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Organizations' Use of Temporary Workers: Its Determinants and HRM Implications

Jyh-Jer Roger Ko
National Sun Yat-sen University

Abstract

This paper draws on theories from organizational analysis, human resource management, and economics to examine the factors that facilitate or impede employers' use of temporary workers. The results show that temporaries are used to achieve staffing flexibility; they are used more by firms which face union pressure; and they are more likely to be used to buffer regular employees against job loss. On the other hand, temporaries are less likely to be employed in jobs where labor costs are high; and they appear not to be used to obtain specialized services.

Keywords: Organizational Analysis, Human Resource Management, Economy.

Introduction

The US public attention has been drawn to the "temping" phenomenon, the growing contingent work arrangements including part-time, temporary, and subcontracting work in workplaces recently. The growing contingent workforce has also become a pressing topic and a main concern of corporate America because they have radically changed the way of labor deployment.

Contingent workers are people with little or no attachment to the organization for which they work. When and how much they work depends on the organization's need. In practice, contingent workers can be hourly part-time employees, temporaries from staffing companies, direct-hire temporaries, workers from leasing companies, or independent short-term contractors (Nollen and Axel 1996). Their work schedule is irregular and usually they have no job security and no contract for

continued employment. Furthermore, contingent workers usually earn less and are less likely to receive fringe benefits than workers in comparable full-time jobs. In particular, temporary workers mostly fit into this situation because in general they lack specialized skill (Callaghan and Hartmann 1991; Hipple and Stewart 1996). Thus, it is important to research the various types of contingent work arrangements and the situation of the contingent work force, but due to the disadvantageous situation of temporary workers and space consideration, this paper focuses on the study of temporary workers only.

Temporary employment has grown rapidly in recent years. Data from the Bureau of Labor Statistics (BLS) for the help supply services (temporary help) industry constitutes a basis for what is known about temporary workers. This industry, which supplies temporary workers to client firms, has been growing very fast. The employment share of the help supply services industry among nonfarm employments rose from below 0.3 to 1.8 percent between 1972 and 1994. The number of workers employed in this industry grew 8.4 times larger between 1972 and 1994 (from less than 214,000 to 2,002,000) (U.S. Department of Labor 1995: 32-33).

Following the rapid growth of temporary employment, there have been some studies about temporary workers, but thus far there are only a few studies examining factors that facilitate or impede employers' use of contingent workers (e.g., Abraham 1990; Abraham and Taylor 1996; Davis-Blake and Uzzi 1993; Harrison and Kelley 1993; Uzzi and Barsness 1998). However, our understanding of the effect of human resource management policies on the use of contingent workers and of the motivations for firms in choosing certain policies has been constrained by three significant problems. First, the above-mentioned works did not exhaust and update the potentially important motivations for using contingent work arrangements, thus I have had only partial understanding about why employers use contingent work arrangements. Second, none of these researchers used data sources including job-, organizational and environmental level data except for Davis-Blake and Uzzi (1993). The lack of job- and firm-level data has limited the ability of researchers to ask even the most basic questions, such as what are the positional and organizational circumstances under which contingent work arrangements emerge and what

conditions govern a particular contingent employment form. Moreover, due to their limitation on data, the linkage between their constructs and the information available from the data was not tight. Third, neglect of some significant statistical problems--such as using a censored sample and neglecting a potential fixed-effects problem--may bias empirical results. This research intends to advance our understanding on factors that facilitate or impede employers' use of temporary workers through correcting these three problems, i.e. by providing comprehensive theoretical arguments, by using appropriate data, and by applying correct statistical methods.

The reasons for using contingent employment have been considered from several perspectives: increasing staffing flexibility (Abraham 1990; Abraham and Taylor 1996; Callaghan and Hartmann 1991), reducing employment costs (Abraham 1990; Callaghan and Hartmann 1991; Davis-Blake and Uzzi 1993; Pfeffer and Baron 1988), acquiring specialized services (Abraham 1990; Abraham and Taylor 1996; Harrison and Kelley 1993), and avoiding unionization (Davis-Blake and Uzzi 1993; Parker 1994; Pfeffer and Baron 1988). In this paper, I would like to propose an often- neglected reason in the literature--buffering regular employees from job loss. This concern arises from seeking an appropriate balance between employers' need for flexibility and employees' need for job security in the design of labor deployment practices (Kochan and Osterman 1994; Morishima 1993; Osterman 1994). Moreover, thus far no research has studied the impact of recent restructuring trends such as downsizing and reengeering upon the use of contingent workers. Considering that the restructuring trend still continues, this neglect will take its toll on our understanding of the temping phenomenon. This research provides comprehensive and updated theoretical arguments and empirical evidence to correct this problem.

An illuminating way to learn why employers use contingent workers is to study the job, organizational and environmental correlates of reasons that have been proposed by major researchers (Abraham and Taylor 1996). Through such analysis, we can obtain a better understanding of what sort of job is more likely to be externalized, what type of organization tends to use contingent workers and what kind of environment paves the way for contingent workers. This research follows such an approach, while updating and exhausting the main reasons for using

temporary workers.

Data used to study factors that affect employers' use of contingent workers were either biased in terms of the sampling frame or limited in scope. This research corrects this deficiency by using an appropriate data set, the National Organizations Study (NOS) (Kalleberg, Knoke, Marsden and Spaeth 1991), which was collected from randomly selected organizations in America in 1991. The data set includes comprehensive establishment-level data on how organizations actually managed contingent workers and on many other human resource management practices. The data set is representative because it is from a nationwide survey and thus can be used to make general conclusions.

Another significant advantage of the NOS survey is that it allows me to conduct a job-level analysis. It is sensible to ask why some jobs are more likely to be externalized than others because organizations externalize some of their jobs rather than entire job clusters. Hence I need to know why certain jobs are externalized when others are not. Furthermore, substantial within-organization variation in human resources management practices exists across jobs. To take that variation and its impacts into consideration, a job-level analysis is necessary.

Although the analysis is conducted on the job level, this job-level data set is constructed from NOS, an organization-level data set. Hence, common organizational characteristics exist across jobs. In this sense, the organizational analysis constitutes a basis for the job analysis. Furthermore, by merging the NOS data with several other major data sources, I can explore the effect of environmental factors upon the use of contingent workers. Integrating these three levels of analysis provides an insightful perspective.

Some studies of contingent employment have applied multivariate analysis to their research; others used logistic regression. Applying logistic regression recognizes the categorical quality of contingent employment practices and has been a significant improvement. However, the problem of using a censored sample--variables whose actual values cannot be observed for a large proportion of the cases--has hardly been recognized. To alleviate this problem, the Tobit model should be applied (Maddala 1983; Winship and Mare 1992). The dependent variable in this research (the proportion of temporary employees) exactly matches the description of

the censored data, so I will apply the Tobit model.

Another often-neglected problem with studies of the contingent works is that observations in the sample might not be independent of each other. This is sometimes termed as the fixed-effects problem. The reason for this problem is that when some jobs are from the same organization, they are unlikely to be independent. As a result, the estimate of the standard error is incorrect (Lunneborg 1994). A corrected procedure is necessary to guarantee correctness of empirical results.

The paper is organized as follows. The next section reviews the literature and discusses the theoretical and empirical expectations surrounding the reasons employers give for using contingent workers. The third section describes data, measures, statistical problems, and the empirical design. The fourth section gives the empirical findings and analysis about the determinants of employers' use of contingent workers. The last section provides a summary and discussion.

Theoretical and Empirical Expectations

There are five main reasons employers give for their use of temporary employment arrangements: to increase staffing flexibility, to reduce labor costs, to acquire specialized services, to avoid unionization, and to buffer regular employees against job loss.[1] In the next several sub-sections, the corresponding job-related, organizational and environmental indicators of each reason are specified and then testable hypotheses are formulated.

1.Increasing Staffing Flexibility

Since the 1980s, new economic conditions have increased the variability and uncertainty in demand for products and services. In order to respond to cyclical or unpredictable variations in demand, employers need freedom to vary the number of work hours and the size of the workforce; this type of flexibility is known as

[1] Besides these five main reasons, there are some other reasons reported by various sources: filling in for absent employees, screening a candidate for future employment, inability to find regular workers and easing management tasks. Due to data limitations, I cannot construct variables for these reasons.

numerical flexibility (Rosenberg 1989; Rubery, Tarling and Wilkinson 1987). In this light, contingent workers are the best choice for employers to achieve numerical flexibility. Employers can add or subtract the number of workers as needed, and thus avoid the added cost of idle people during slack times and the extra cost of overtime during peak periods (Nollen and Axel 1996). Therefore, if an important reason for firms to employ contingent workers is to rapidly adjust the number of workers because of fluctuation in demand, then the number of contingent workers an employer needs would be determined by the size of the workload fluctuations.

Previous research has provided some evidence that higher variation in production and employment levels increase the use of contingent workers. Mangum, Mayall, and Nelson (1985) found that the use of temporary workers was positively associated with the instability of product demand as measured by employment change. Abraham (1990) reported that both the seasonal and cyclical variation in an organization's demand affect the use of temporary workers. Based on the preceding discussion, I predict:

Hypothesis 1: There is a positive relationship between the extent of variation in industrial and organizational employment levels and the extent of using temporary workers.

Pushing decisions to the lower levels can shorten the decision process and thus enhances staffing flexibility. On the other hand, researchers have argued that transformed organizations often build participation and enpowerment into their organizational structure, both by pushing decisions to the lower levels of the organization and by breaking down boundaries across departments through the use of teams (Appelbaum and Batt 1994; Osterman 1994). The use of contingent work arrangements is related to the transformed organizations because the contingent labor force is used to buffer core employees from job loss in such transformed work systems (Osterman 1994). Through these links, I connect the degree of decentralization of decision-making on using contingent work arrangements to the actual use of contingent workers, and predict:

Hypothesis 2: The more decentralized the organizational decision-making structure is, the more likely the organization will employ temporary workers.

2.Reducing Labor Costs

Since the 1980s, new economic conditions have increased the variability and uncertainty in product demand, expanded and internationalized the domain of markets, and influenced firm market shares. These new features of competition in combination with the experience of severe and recurring recession have caused employers to become very sensitive to all types of costs, especially labor-related costs. These factors have pressured organizations to cut labor costs, to achieve greater flexibility in the employment of their workforce, and to change organization boundaries by shifting some costs of production to contingent workers. In this respect, contingent employment arrangements seem to fit employers' broader strategy of cutting labor costs and boosting organizations' competitiveness: contingent workers are less expensive than regular workers because their pay and benefits can be lower (Carre 1992, Parker 1994).

Using contingent workers can save on labor costs in two ways. First, the use of contingent workers can reduce employment costs, such as payroll, fringe benefits expenditures, and training costs. Second, many employers believe that dismissing regular employees and using contingent workers as replacements is the most effective way of reducing costs. Therefore, labor costs related to the use of contingent workers can be studied from these two perspectives: employment costs, and downsizing action.

3.Employment costs

Contingent workers normally receive lower pay than regular full-time employees and are usually excluded from the available fringe benefits. In addition, through contingent employment arrangements, employers can reduce or eliminate overtime and save on expenditures associated with various aspects of employment such as recruiting, training, and even firing workers (Abraham 1990; Appelbaum 1987; Callaghan and Hartmann 1991; Parker 1994). Since data on the cost of other aspects of employment practices were not available, I limit my discussion to training costs only. Therefore, my discussion of employment costs focuses on pay, fringe benefits and training costs.

Pay. A major reason employers hire contingent workers is to minimize

expenses associated with regular workers. Since contingent workers generally receive lower pay than regular employees, employers are tempted to use contingent work arrangements to reduce employment costs if the high pay level of certain jobs has been a main concern.

Research on the earnings of contingent workers has found that contingent workers earn less than regular workers. Using data from the Bureau of Labor Statistics, Callaghan and Hartmann (1991) found that temporary workers earned about 75 to 80 percent of what wage and salary workers earned during the 1980s.

Other researchers also have found a connection between the pay level and use of contingent work arrangements. Studying contracting arrangements in manufacturing industries, Harrison and Kelley (1993) reported that a higher wage level in the work force they studied increased the likelihood of subcontracting. Abraham and Taylor (1996) found that wage saving is a key factor in contracting out tasks in three out of five types of services they studied. Thus, I predict:

Hypothesis 3: The higher the level of pay for a job, the more likely the organization will use temporary employment arrangements.

Fringe benefits. Fringe benefit costs for regular employees are a substantial part of employment costs; thus employers are motivated to avoid fringe benefit costs by using contingent workers. The U.S. Chamber of Commerce's annual employer survey shows that non-wage payroll costs have increased from 28 to 38 percent of total payroll between 1969 and 1989 (cited in Callaghan and Hartmann 1991, p. 26). From BLS data on benefit, wage, and total compensation costs per hour, Callaghan and Hartmann (1991) found that between 1970 and 1991 employers' payments for various fringe benefits grew from 20 to 28 percent of total compensation for employed workers (p. 26).

Some researchers have related fringe benefit costs to the use of contingent workers. Abraham and Taylor (1996) argued that the soaring cost of health insurance during the 1980s may well have strengthened employers' incentives to contract out tasks to firms not offering health benefits. Davis-Blake and Uzzi (1993) found fringe benefits did not affect the use of both temporary workers and independent contractors, but they noted that this finding may be due to their use of an

industry-level fringe benefit measure, which may not be a good indicator of a firm fringe benefits level. In contrast, Mangum, Mayall, and Nelson (1985) reported that firms with higher fringe benefits used more call-ins and temporary-help service employees, whereas they found no effect of fringe benefit levels on the use of direct-hires. Based on the above reasoning, I predict:

Hypothesis 4: The higher the level of fringe benefits in an organization is, the more likely the organization will use temporary workers.

4.Training costs

Facing increasing economic competition and uncertainty, many employers are using job training to cope with rapid changes in technology, industrial restructuring, market conditions, and demographic shifts (Knoke and Kalleberg 1994). Organizational formal training involves human, physical and financial resources; hence expenditure on training constitutes a substantial part of employment costs. In addition, it takes time for employers to recoup training costs. Hence, organizations tend to retain those employees with formal training. Williamson (1979, 1981) offered a similar argument: employers with firm-specific skills will pursue a long-term employment relationship with regular employees to avoid losing the investment in high training costs. Davis-Blake and Uzzi (1993) findings that firm-specific training had a negative effect on the use of temporary workers support this line of argument. I thus infer that if a job involves high training costs, employers will try to retain the regular employees with organizational-specific training and will be less likely to replace the employees with contingent workers; the accompanying hypothesis is:

Hypothesis 5: Jobs involving higher training costs are less likely to be filled by temporary workers.

5.Downsizing (controlling headcount)

For many employers, the fastest and easiest way to reduce costs has been to dismiss workers. At the same time, with several recessions still fresh in their memories, employers are reluctant to hire regular workers. Under such conditions, downsizing has been increasingly used as a strategic move toward cost-saving

(Parker 1993). Although it has not been verified that controlling headcount through the use of contingent workers can save costs, many employers have followed the downsizing trend. They believe that controlling headcount can contain costs and do not consider contingent workers as part of headcount (Nollen and Axel 1996).

One major problem downsizing organizations have to face, especially those which turn to temporary or contract workers as substitutes for regular employees, is that they are most likely to use a considerable number of contingent workers. Nollen and Axel (1996) found that "downsized companies often find themselves in this predicament when large numbers of employees are terminated without controls in place to protect vital jobs and prevent a massive talent drain. Seeking an immediate solution, such companies then bring back former employees and temporaries to fill in the gaps" (p. 43). This measure brings in a work force of so-called "permanent temporaries" (Nollen and Axel 1996: 43). Considering that downsizing organizations use contingent workers to prevent a talent drain, I predict:

Hypothesis 6: Organizations that have downsized within the past year will be more likely to use temporary workers than those that have not downsized.

6.Acquiring Specialized Services

The need for specialized services is another essential reason why organizations adopt contingent work arrangements. Acquiring specialized talent has gained importance in an era of downsizing and restructuring. Organizations may sometimes find that they do not have the specialized equipment or skills in-house needed to produce a product or deliver a service. Therefore, they have to turn to outside providers--either temporary or contract workers--to perform the specialized tasks. The situation can be either due to the considerations concerning the economies of scale in the provision of the specialized services in question (Abraham and Taylor 1996), or due to organizational strategic concerns (Harrison and Kelley 1993). This reason for using contingent workers includes two organizational correlates: economies of scale, and product/service diversity.

7.Economies of scale (establishment size)

Contracting arrangements for a particular job may indicate that an organization

cannot economically maintain the specialized equipment or skills in-house. In addition, firm size is sometimes used to indicate the extent of economic scale. Therefore, small organizations would be more likely to contract out for this reason (Abraham and Taylor 1996). Harrison and Kelley (1993) held a similar argument regarding subcontracting behavior in terms of their machining production sample, but their indicator of the scale of machining operations is employment in those occupations at the establishment, which is different from establishment size. Although both arguments are focusing on contracting arrangements, similar reasoning can be applied to temporary workers. Because large firms have a larger pool of employees than small firms, they are likely to have employees available to meet temporary skill or service needs.

The argument that large organizations are less likely than small organizations to use temporary workers has been partially supported by past research. Davis-Blake and Uzzi (1993) reported that larger establishments were less likely to use temporary workers than small ones. In contrast, Mangum, Mayall, and Nelson (1985) reported that large organizations were more likely than small organizations to use temporary workers, based on a bivariate relationship.

Based on economies of scale, I infer that:

Hypothesis 7: Larger organizations should be less likely to employ temporary workers.

8.Product/service diversity

As product/service diversity increases, the employer will be more likely to encounter the need for greater capacity or for more specialized skills or tools that cannot be easily accessed in-house. Outside subcontractors may have specialized skills or equipment that the organization needs. Therefore, product/service diversity increases the likelihood of subcontracting out (Harrison and Kelley 1993). Harrison and Kelley (1993) verified this argument in their empirical study on manufacturing industries. Jobs requiring specialized skills or equipment generally involve high complexity. Specialized subcontractors might be able to meet the job requirements, but temporary workers are less likely to fit into such jobs. Davis-Blake and Uzzi (1993) found that temporary workers usually fill in low skill jobs. Thus, I infer that

the impact of product/service diversity upon the use of temporary and subcontracting workers will be different and predict:

Hypothesis 8: The greater an organization's diversity of product/service, the less likely it is that the employer will use temporary workers.

9.Avoiding Unionization

One main argument on the effect of unionization upon the use of contingent workers is that of union avoidance. While public discussion did not pay much attention to it, supposedly one of the main reasons for the use of contingent work arrangements is to allow organizations to remain union-free or to weaken incumbent unions. It is generally believed that contingent workers are difficult to organize because many contingent workers either do not stay with the same employer for extended periods, or because they work for more than one employer, conditions that leave them at a disadvantage in organizing and mobilizing collective action for their own welfare. Moreover, contingent workers are generally separated from and excluded by the regular employees because some employers use contingent workers to put pressure on regular employees (Parker 1994; Pfeffer and Baron 1988). Hence employers can hamper unions through contingent work arrangements since contingent workers are inherently more difficult to organize and are often in tension with the organized regular employees.

This line of reasoning implies a positive relationship between the use of contingent workers and the intensity of union pressure, because as union pressure increases, employers are more likely to utilize contingent workers to remain union-free or to weaken incumbent unions. Based on this discussion, I predict:

Hypothesis 9: The intensity of union pressure in an organization will be positively associated with the organization's use of temporary workers.

10.Buffer Regular Employees Against Job Loss

Some researchers claimed that in spite of employers' strong need for flexibility, employees' need for security has aroused public concern and has become an issue that cannot be neglected by employers. The appropriate balance between flexibility and security in the design of labor deployment practices is an issue of increasing

importance (Abraham and McKersie 1990; Kochan and Osterman 1994). I would like to perceive this problem from several aspects.

(1)Internal labor market system

If I describe the traditional employment system--the so-called internal labor market (ILM) system, which emphasizes mutual obligation and job securitys the internalization of employment, the new flexible work arrangements are moving toward externalization by substituting market-mediated work arrangements for the internalized ones. Morishima (1993) claimed that firms may pursue both internalization and externalization policies simultaneously by considering relative benefits and costs of each policy. He argued that the benefits employers can receive from regular employees are the reason why employers want to increase the use of contingent workers. The benefits of internalization are numerous and include a trained and skillful workforce, reduction of monitoring costs, less union-management conflict, motivated and committed employees, and flexibility in job assignments and transfers. However, maintaining these benefits is quite costly. The costs of internalization practices include higher wages, fringe benefits, and training costs, lack of flexibility in labor deployment, and slowness in obtaining firm-specific skills. Therefore, the more intense the internalization practices are, the higher the cost of maintaining them. Morishima argued that the cost of internalization could be recuperated through the use of contingent workers and reported that some firm-specific internalization practices were related to a higher proportion of contingent workers. I thus infer:

Hypothesis 10: Jobs with more ILM features are more likely to be filled by temporary workers than jobs with less ILM features.

(2)Screening requirements

Some researchers of labor markets have suggested that an employer selects new employees partly based on the possibility that they will remain with the organization long enough to repay organizations= investment on firm-specific and formal training (Stiglitz 1975; Thurow 1975). Under such consideration, it is reasonable for employers to be highly selective in hiring and providing proper job training. Furthermore, employers will retain employees with firm-specific

training and are likely to hire temporary workers to protect these employees from losing their jobs. Based on the above discussion, I infer:

Hypothesis 11: Jobs requiring more intensive screening requirements are more likely to use temporary workers to protect those internalized employees.

(3)Formalization

Formalizing employment practices is another way employers guarantee regular employees a secure job future with the organization (Kalleberg, Marsden, Knoke, and Spaeth. 1996). Therefore, the higher the level of formalization is, the stronger the employers' intention to protect regular employees will be. Increasing the use of contingent workers would be a viable option to employers for accomplishing this purpose. I thus predict:

Hypothesis 12: There is a positive relationship between the level of formalization of employment practices (or the level of job security) and the extent of using temporary workers.

Methods

1.Data

The main data used in this research come from the 1991 National Organizations Study (NOS) (Kalleberg, Knoke, Marsden and Spaeth 1991), which consists of data on 727 employers of the respondents and their spouses in the 1991 General Social Survey (GSS). The NOS concentrated on the establishments' human resources policies and practices. Items asked about current staffing procedures, internal job ladders and promotion chains, job training programs, and employee benefits and incentives. Additional items gathered basic information about each organization's formal structures, social demography, environmental situation, and productivity and performance.

2.Unit of Analysis

In order to take the job heterogeneity in the NOS into consideration, I created a

job level data set which concatenated information of the three jobs, core, GSS and managerial jobs, which were collected by the same sequence of questions. By doing so, I transformed the organizational data set into a job-level data set and made *job* the unit of analysis in this research. As a result of this procedure, the sample size was increased from 727 to 1701. However, because there was overlap among the core, GSS, and managerial jobs in some organizations, the three types of job were not evenly distributed in the job-level data set. Among the 1701 jobs, 717 (42%) of them are core jobs; 378 (22%) of them are GSS jobs; and 606 (36%) of them are managerial jobs.

3.Measurement

Variables used can be broadly divided into dependent and independent variables. For analytical purposes, independent variables were further classified into two categories, study and control variables. Table 1 reports the definitions, means, and standard deviations of all the variables used in this paper by three levels--job, organizational and environmental.

4.Dependent variables

The extent of using temporary workers was examined at the job level of analysis. This measure of temporary work arrangement is based on the question repeated for three jobs: about what percentage (of CORE, GSS or MANAGERIAL workers) were temporaries?"

5.Independent variables

Independent variables are divided into two groups: study and control variables.

(1)Study Variables:

Five sets of variables will be constructed to measure job, organizational, and environmental indicators of the following four reasons for using contingent workers: increasing staffing flexibility, reducing labor costs, acquiring specialized services, avoiding unionization, and buffering regular employees from job loss.

(a)Increasing staffing flexibility. *Organizational variation in employment* was measured as the standard deviation in an organization's employment of full-

timers and part-timers within the past one and three years. *Industrial variation in employment* was measured as the coefficient of variation of monthly employment in various industries over the period from 1989 to 1990. The data come from the BLS Employment and Earnings.

(b)Reducing labor costs. Three measures of employment costs are constructed. The *pay level* of a job is what most persons in that job earned annually in the organization. *Fringe benefits* is a scale based on 13 items of various benefits including medicare, dental care, life insurance, sick leave, maternity leave, elderly care, flexible hours, cash or stock bonus, pensions, profit-sharing, drug and alcohol abuse programs, disability insurance, and child care. *Training costs* is a logged expenditure measure representing the training budget divided by the number of persons trained.

Two binary indicators of *downsizing* are used: if an organization has ever cut the number of full-time or part-time employees within the last year, then it is considered a downsizing organization.

(c)Acquiring specialized services. *Organizational size* is defined as the natural log of an establishment's full plus part-time employees. The indicator of *product/service diversity* is based on employers' evaluations of their organizations' performance in developing new products, services or programs.

(d)Avoiding unionization. No specific NOS survey item asked informants to estimate the degree to which the workforces in their establishment were organized by trade unions. Several items that did appear in the survey, however, are indicative of the presence of organized labor, and these were combined into a *union pressure* scale[2]. These indicators are well correlated with one another, so the scale has an estimated reliability (Cronbach's alpha) of 0.82.

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[2] Marsden, Cook and Knoke (1996) inferred the presence of a union when informants told interviewers that formal training was offered by virtue of provisions in union contracts; when union negotiations were said to be an important criterion in the determination of earnings of core or GSS employees; or when it was anticipated that union relations would be a problem for the establishment over the three-year term. These indicators were combined into the *union pressure* scale

(e)Buffering regular employees against job loss. *Internal labor market* (*ILM*) is an indicator to show if the job has a job ladder and a "promotion from within" policy. *Formalization* of employment practices was measured as a mean score for the number of types of written documents, including employment contracts, rules-and-procedures manuals, hiring and firing procedures, safety and hygiene documents, and fringe benefits documents. This scale has an estimated reliability (Cronbach's alpha) of 0.80. Intensity of *screening* is a scale based on five selection methods including intelligence tests or other psychological tests, skill or proficiency tests, letters of reference, physical examination and drug or alcohol tests. The Cronbach's alpha of this scale is 0.66.

(2)Control variables:

Several variables were included to control for human capital, occupational, organizational, governmental, industrial, and geographic factors that were likely to affect the use of contingent workers.

In this research, human capital variables are features of a job (rather than of a current employee) since only job information was available in the NOS data. In order to control for gender effect, the percentage of female employees of a certain job is included. To control for the effects of skills required to perform a job, several measures of occupational complexity from the Dictionary of Occupational Titles (DOT) were combined to create the job complexity measure.

Whether an organization is profit or nonprofit could cause fundamental differences in practice patterns. To control for organizational type, I included an indicator variable for nonprofit organizations.

Organizations regulated by the government ought to be responsive to the concerns of the government. Government agencies have become more concerned about the well-being of contingent workers recently (Belous 1989; Davis-Blake and Uzzi 1993). A scale measuring the intensity of governmental regulation was used to control for the effect of governmental regulation upon the use of contingent workers.

Some researchers (Abraham 1988, 1990; Abraham and Taylor 1996; Davis-

Blake and Uzzi 1993; Mangum, Mayall, and Nelson 1985) have suggested that the use of contingent workers varies by occupation, industry, and region. Using 1980 Census occupation codes, six binary variables for occupational categories were created: (1) managerial, (2) professional and technical, (3) sales and administrative support, (4) service, (5) precision production, craft, and repair, and (6) operator, fabricator, laborer, farming and fishing. Binary variables for nine industries were created based on three-digit SIC codes: (1) agriculture, forestry and mining, (2) manufacturing, (3) construction, (4) infrastructural activities (transportation, communication, and utilities), (5) trade (wholesale and retail), (6) finance, insurance, and real estate, (7) professional services, (8) personal services, (9) public administration.

To control for regional effect, four regional binary variables were added to the models: East, West, South, and Midwest (which serves as the omitted category).

6.Missing Values

In order to preserve cases, I replaced missing values of these variables with the means of nonmissing values. However, if cases had missing values on the dependent variables, they were dropped from an equation.

7.Statistical Methods

One problem that has not been commonly recognized in research on contingent employment is the censored dependent variable problem--variables whose actual values are not observed for a large proportion of the cases. One of the dependent variables in this research, the proportion of temporary workers in a particular job, is censored. A Tobit analysis is thus appropriate for these data because some of the jobs had been filled with varying levels of temporary workers--some had no temporary workers at all; some used exclusively temporary workers; others were in between. Thus, the cases without any temporaries were censored on the dependent variable (intensity of temporary employment) because they might fall below the value necessary to be recorded. Zero was designed as the lower limit for this type of dependent variable. In contrast, cases solely filled by temporary workers were censored on the dependent variable at one because their actual values might go

beyond one. Hence, unity was designated as the upper bound for this dependent variable. I used the two-limit Tobit model, since the dependent variable was censored from both sides (Long 1997; Maddala 1983; Winship and Mare 1992).

Analysis

Table 1 reports the definitions, means, and standard deviations of the variables used in this paper. Pooling all jobs together, I found that 7 percent of the jobs could be filled with temporary workers for these organizations. The mean percentage of temporary employees for all kinds of jobs was 2 percent. Table 2 presents the Tobit results on the determinants of extent of using temporary workers. Each model is associated with a particular perspective. The perspectives and the corresponding model titles are "Increasing Staffing Flexibility" (Model 1), "Reducing Labor Costs" (Model 2), "Acquiring Specialized Services" (Model 3), "Avoiding Unionization" (Model 4), "Buffering Regular Employees Against Job Loss" (Model 5), and an integrative model (Model 6).

Before analyzing the Tobit results, I applied likelihood-ratio tests to assess the contribution of each set of variables, which correspond to a particular perspective, to the explanatory power of the full model. To attain this purpose, I constrained the coefficients of each set of variables to zero alternately. Likelihood-ratio tests on the net effect of the five sets of variables indicate that each makes a significant contribution to the explanatory power of the perspective: the model chi-square values are 16.98 (p-value = 0.002), 17.48 (p-value = 0.004), 12.18 (p-value = 0.002), 2.73 (p-value = 0.099), and 16.22 (p-value = 0.001) respectively.

In Table 2, each model includes the group of study variables associated with a particular perspective and the control variables. Based on the results from the table, I found the following results.

1.Determinants of the Extent of Employers' Use of Temporary Workers

Employers use contingent workers to increase staffing flexibility, to reduce labor costs, to acquire specialized services, to avoid unionization, and to buffer

Table 1 Descriptive Statistics and Correlations

Variable	Mean	s.d.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. % of temp	.02	.12															
2. Industrial employment variation	.10	.23	-.01														
3. Full-time employment variation	7.44	16.58	.01	-.01													
4. Part-time employment variation	5.42	15.31	.06*	.00	.08**												
5. Decentralization	3.52	1.31	.03	-.09**	.06*	-.04†											
6. Log (mode of earnings)	10.15	.68	-.13**	.00	.02	-.08**	.12**										
7. Fringe benefits	.58	.23	-.06**	-.14**	-.00	-.05†	.17**	.32**									
8. Training cost	4.56	2.89	-.03	-.15**	.04†	-.02	.14**	.19**	.54**								
9. Downsizing full-time employees	.23	.42	-.05*	.02	.04*	.00	.07**	.07**	.15**	.14**							
10. Downsizing part-time employees	.09	.28.	-.01	-.06*	.00	.13**	.06*	-.02	.05*	.04†	.15**						
11. Log (size)	4.51	2.23	-.04*	-.13**	-.05*	-.05*	.38**	.27**	.62**	.46**	.16**	.11**					
12. Product diversity	1.00	.78	-.05*	-.05*	.09**	.05*	.05†	.05†	.16**	.13**	-.04	-.01	.13**				
13.Union pressure	.34	.26	.04*	.01	-.03	-.03	.01	.01	.21**	.17**	.14**	.03	.22**	-.02			
14. ILM	.62	.40	-.07**	-.07**	-.01	-.06*	.16**	.26**	.51**	.38**	.14**	.08**	.53**	.06**	.05*		
15. Formalization	.71	.30	-.03	-.12**	.00	-.05*	.08**	.23**	.65**	.51**	.14**	.04†	.63**	.16**	.20**	.48**	
16. Screening	.22	.26	.02	-.10**	-.04†	-.02	.16**	.10**	.31**	.27**	.03	.04	.40**	.04†	.14**	.24**	.36**

† p<.10; * p <.05; ** p<.01

regular employees from job loss. Based on the results from Model 1 through Model 6 in Table 2, I had the following findings:

Table 2 The Determinants of the Intensity of Employers' Use of Temporary Workers by Perspective: Tobit Models

Study variables	Model 1 ß (s.e. (ß))	Model 2 ß (s.e. (ß))	Model 3 ß (s.e. (ß))	Model 4 ß (s.e. (ß))	Model 5 ß (s.e. (ß))	Model 6 ß (s.e. (ß))
Staffing Flexibility						
Industrial employment	-.156					-.137
Variation	(.270)					(.283)
Organizational	-.003					-.002
variation of employment	(.003)					(.003)
(full-time)						
Organizational variation of	.005*					.005*
employment (part-time)	(.002)					(.002)
Decentralization	.117***					.130***
	(.034)					(.038)
Labor Cost						
Mode of earnings		-.152**				-.153**
		(.055)				(.055)
Fringe benefits		.171				-.152
		(.219)				(.268)
Training Cost		-.023				-.037*
		(.016)				(.017)
Downsizing full-time		-.044				-.108
employees		(.100)				(.103)
Downsizing part-time		.259*				.182
employees		(.131)				(.129)
Specialized Services						
Size			.031			-.035
			(.021)			(.030)
Product diversity			-.157**			-.166**
			(.051)			(.053)
Avoiding Unionization						
Union pressure				.265		.319†
				(.183)		(.193)
Buffering Regular Employees						
ILM					.014	.089
					(.114)	(.122)
Formalization					.129	.585**
					(.180)	(.219)
Screening					.422**	.374*
					(.166)	(.167)

Study variables	Model 1 ß (s.e. (ß))	Model 2 ß (s.e. (ß))	Model 3 ß (s.e. (ß))	Model 4 ß (s.e. (ß))	Model 5 ß (s.e. (ß))	Model 6 ß (s.e. (ß))
Control variables						
Core job	.117	.095	.110	.098	.075	.059
	(.089)	(.089)	(.090)	(.089)	(.091)	(.090)
Job complexity	-.012	-.012	-.011	-.014	-.014	-.012
	(.011)	(.012)	(.011)	(.011)	(.012)	(.012)
Percentage of females	.003**	.002†	.003**	.003**	.003*	.002†
	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)
Nonprofit	.147	.208†	.131	.168	.132	.092
	(.117)	(.119)	(.121)	(.117)	(.122)	(.123)
Governmental regulation	.041	.048	.029	.023	.009	.024
	(.038)	(.039)	(.038)	(.038)	(.039)	(.040)
Occupation						
Managerial	-.602**	-.556**	-.649**	-.582**	-.590**	-.594**
	(.221)	(.222)	(.224)	(.220)	(.228)	(.225)
Professional, and technical	-.033	.043	-.074	-.035	-.027	.001
	(.186)	(.188)	(.191)	(.188)	(.190)	(.189)
Sales & administrative	.095	.062	.023	.039	.059	.072
support	(.152)	(.154)	(.152)	(.153)	(.155)	(.154)
Service	.090	.054	.015	.038	.031	-.041
	(.163)	(.164)	(.164)	(.164)	(.166)	(.165)
Precision, craft, and repair	.165	.154	.122	.119	.131	.168
	(.163)	(.165)	(.163)	(.163)	(.166)	(.163)
Operator, etc (omitted)						
Industry						
Construction	.141	-.190	-.039	-.067	.095	.180
	(.267)	(.218)	(.219)	(.208)	(.221)	(.286)
Communication, transport	.011	-.128	-.009	-.046	-.056	.011
& utility	(.176)	(.180)	(.179)	(.176)	(.183)	(.183)
Trade	-.124	-.327†	-.168	-.186	-.093	-.084
	(.170)	(.176)	(.172)	(.169)	(.174)	(.178)
Finance, insurance, real	-.240	-.261	-.108	-.221	-.130	.042
estate	(.248)	(.248)	(.244)	(.243)	(.248)	(.252)
Professional service	.233	.073	.182	.164	.201	.293
	(.171)	(.173)	(.173)	(.170)	(.176)	(.181)
Personal service	.378**	.287†	.419**	.341*	.436**	.517**
	(.154)	(.160)	(.163)	(.154)	(.164)	(.170)
Public administration	-.150	-.340	-.198	-.226	-.216	-.013
	(.248)	(.246)	(.246)	(.245)	(.254)	(.252)
Manufacturing (omitted)						
Area						
East	-.160†	-.182*	-.168†	-.174†	-.165†	-.114
	(.093)	(.094)	(.093)	(.093)	(.095)	(.093)

Study variables	Model 1 ß (s.e. (ß))	Model 2 ß (s.e. (ß))	Model 3 ß (s.e. (ß))	Model 4 ß (s.e. (ß))	Model 5 ß (s.e. (ß))	Model 6 ß (s.e. (ß))
South	-.205†	-.238*	-.214†	-.216†	-.209†	-.192
	(.119)	(.120)	(.118)	(.119)	(.120)	(.121)
West	.069	.079	.074	.070	.086	.090
	(.111)	(.112)	(.111)	(.111)	(.112)	(.112)
Midwest (omitted)						
N	1668	1668	1668	1668	1668	1668
-2 log likelihood	672.263	676.820	678.948	688.097	680.544	631.217
$\chi 2$ (df)	152.12***	147.56***	145.43***	136.29***	143.84***	193.16***
	(24)	(25)	(22)	(21)	(23)	(35)
Psuedo R2	0.185	0.179	0.176	0.165	0.175	0.234

† p<.10; * p<.05; ** p<.01; *** p<.001.

Tobit regression coefficients are reported. Standard errors are in parentheses. The two-sided t-test was applied to test all variables.

2.Increasing staffing flexibility

As predicted, organizational fluctuation of part-time employment was important for explaining the extent of using temporary workers and had a significant positive association with the extent of use. Here, the role played by temporary workers in adjustment to organizational employment variation was similar to the typical buffer story which predicted that organizations with seasonal or cyclical demand would use more contingent workers during peak periods. This finding also implies that in deciding the degree of temping for a particular job, employers resort to past experiences of employing part-time workers. The highly significant and positive coefficient of decentralization indicator supports the hypothesis that the more decentralized the organizational decision-making on using contingent workers is, the more likely the organization will employ temporary workers.

3.Reducing labor costs

Contrary to usual predictions, employment costs such as the pay level and training cost had a negative effect on the use of temporary workers, while the fringe benefits' measure and the downsizing indicators were not significant predictors. This result did not support the common argument that the primary motivation for using contingent workers was to save on employment costs; otherwise, the increase of costs should have driven employers to use more temporary workers. One

possible interpretation of these negative coefficients is that many of the jobs analyzed were central to the organizational success and were performed by workers who are more difficult to replace. If employers have invested high costs in rewarding and training such employees, they are less likely to replace those employees with contingent workers.

As predicted, one of the downsizing indicators, organizations having downsized their part-time employees, was once strongly related to the use of temporary workers. The positive coefficient here showed that organizations which had laid off part-time workers were more likely to use temporary work arrangements.

4.Acquiring specialized services

As anticipated, product diversity had a significant negative effect on the extent of using temporary workers. One interpretation is that product/service diversity creates the need for specialized expertise which generally involves high complexity, but temporary workers were less likely to fit into such jobs because in general they lacked the necessary specialized skill. This finding supplemented Davis-Blake and Uzzi (1993) findings that temporary workers usually filled jobs low in skills.

5.Avoiding unionization

Union pressure, as anticipated, had a positive effect on the extent of using temporary workers. This evidence supported the union avoidance argument, i.e., as the union pressure increased, employers were more likely to use temporary workers to remain union-free or to weaken existing unions.

6.Buffering regular employees

Intensity of screening, and formalization of employment practices, all had very positively significant effects upon the extent of using temporary workers; these confirmed Hypotheses 11 and 12. This result is consistent with the finding of staffing flexibility. They all suggest: if employers have committed to internalize regular employees, they were more likely to use temporary workers as a buffer to protect these regular employees from economic fluctuation. This finding is interesting because it confirms the theory concerning the buffer role played by the contingent workers.

7.Control variables

In general, control variables had the expected signs, though some of them were not statistically significant. Occupation generally had no effect on the use of temporary workers except for the managerial occupation that also served as the managerial job indicator. Moreover, the highly significant and negative coefficient of the managerial job indicator indicated the extremely low usage of temporary work arrangement for managerial jobs. The higher the percentage of female workers for a job, the more likely the job will be filled with temporary workers. Temporary work arrangements were more frequently used in personal service than in manufacturing industries.

In order to assess the robustness of the results, I conducted one additional analysis. One problem with a sample like the NOS is that observations in it might not be independent of each other. This problem is sometimes termed as the fixed-effects problem. This problem arises because some jobs in the NOS sample are from the same organization, so they are unlikely to be independent. As a result, the estimate of the standard error is incorrect (Lunneborg 1994). One solution to this problem would be to estimate models using robust (corrected) standard errors based on Huber=s (1967) and White=s (1980, 1982) formula.

A robust regression procedure was used to remedy this problem. Stata 5.0 provides a ROBUST regression procedure which uses the Huber/White estimator of variance to replace the traditional calculation. This ROBUST command combined with the CLUSTER command provides consistent estimates of standard errors even if sampling is clustered or the data are weighted (see Stata Reference Manual, Release 5). The comparison between corrected and uncorrected results regarding the determinants of extent of using temporary workers is displayed in Column 1 and 2 of Table 3.

Comparing Column 1 and 2, I found that after applying the corrective procedure, almost all the variables in the equation behaved in the same pattern as before, except for a couple of minor changes, such as the increasing significance of the union pressure scale and the percentage of female workers in a job, and the decreasing significance of the managerial job indicator and the personal service industry indicator. The result indicated no fixed-effects problems and confirmed the

robustness of the empirical results.

Table 3 The Determinants of the Intensity of Employers' Use of Temporary Workers: Tobit Results Corrected for the Fixed-effects

Study variables	Model 1 Full model ß (s.e. (ß))	Model 2 Corrected for Fixed-effects ß (s.e. (ß))
Staffing Flexibility		
Industrial employment variation	-.137	-.137
	(.283)	(.268)
Organizational variation of employment	-.002	-.002
(full-time)	(.003)	(.003)
Organizational variation of employment	.005*	.005*
(part-time)	(.002)	(.002)
Decentralization	.130***	.130***
	(.038)	(.034)
Labor Cost		
Mode of earnings	-.153**	-.153**
	(.055)	(.060)
Fringe benefits	-.152	-.152
	(.268)	(.258)
Training Cost	-.037*	-.037*
	(.017)	(.017)
Downsizing full-time employees	-.108	-.108
	(.103)	(.096)
Downsizing part-time employees	.182	.182
	(.129)	(.129)
Specialized Services		
Size	-.035	-.035
	(.030)	(.028)
Product diversity	-.166**	-.166***
	(.053)	(.050)
Avoiding Unionization		
Union pressure	.319†	.319*
	(.193)	(.154)
Buffering Regular Employees		
ILM	.089	.089
	(.122)	(.130)
Formalization	.585**	.585*
	(.219)	(.234)

Study variables	Model 1 Full model ß (s.e. (ß))	Model 2 Corrected for Fixed-effects ß (s.e. (ß))
Screening	.375*	.375*
	(.167)	(.172)
Control variables		
Core job	.059	.059
	(.090)	(.080)
Job complexity	-.012	-.012
	(.012)	(.010)
Percentage of females	.002	.002*
	(.001)	(.001)
Nonprofit	.092	.092
	(.123)	(.133)
Governmental regulation	.024	.024
	(.040)	(.041)
Occupation		
Managerial	-.594**	-.594*
	(.225)	(.230)
Professional, and technical	.001	.001
	(.189)	(.163)
Sales & administrative support	.072	.072
	(.154)	(.143)
Service	-.041	-.041
	(.165)	(.152)
Precision, craft, and repair	.168	.168
	(.163)	(.171)
Operator, farmer & laborer (omitted)		
Industry		
Construction	.180	.180
	(.286)	(.289)
Communication, transportation & utility	.011	.011
	(.183)	(.186)
Trade	-.084	.084
	(.178)	(.212)
Finance, insurance, & real estate	.042	.042
	(.252)	(.246)
Professional service	.293	.293
	(.181)	(.201)
Personal service	.517**	.517*
	(.170)	(.210)

Study variables	Model 1 Full model ß (s.e. (ß))	Model 2 Corrected for Fixed-effects ß (s.e. (ß))
Public administration	-.013	-.013
	(.252)	(.247)
Manufacturing (omitted)		
Area		
East	-.114	-.114
	(.093)	(.103)
South	-.192	-.192
	(.121)	(.134)
West	.090	.090
	(.112)	(.124)
Midwest (omitted)		
N	1668	1668
-2 log likelihood	631.217	631.217
Psuedo R2	0.234	N.A.

† p<.10; * p<.05; ** p<.01; *** p<.001.

Tobit regression coefficients are reported. Standard errors are in parentheses. The two-sided t-test was applied to test all variables.

Summary and Discussion

This paper draws on theories from organizational analysis, human resource management, and economics to examine the factors that influence US employers' use of temporary workers. The objective of this paper is to explain how the use of temporary workers allows employers to achieve staffing flexibility, lower labor costs, obtain specialized services, deal with union pressure, and buffer regular employees from job loss. To test these hypotheses, I identify features of jobs, organizations, and environments which are likely to predict the extent of using temporary workers. This research tries to complete theoretical arguments, improves the research methods and data quality, and provides robust and clear-cut empirical results.

The results pertaining to the use of temporaries are mixed with respect to the main hypotheses. Evidence shows that temporaries are used to achieve staffing flexibility that is provided by part-time workers and that is facilitated by higher

degree of decentralization on the decision making of using contingent workers; they are used more by firms that face union pressure; and they are used more to protect regular employees from job loss, if employers have increased the intensity of screening and formalizing regular employees to improve their commitment. On the other hand, temporaries are less likely to be employed in jobs where labor costs such as pay and training cost are high; and they appear not to be used to obtain specialized services, because in general temporaries lacked such specialized skills.

One of the findings is particularly noteworthy: the results regarding staffing flexibility and buffering employees from job loss are quite consistent--they all suggest that if employers have committed to internalize regular employees, they are more likely to use temporary workers as a buffer to protect these regular employees from economic fluctuation. Osterman (1994) ascribed the buffer role of contingent workers to the nature of transformed organizations. He argued that protection of core employees is more important in transformed work systems than in traditional work settings because these workers possess higher skill levels and because greater security is necessary to obtain their cooperation in flexible job assignments. Therefore, organizations use contingent workers to buffer their core employees from economic fluctuation (Osterman 1994). Moreover, a multi-skilled work force is valuable to a transformed organization and it takes time for employers to recoup training expenditure; thus organizations tend to retain those employees with firm-specific training. This latter argument is also verified by the findings regarding employment costs in this research. Although Osterman's argument is quite persuasive, data used in this research did not allow me to identify which firms were transformed organizations. To identify this connection requires a more comprehensive data set.

The above findings provide some practical implications for organizations' human resources management practices, particularly for contingent labor deployment, and supply robust evidence for further theoretical development. However, there are a couple of points need to be noted: First, the data set used in this research was not designed to study the use of contingent workers, therefore some crucial aspects about the use of contingent work arrangements were not available. This problem suggests that more representative and systematic data need to be collected in order to advance

our understanding about the contingent work world. Second, this research studied the causes of organizations' use of temporary employment, but did not explore labor market consequences of such employment practice due to lack of data sets which match employers' information with employees'. This is definitely a very urgent and promising field to be researched considering the rapid growth of the contingent workers.

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