	-0.0768**	-0.0575**	-0.0779**	-0.0530**
Wholesale and retail	(0.0185)	(0.0109)	(0.0183)	(0.0103)
	-0.0477	-0.0610**	-0.0514	-0.0553**
Hotels and restaurants	(0.0368)	(0.0202)	(0.0362)	(0.0200)
	-0.0359	-0.0051	-0.0480	-0.0001
Transport and communication	(0.0444)	(0.0429)	(0.0391)	(0.0459)
	-0.0771**	-0.0587**	-0.0774**	-0.0570**
Financial services	(0.0176)	(0.0108)	(0.0169)	(0.0103)
	-0.0401	-0.0490**	-0.0485	-0.0475**
Other business services	(0.0401)	(0.0158)	(0.0349)	(0.0146)
	-0.0451	-0.0465**	-0.0543+	-0.0450**
Education	(0.0326)	(0.0176)	(0.0315)	(0.0171)
	-0.0714**	-0.0438*	-0.0738**	-0.0419*
Health	(0.0267)	(0.0198)	(0.0225)	(0.0193)
	-0.0669*	-0.0527*	-0.0671*	-0.0470*
Other community services	(0.0322)	(0.0206)	(0.0315)	(0.0211)
	-0.0793**	-0.0517**	-0.0761**	-0.0496**
Occupational distribution:	(0.0201)	(0.0137)	(0.0205)	(0.0126)
Managers, administrators (prop.)	0.0699	0.0552	0.1093	0.0392
	(0.1398)	(0.1017)	(0.1328)	(0.1005)
Professional (prop.)	0.1357	0.1446+	0.1584	0.1363+
	(0.0994)	(0.0762)	(0.0970)	(0.0748)
Associate professional, technical (prop.)	0.1712*	0.1900**	0.1960**	0.1757**
	(0.0731)	(0.0641)	(0.0725)	(0.0619)
Administrative, secretarial (prop.)	0.0512	0.1293*	0.0845	0.1098*
	(0.0529)	(0.0574)	(0.0557)	(0.0546)

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Table 9 — continued from previous page.

	(1)	(2)	(3)	(4)
	Marginal effect (SE)	Marginal effect (SE)	Marginal effect (SE)	Marginal effect (SE)
Skilled trades (prop.)	-0.0164 (0.0889)	-0.0494 (0.0640)	0.0090 (0.0902)	-0.0548 (0.0576)
Caring, leisure, personal service (prop.)	0.1567* (0.0733)	0.1547* (0.0627)	0.1501* (0.0709)	0.1533* (0.0617)
Sales, customer service (prop.)	-0.0685 (0.0533)	0.0326 (0.0507)	-0.0708 (0.0540)	0.0150 (0.0483)
Process, plant, machine operatives (prop.)	0.1164+ (0.0663)	0.0768 (0.0520)	0.1458* (0.0669)	0.0649 (0.0487)

Note: Data from WERS 2004. N=1200. ** $p < 0.01$, * $p < 0.05$, + $p < 0.10$. Weighted estimates using the stratification and workplace weight variables provided by WERS. Marginal effects evaluated at the mean of the dependent variable.

Table 10: Firm's use of temporary agency workers in 1998 and 2004, % of workplaces

		Temporary agency workers in		
		1998	2004	
		Yes	No	Total
Yes	%	41.5	58.5	100
	<i>N</i>	<i>160</i>	<i>84</i>	<i>244</i>
No	%	13.1	86.9	100
	<i>N</i>	<i>86</i>	<i>255</i>	<i>341</i>
Total	%	18.8	81.2	100
	<i>N</i>	<i>246</i>	<i>339</i>	<i>585</i>

Note: Data from WERS 2004 Panel sample. Weighted estimates using the stratification and workplace weight variables provided by WERS.

Table 11: Pooled probit estimations of firm's use of temporary agency workers - 2004 Panel.

	(1)	(2)	(3)	(4)
	Marg. effect (SE)	Marg. effect (SE)	Marg. effect (SE)	Marg. effect (SE)
Employment (ln)	0.1342** (0.0145)	0.1003** (0.0145)	0.1365** (0.0133)	0.0955** (0.0144)
Single independent establishment	-0.1081** (0.0314)	-0.0764** (0.0246)	-0.1020** (0.0310)	-0.0704** (0.0239)
Foreign owned/controlled	0.0802 (0.0632)	0.0251 (0.0417)	0.0815 (0.0641)	0.0271 (0.0402)
Competition:				
Monopolist (no competitors)		Many competitors omitted		
Oligopolist (<6 competitors)			0.1585 (0.1246)	0.1036 (0.0890)
Collective bargaining	-0.0204 (0.0312)		0.1045* (0.0483)	0.0908* (0.0366)
Work council	0.0246 (0.0332)			0.0192 (0.0296)
Part-time employees (prop.)				0.0068 (0.0254)
Female employees (prop.)				-0.3522+ (0.1949)
Female part-time employees (prop.)				0.0442 (0.0881)
Parental leave				0.0235 (0.2529)
Working at or from home				-0.0264 (0.0263)
Term-time only contracts				0.0593 (0.0443)
Reduce hours (full-time to part-time)				-0.0102 (0.0341)
				-0.0078 (0.0081)

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Table 11 — continued from previous page.

	(1)	(2)	(3)	(4)
	Marg. effect (SE)	Marg. effect (SE)	Marg. effect (SE)	Marg. effect (SE)
Job sharing schemes		(0.0295)		(0.0274)
		-0.0353		-0.0257
		(0.0264)		(0.0265)
Workplace nursery		0.1604		0.1224
		(0.1187)		(0.1092)
Child care subsidy		-0.0600*		-0.0577**
		(0.0234)		(0.0216)
Annualised hours		0.1493+		0.1199+
		(0.0773)		(0.0645)
Regularly working more than 48 hours		0.0009		0.0041
		(0.0307)		(0.0293)
Flexitime		-0.0055		-0.0041
		(0.0299)		(0.0281)
Shift working		0.0068		-0.0008
		(0.0282)		(0.0264)
Zero-hour contracts		0.3727*		0.3584*
		(0.1472)		(0.1511)
9 day fortnight / 4.5 day week		-0.0168		-0.0154
		(0.0383)		(0.0350)
Fixed-term contract employees		0.1277**		0.1220**
		(0.0433)		(0.0407)
Freelance workers		0.0073		-0.0077
		(0.0283)		(0.0250)
Teamworking (members of log)		-0.0380		-0.0364
		(0.0352)		(0.0332)
Performance test		0.0330		0.0345
		(0.0268)		(0.0247)
Internal applicants preferred		0.0163		0.0185
		(0.0257)		(0.0251)

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Table 11 — continued from previous page.

	(1)	(2)	(3)	(4)
	Marg. effect (SE)	Marg. effect (SE)	Marg. effect (SE)	Marg. effect (SE)
Policy of guaranteed job security		-0.0299 (0.0326)		-0.0274 (0.0313)
Non-trading sector	-0.0265 (0.0386)	-0.0181 (0.0296)	-0.0209 (0.0364)	-0.0137 (0.0291)
Industry:		Manufacturing omitted		
Electricity, gas, water	0.0634 (0.1081)	0.1019 (0.1164)	-0.0096 (0.0841)	0.0271 (0.0852)
Construction	0.0054 (0.0513)	0.0396 (0.0568)	0.0403 (0.0600)	0.0737 (0.0642)
Wholesale and retail	-0.1337** (0.0339)	-0.0968** (0.0292)	-0.1163** (0.0350)	-0.0814** (0.0287)
Hotels and restaurants	-0.1751** (0.0289)	-0.1178** (0.0235)	-0.1655** (0.0268)	-0.1042** (0.0216)
Transport and communication	-0.0732 (0.0569)	-0.0654* (0.0282)	-0.0676 (0.0528)	-0.0548+ (0.0296)
Financial services	-0.1185** (0.0278)	-0.0625+ (0.0351)	-0.1043** (0.0303)	-0.0439 (0.0416)
Other business services	-0.1322** (0.0334)	-0.0962** (0.0247)	-0.1152** (0.0329)	-0.0791** (0.0245)
Education	-0.1215** (0.0242)	-0.0917** (0.0160)	-0.1137** (0.0241)	-0.0831** (0.0162)
Health	-0.0893* (0.0414)	-0.0471 (0.0450)	-0.0874* (0.0400)	-0.0418 (0.0427)
Other community services	-0.1252** (0.0214)	-0.0897** (0.0167)	-0.1240** (0.0197)	-0.0859** (0.0146)
Occupational distribution:		Elementary occupations omitted		
Managers, administrators (prop.)	0.8585** (0.2065)	0.5980** (0.1770)	0.9080** (0.2128)	0.5678** (0.1649)
Professional (prop.)	-0.0179	-0.0959	-0.0595	-0.1453

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Table 11 — continued from previous page.

	(1)	(2)	(3)	(4)
	Marg. effect (SE)	Marg. effect (SE)	Marg. effect (SE)	Marg. effect (SE)
Associate professional, technical (prop.)	(0.1138) -0.0296	(0.0928) -0.1909+	(0.1085) -0.0427	(0.0886) -0.2013*
Administrative, secretarial (prop.)	(0.1163) 0.2639*	(0.1038) 0.1647+	(0.1137) 0.2432*	(0.0986) 0.1307
Skilled trades (prop.)	(0.1191) -0.1875+	(0.0955) -0.2059*	(0.1196) -0.1936+	(0.0888) -0.2131*
Caring, leisure, personal service (prop.)	(0.1108) 0.1491	(0.0905) 0.0967	(0.1140) 0.1415	(0.0859) 0.0984
Sales, customer service (prop.)	(0.1050) 0.0183	(0.0943) 0.0408	(0.1019) -0.0097	(0.0895) 0.0167
Process, plant, machine operatives (prop.)	(0.1182) -0.0795	(0.1073) -0.0994	(0.1109) -0.0942	(0.0983) -0.1151
1998	(0.0992) 0.0313	(0.0807) 0.0068	(0.1000) 0.0355	(0.0759) 0.0126
	(0.0318)	(0.0277)	(0.0302)	(0.0244)

Note: Data from WERS 2004. N=1052. ** p<0.01, * p<0.05, + p<0.10. Weighted estimates using the stratification and workplace weight variables provided by WERS. Marginal effects evaluated at the mean of the dependent variable.

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