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FLEXIBLE STAFFING ARRANGEMENTS AND EMPLOYERS' SHORT-TERM ADJUSTMENT STRATEGIES

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Abstract

This paper reports new evidence from a survey of over 400 U.S. employers concerning their use of temporary and on-call workers. More than 90 percent of responding organizations reported reliance on these flexible staffing arrangements. They accounted for an average of 1.5 percent of total labor input at user organizations during 1985; at some organizations, they accounted for 10 percent or even 20 percent of total labor input. Four-fifths of survey respondents indicated that flexible staffing arrangements play an important role in absorbing workload fluctuations. Moreover, organizations with highly seasonal or highly cyclical demand made significantly greater use of flexible staffing arrangements during 1985 than organizations with less seasonal or less cyclical demand. The use of flexible staffing arrangements appears to be a more important component of employers' short-term adjustment strategies than has previously been recognized.

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I. Introduction

Any viable enterprise must somehow accomodate uncertainty and flux in both output and input markets. In this paper, I explore the use of a hitherto largely neglected mechanism for accomplishing this: the use of workers who provide their services only on an as-needed basis. Reliance on this sort of flexible staffing arrangement offers employers an alternative to adjusting hours, adjusting the size of the regular workforce, and/or using inventories as a buffer, approaches that have been the focus of a considerable body of earlier work.[1] I conclude that the use of flexible staffing arrangements constitutes an important component of many U.S. employers' short-term adjustment strategies.

There are at least two sorts of fluctuations that may lead employers to use flexible staffing arrangements. First, if demand varies from period to period, it may make sense to cover some part of peak demand with flexible staffers. Second, it may be appropriate to rely in part on flexible staffing arrangements to deal with labor supply fluctuations due to absences, vacations, leaves, and so on. Section II develops two simple models designed to illustrate how demand variability and the existence of a stochastic component in regular employees' labor supply affect employers' optimal staffing strategies and, in particular, create a motivation for using flexible staffing arrangements. Empirical

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[1] Most of this earlier work has been concerned with firms' responses to fluctuations in product demand. Hart (1984) discusses the choice between hours adjustment and employment adjustment, and also cites numerous other studies; see particularly Nickell (1978). Medoff (1979) discusses the allocation of the burden of adjustment to downturns across layoffs, quits and hours reductions in union and nonunion settings. Topel (1982) analyzes the strategic use of inventories as an alternative to varying employment and/or hours.

evidence on the use of agency temporaries, short-term hires and on-call workers from a new survey of over four hundred U.S. employers is presented in Section III. This survey yields unique evidence on the use of these flexible staffing arrangements, on employers' reasons for relying on flexible staffers and on the organizational characteristics associated with flexible staffing use. The survey results support the conclusion that, in the United States, flexible staffing arrangements play an important role in the short-run adjustment process.

In recent years, considerable attention has been given to what anecdotal evidence suggests is an increasing reliance on nonstandard employment relationships by many U.S. employers. While this paper does not speak directly to the question of how and why the use of flexible staffing arrangements has changed over time, it does provide a benchmark for future investigations. Section IV summarizes the paper's main conclusions and suggests some directions for future research, including some thoughts on the changing pattern of flexible staffing use.

II. Models of Employers' Staffing Decisions

The two simple models presented in this section of the paper provide a starting point for thinking about the role of flexible staffing arrangements in employers' overall staffing strategies. In the first model, demand varies and employers cover peak demand with workers who provide their services on an as-needed basis.[2] In the second, the existence of a stochastic element in the labor supply of workers hired

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[2] This model is much in the spirit of Piore (1980), who suggests that different employment arrangements are likely to evolve to cover the stable and the unstable components of demand.

on long-term contracts (vacations, leaves, etc.) provides the motivation for using flexible staffers. Both models imply that flexible staffing arrangements should be an important component of many employers' cost-minimizing staffing plans and suggest several factors that should influence the extent to which they are relied upon. At the end of the section, I briefly discuss how allowing for alternatives to the use of flexible staffers affects these models' implications.

The partial equilibrium nature of the analysis undertaken here should be stressed from the outset. In the models that follow, the relative costs of employing workers under alternative arrangements are taken as fixed. While these models capture important features of individual employers' decisions regarding the use of flexible staffing arrangements, a full understanding of the evolution of flexible staffing patterns will eventually require consideration of the overall demand for different sorts of workers and the supply of labor to different sorts of jobs.[3]

Stochastic Demand for Output

Variability in product demand is one potentially important motivation for using flexible staffing arrangements. This can be illustrated in the context of a simple model of a cost-minimizing firm. Each period, this firm produces output x, where x is distributed as f(x). Ignoring discounting, actual output may be thought of as either unpredictable (each period's output drawn from the same f(x)

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[3] In a perfectly competitive labor market in which the workers' preferences for stable versus unstable work were static and firms' flexible staffing needs were uncorrelated, individual employers would face fixed relative costs of employing workers under alternative arrangements. This need not be true if labor markets are not perfectly competitive, workers' preferences change over time or firms' flexible staffing needs are correlated.

distribution) or predictable (output varying over, say, the course of a year according to some seasonal pattern that is known in advance). At this point, I assume that, in the initial period, the firm must make a once-and-for-all decision concerning the number of regular employees, L_p, to be hired at a given wage, w_p; new regular workers cannot be hired later on and regular workers never leave the firm. I also assume initially that regular workers work a fixed number of hours.

Each regular employee can produce one unit of output per period. If it turns out that $x \leq L_p$, the regular workforce can produce all the output required and no temporary workers will be hired. If $x > L_p$, the firm may hire supplemental workers, L_s, at a given wage, w_s, to make up the shortfall in production capacity. Because these flexible staffers are unfamiliar with the firm's production process, they may be less productive than regular workers; b flexible staffers are required to produce one unit of output, $b \geq 1$.

A more complete model might explicitly incorporate other differences between regular employees and flexible staffers, such as differences in expected supervision costs. As already noted, flexible staffers are likely to have less experience with the particular tasks they are performing than regular employees. Moreover, a flexible staffer who expects to be on a job only a short time will not be motivated by the hope of future rewards for good performance and may for that reason be more likely to shirk. For both of these reasons, flexible staffers may require closer supervision than regular employees. The easiest way to allow for these possibilities is to think of w_p and w_s as the total per-hour costs associated with the use of regular employees and flexible staffers, respectively, including not only wages and benefits but also indirect costs such as supervision costs. I

assume that it is more expensive to produce a fixed quantity of output using flexible staffers than using regular workers ($bw_s > w_p$), so that some regular workers are hired.[4]

The firm's problem is then to choose the level of regular employment that will minimize its expected production costs:

$$(1) \qquad E(C) = w_p L_p + w_s \int_{L_p}^{\bar{x}} b(x - L_p)\, f(x)dx ,$$

where $\bar{x}$ is the maximum of the output distribution and $b(x-L_p)$ equals the number of supplemental workers hired when $x > L_p$.[5] The first order condition for a minimum is:

$$(2) \qquad w_p = bw_s \int_{L_p}^{\bar{x}} f(x)\, dx .$$

Intuitively, the firm equates the cost of expanding production capacity

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[4] In a perfectly competitive labor market in which flexible and regular staffing arrangements coexist, equilibrium wages for flexible staffers should exceed those for equally-able regular employees; with $b \geq 1$, the stated assumption holds. Shapiro and Stiglitz (1984) and Bulow and Summers (1986) argue that, if labor markets are not perfectly competitive, it may be optimal for employers to pay some workers above-market wages. They reason that fear of losing a high-paying job will inhibit worker shirking and that this inhibiting effect will be strongest where workers expect to remain on their jobs for a long time if not fired for poor performance. This reasoning suggests that it may make sense to pay flexible staffers market wages and closely monitor their performance, but to pay regular employees above-market wages, thereby saving on direct supervision costs. In this situation, the per-hour costs of using flexible staffers may exceed the per-hour costs of using regular employees even though flexible staffers' per-hour wages are lower.

[5] The firm maximizes expected profits subject to the constraint that
$L_p + L_s/b \geq x$
for all x. Given our assumptions, this implies that
$L_s = b(x-L_p)$
when $x > L_p$. This expression for L_s has been substituted in equation (1).

by hiring another permanent employee to the expected cost of producing the marginal unit of output by hiring flexible staffers as needed (bw_s times the probability that flexible staffers are hired). This first order condition can be rewritten:

$$(3) \qquad R = \frac{bw_s - w_p}{bw_s},$$

where R is the fraction of its output distribution the firm chooses to cover with regular workers. As might be expected, R increases with b; that is the lower the relative productivity of flexible staffers, the smaller the expected number hired. Thus, one implication of the model is that the use of flexible staffers should be greater in positions in which firm-specific skills are relatively unimportant for successful job performance. R also decreases with w_p and increases with w_s; that is, the lower the relative cost of using flexible staffers, the greater the reliance placed upon them.

Intuition suggests that increases in the dispersion of demand ought to increase the expected ratio of supplemental to regular staff. This intuition can be formalized. Imagine a mean-preserving spread of the original demand distribution such that:

$$(4) \qquad \tilde{x} = \mu + (x-\mu)/k, \quad 0<k<1,$$

and

$$(5) \qquad f(\tilde{x}) = k\, f(x)$$

where $\tilde{x}$ is the new output variable, μ is the common mean of the new and the old output distributions, and k captures the relative dispersion of the new distribution compared to the old, with smaller values of k being associated with greater relative dispersion. Note that R, the share of its demand distribution the firm chooses to cover with regular employees, is independent of the dispersion of demand. If L_p is optimal

regular employment in the initial situation, optimal regular employment in the new regime is:

$$(6) \qquad \tilde{L}_p = \mu + \frac{(L_p - \mu)}{k}, \quad 0 < k < 1,$$

The expected level of temporary employment in the new regime is:

$$(7) \qquad E(\tilde{L}_s) = \int_{\tilde{L}_p}^{\tilde{x}} b(\tilde{x}-\tilde{L}_p)\, f(\tilde{x})\, d\tilde{x} = \int_{L_p}^{\bar{x}} \frac{b}{k}(x-L_p)\, f(x)\, dx .$$

The proportional change in L_p associated with an increase in demand dispersion (decline in k) is:

$$(8) \qquad \frac{-\delta \tilde{L}_p / \delta k}{\tilde{L}_p} = \frac{(L_p - \mu)}{\mu + (L_p - \mu)} * \frac{1}{k},$$

and the proportional change in $E(L_s)$ turns out to be simply

$$(9) \qquad \frac{-\delta E(\tilde{L}_s)/\delta k}{E(\tilde{L}_s)} = \frac{1}{k} .$$

If L_p is less than the mean of the demand distribution ($R \leq 1/2$), increases in the dispersion of demand reduce L_p and increase $E(L_s)$, so $E(L_s)/L_p$ clearly increases. But even if L_p is greater than the mean of the demand distribution ($R > 1/2$), so long as μ is positive -- which it must be for any observed demand distribution -- the percentage increase in L_p will be less than $1/k$, so $E(L_s)/L_p$ increases. Thus, increases in the dispersion of demand of the sort considered here unambiguously raise the expected ratio of supplemental to regular employment.

Stochastic Labor Supply by Regular Workers

The preceding discussion assumes that regular employees supply a fixed flow of labor services to the firm. But any manager could tell you (though perhaps not in precisely these words!) that there is a stochastic element in employees' labor supply. Overstaffing is one way to accomodate vacations, leaves, absences due to illness, etc.; relying on supplemental workers to fill in for regular employees as needed is another, possibly complementary, strategy.

Let us represent the stochastic nature of regular employees' labor supply as follows:

$$(10) \qquad L_p = gL,$$

where L_p is the actual quantity of labor supplied, L is the number of regular workers hired, and g is distributed as f(g), $0 \leq g \leq 1$. This means that the density of the labor supply distribution can be written:

$$(11) \qquad f(L_p) = f(g)*(1/L).^6$$

Note that there is no reason to use flexible staffers unless g varies from period to period. If individual employees' labor supply varied but the aggregate quantity of labor supplied by regular employees within a relevant grouping did not, one could simply hire 1/g times as many regular employees as actually needed and have exactly the right number at work in every period. In general, however, g will vary from period to period. For example, absences are typically higher on Mondays and Fridays than on other days of the week, and more vacations are scheduled during the summer than at other times of year.

I assume that regular employees must be paid whether they work or

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6 This is less general but more tractable than writing the firm's labor supply function as g(L), with density f(g(L)).

not. As in the previous model, I also assume that the cost per effective unit of labor suplied by supplemental workers is higher than for regular employees (here, $bw_s > w_p/E(g)$), so that some regular employees are hired.[7]

To highlight the implications of stochastic variation in the quantity of labor supplied by regular employees, output is taken as fixed. The firm's objective is to choose L to minimize expected production costs:

$$(12) \qquad E(C) = w_p L + w_s \int_0^x b(x - L_p)\, f(L_p)\, dL_p .$$

Substituting for L_p and $f(L_p)$ from equation (10) and equation (11) above:

$$(13) \qquad E(C) = w_p L + w_s \int_0^{x/L} b(x - g \cdot L)\, f(g)\, dg .$$

Differentiating with respect to the number of regular employees hired, L, yields the first order condition for cost minimization:

$$(14) \qquad w_p = b w_s \int_0^{x/L} g\, f(g)\, dg .$$

Given our assumptions, this condition implies that the firm will choose

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[7] The assumption that regular employees must be paid whether they work or not is appropriate for situations where most of the stochastic variation in regular employees' labor supply reflects paid vacations, paid sick leave or other paid time away from work, but not for situations where most of the stochastic variation reflects unpaid time away from work or unexpected quits. If regular workers are paid only for time actually worked, the optimizing employer uses relatively more regular employees and relatively fewer flexible staffers.

to hire more than x regular employees.[8] Flexible staffers are used to fill in when g*L is less than x. Thus, overstaffing and the use of supplemental workers are complementary approaches to dealing with variation in regular employees' labor supply. As in the model with variable demand, decreases in b, increases in w_p, and decreases in w_s all lead the firm to reduce the number of regular employees hired and to increase its reliance on flexible staffers. Though intuition suggests that increases in the variability of the firm's absenteeism rate should raise the relative use of supplemental workers, this does not in fact hold as a general proposition.

Alternatives to the Use of Flexible Staffing Arrangements

A model in which employers' only choices are to use regular employees who work a fixed number of hours or to use flexible staffers is, of course, unrealistic. Some of the alternative approaches to dealing with variability/uncertainty in product demand and labor supply have already been mentioned: varying the hours worked by regular workers; hiring and firing regular workers as conditions change; and/or using inventories as a buffer.

For many employers, varying regular employees' hours of work, particularly through scheduling of overtime, is an important instrument for absorbing demand fluctuations and for handling absences, vacations, leaves, and so on. The ability to vary regular employees' hours is not, however, a perfect substitute for the use of flexible staffing arrangements. Standard arguments imply that marginal productivity of

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[8] If L equalled x, equation (14) could be rewritten

$$w_p = b w_s E(g),$$

but we have assumed

$$w_p < b w_s E(g).$$

hours worked by the regular workforce during a given time period will eventually decline. For a firm with a given regular workforce, beyond a certain point it will be cheaper to accomodate higher-than-usual demand or higher-than-usual absenteeism by using supplemental staff rather than by increasing regular workers' hours.

Adjusting the size of the regular workforce is another approach to accomodating changing circumstances. If there is a change in demand or in employees' labor supply behaviour (for example, an increase in expected absenteeism) that is expected to persist for an extended period of time, one would expect an employer to make changes in the size of the regular workforce. But one would not expect an employer to hire additional regular staff to meet short-term needs; any wage savings associated with using additional regular staff rather than flexible staffers would be more than offset by the fixed costs of increasing and then decreasing the size of the regular workforce. Hiring costs include the costs of screening potential new hires plus the costs of any initial on-the-job training provided. The costs of reducing the size of the regular workforce will depend upon the method chosen for accomplishing that end. Attrition takes time; moreover, the wrong employees (from the employer's perspective) may choose to leave. Layoffs may also be costly, both because of government regulations (for example, U.S. employers who lay off workers may incur increased unemployment insurance costs) and because of firms' own previous strategic decisions (for example, a no-layoff firm that resorts to layoffs may experience deterioration of employee morale and commitment). So long as the costs

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Increases in L lower the value of the right hand side of equation (14). Given our initial assumptions, L must be greater than x.

of adjusting the size of the regular workforce exceed the costs associated with taking on and releasing flexible staffers, there will be circumstances under which it is optimal to rely on flexible staffers.

In certain goods-producing industries, inventories may be used to buffer fluctuations in demand or, possibly, in regular employees' labor supply. The degree of reliance on inventory buffer stocks will depend, ceteris paribus, on the costs associated with holding them. A strategy of holding sufficient inventories to cover all possible contingencies is likely to be very expensive. Thus, even in industries producing reasonably standardized and storable products where the use of inventory buffer stocks is feasible, there is likely to be a role for flexible staffers. A similar argument can be made concerning the strategy of lengthening delivery or waiting times during busy periods. Some lengthening of the customer queue may be optimal; however, if delivery or service lags become too long, customers will seek other sources of supply. Thus, beyond a certain point, it will pay to hire flexible staffers.

III. Empirical Evidence on the Use of Flexible Staffing Arrangements by U.S. Employers

The theoretical discussion just concluded suggests that flexible staffing arrangements can play an important role in employers' accomodation of variations in demand and/or in the labor supply of regular employees. Flexible staffers should be concentrated in jobs that require little firm-specific knowledge or skills, and the duration of flexible staffing assignments should be sufficiently short that adjusting the size of the regular workforce is not a cost-effective

alternative. The theoretical discussion also implies that the use of flexible staffing arrangements should be greatest in organizations where: the relative costs of using flexible staffers are low; demand is highly variable; and alternative methods of accomodating fluctuations are costly. This section of the paper presents new empirical evidence on U.S. employers' use of flexible staffing arrangements intended to shed light on these propositions.

The Flexible Staffing Survey

The data analyzed here come from an employer survey that I recently conducted in collaboration with the Bureau of National Affairs (BNA). The survey questionnaire included questions on responding organizations' use of agency temporaries, short-term hires, on-call workers and contracting out. The analysis in this paper focuses on the first three of these arrangements, all of which involve bringing people other than regular employees onto the organization's premises to do work that in principle might be done by regular employees. My objectives were to document the reliance upon these arrangements and the factors responsible for their use.

For purposes of this study, respondents were given the following definitions:

Agency Temporaries: Individuals employed through a temporary help agency to work for your organization. Examples: accountants, clerical help, laborers, maintenance workers, nurses.

Short-term Hires: Employees hired on the company payroll either for a specific period of time or for a specific project. Examples: employees hired during the Christmas season, students hired for the summer, employees hired for a one-time project or event. This classification includes freelancers hired by the hour or day, but does not include individuals in an "on-call" pool.

On-Call Workers: Individuals in a pool of workers who are called in on an as-needed basis. Examples: laborers supplied by a union hiring hall, retirees who work for a few days a month.

All questions on the survey pertained to calendar year 1985.

The survey questionnaire was sent during May 1986 to 799 human resource executives at private firms, some corporate-level personnel and some with division or plant level responsibility. All were members of a standing panel previously solicited for participation in a short quarterly survey on absence and turnover rates and in an annual survey on personnel department activities and budgets. A followup letter including another copy of the survey form was sent to those executives we had not heard from by the end of June 1986. Replies from 469 respondents were received by the end of July 1986. The questions about on-call work generated some confusion; followup telephone interviews were conducted to clarify the answers to these questions.[9] Altogether, 442 surveys were usable in at least some of our analyses, a usable response rate of 55 percent.[10]

The replies do not mirror the industry distribution of employment, but are skewed towards manufacturing, finance, insurance and real

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[9] Many respondents did not provide the information needed to estimate on-call use intensity. Between mid-July and mid-August of 1986, my research assistant, Kelly Eastman, telephoned all 92 respondents who reported using on-call workers other than former regular employees; useful clarification was obtained from 55 of these 92 respondents.

[10] Respondents who did not answer all the yes/no questions about whether they used each of the various flexible staffing arrangments were excluded from all analyses. I also excluded a very few replies from agricultural, mining and construction firms, one reply from a firm located in Puerto Rico, and two replies from firms whose industry and location could not be determined. Two respondents replied twice; in these cases, I used the information from the earlier reply.

estate, and health care, and away from trade and services other than health care.[11] In addition, almost all the responding organizations had more than 50 employees at year-end 1985 and many are part of even larger corporations.[12] While the nonrandom nature of the survey sample mandates caution in generalizing from the survey findings, evidence described at the end of this section suggests that the pattern of flexible staffing use reported by survey respondents is not out of line with that of U.S. employers overall.

Use of Temporary Workers, Short-Term Hires and On-Call Workers

The top panel of Table 1 reports the percentages of responding organizations that use flexible staffers. Overall, 93 percent of respondents use at least one of the three flexible staffing arrangements.

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[11] The industry distribution of survey responses, the industry distribution of employment in establishments with 50 or more employees (excluding agriculture, mining, construction and government), and the industry distribution of total employment (again excluding agriculture, mining, construction and government) are as follows:

	Survey Responses	1984 Employment in 50+ Employee Establishments	Total 1984 Employment
Manufacturing	.566	.385	.270
Trans./utilities	.066	.077	.065
Trade	.023	.190	.300
Fin./ins./real estate	.176	.074	.081
Health care	.127	.106	.087
Other services	.043	.168	.198

The numbers in the two right-hand columns come from United States Bureau of the Census (1986).

[12] In the letter accompanying the first survey mailing, respondents were instructed that "(i)f staffing practices vary by facility or if you can provide more accurate information for particular facilities than for the company as a whole, please answer for one facility, preferably the largest." Some replies apply to a single establishment; some apply to a division or subsidiary; and some apply to an entire firm. This makes meaningful comparison of the size distribution of responding organizations with other data difficult.

Table 1: Percent of Organizations Using Flexible Staffers and Intensity of Their Flexible Staffing Use

	Agency Temporaries	Short-Term Hires	On-Call Workers	All three Combined
Percent of organizations using flexible staffers[a]	77	64	36	93
Overall mean use intensity among users[b,c]	.82	.85	.62	1.49
Mean use intensity among top 25 percent of users[b,c]	2.84	2.43	2.03	4.50
Mean use intensity among top 10 percent of users[b,c]	5.86	4.16	3.92	7.91
Percent of users with use intensity in range:[c]				
0.01 to 0.49	76	55	75	45
0.50 to 0.99	11	23	11	21
1.00 to 1.99	4	11	9	16
2.00 to 4.99	4	8	3	10
5.00 to 9.99	3	3	1	6
10.00 to 14.99	1	0	0	1
15.00 and up	1	0	1	1
Sample size	265	221	107	329
Total number of users	339	282	161	413

[a]The percentages in this row are based on 442 total responses.

[b]The use intensities reported in this row represent the contribution of the given category of flexible staffers, expressed in person-years of work divided by the number of regular employees times 100.

[c]These estimates are based upon answers from respondents who provided complete information on flexible staffing use intensity. These responses were weighted in inverse proportion to the response rate in the relevant use category (use agency temporaries only, use both agency temporaries and short-term hires, and so on). In defining use categories, those who used only former regular employees as on-call workers were distinguished from other on-call users.

While previous studies have suggested that many U.S. employers use flexible staffers, particularly agency temporaries, to my knowledge none has yielded estimates of how intensively these arrangements are used.[13] For each type of flexible staffing, the survey described here collected two pieces of information that together permit an estimate of use intensity: the total number of assignments during calendar year 1985; and the typical duration of calendar year 1985 assignments (which can be expressed as a fraction of a year). For each organization for which both of these pieces of information were reported, their product yields an estimate of person-years worked by flexible staffers. This person-years number was then divided by regular employment as of year-end 1985 and the resulting ratio multiplied by 100 to yield a use intensity measure that is a rough proxy for the average percentage addition made by flexible staffers to the regular workforce's labor input over the course of the year.[14]

The second panel of Table 1 reports estimates of how intensively

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[13] The best earlier study was carried out by Donald Mayall and Kristin Nelson (Mayall and Nelson (1982); see also Mangum, Mayall and Nelson (1985)). Their data apply to 1981, a year in which use of flexible staffers might be expected to have been low; they collected information on whether firms used agency temporaries, short-term hires and on-call workers, but not on use intensity. Official government statistics provide information on temporary help industry employment but not on where agency temporaries actually work. See Carey and Hazelbaker (1986) for a discussion of these data.

[14] Not all users of flexible staffing arrangements provided complete information on their intensity of use. The responses from those that did were weighted in inverse proportion to the response rate in the relevant use category (use agency temporaries only, use both agency temporaries and short-term hires, and so on). In defining use categories, those whose only on-call use consisted of sometimes having former regular employees come in to work were distinguished from other on-call users.

flexible staffers are used. These estimates indicate that average use intensity among users of each of the individual categories of flexible staffing amounts to between a 0.5 percent and 1.0 percent addition to their regular employment, with combined use for organizations using at least one of the three arrangements averaging a 1.5 percent addition. Since 93 percent of all respondents said that they used flexible staffers, this number implies an average use intensity across all sampled organizations of approximately 1.4 percent.

The use intensity distribution is markedly skewed. For most organizations, use intensities are small: 45 percent of user organizations had use intensities for all three categories of flexible staffers combined of less than 0.5 percent and another 21 percent had use intensities of less than 1.0 percent. But for a minority of user organizations, use intensities are very large: 8 percent had use intensities in excess of 5.0 percent and 2 percent had use intensities in excess of 10.0 percent.

An important assumption underlying the discussion in Section II was that flexible staffers cost more per hour to employ than comparably productive regular employees; otherwise, I reasoned, there would be an incentive for employers to employ only flexible staffers, at least in certain types of jobs. Testing this assumption turns out to be very difficult. The data in the top panel of Table 2 pertain to the direct hourly costs associated with using flexible staffers. The answers imply that temporary help agencies' per-hour charges typically equaly or exceed the per-hour wage and benefit costs associated with regular employees in comparable positions; however, a substantial share of users of short-term hires and on-call workers report lower per-hour wage and benefit costs for those flexible staffers than for regualr employees in

Table 2: Selected Characteristics of Flexible Staffing Use

	Agency Temporaries	Short-term Hires	On-call Workers
Percent of users reporting direct costs of flexible staffers compared with regular employees:[a]			
Generally higher	42	6	11
Generally about the same	30	33	46
Generally lower	27	60	43
Sample size	330	273	156
Percent of users reporting typical assignment duration:			
Up to 1 week	26	2	54
1 week to 1 month	41	9	27
1 to 3 months	25	73	11
3 to 6 months	5	13	4
More than 6 months	2	3	4
Sample size	307	269	139
Percent of users reporting assignments that are:			
Managerial/administrative	1	5	6
Professional/technical	29	38	35
Office/clerical	96	75	63
Sales	3	5	4
Production/service	29	44	36
Sample size	336	277	159
Total number of users	339	282	161

[a]The question asked about agency temporaries was, "Is your hourly cost for agency temporaries generally higher or lower than the hourly pay and benefits costs for regular employees in comparable positions?" The questions about short-term hires and on-call workers substituted "your hourly pay and benefits cost" for "your hourly cost".

comparable positions. Unfortunately, it was not possible to collect information either on flexible staffers' relative productivity or on the relative costs of supervising them, as would have been required to construct direct estimates of per-unit production costs. The data in the second panel of Table 2, which show that flexible staffing assignments are typically quite short, are consistent with per-unit production costs being higher for flexible staffers than for regular workers. If using flexible staffers reduced per-unit production costs, I would expect flexible staffing assignments to be longer than they typically are.[15]

The discussion in Section II also implied that the use of flexible staffers should be more prevalent in jobs requiring little firm-specific expertise than in jobs where firm-specific skills are important. The data in the bottom panel of Table 2 are at least consistent with this implication. Substantial numbers of organizations assign flexible staffers to office/clerical, professional/technical and production/service positions, but very few make use of flexible staffers in either managerial/administrative or sales positions.[16]

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[15] Mayall and Nelson (1982) and Mangum, Mayall and Nelson (1985) argue that the relative median assignment durations associated with each of the three flexible staffing arrangments reflect differencesin their respective cost structures.

[16] One might also hypothesize that managerial/administrative and sales personnel are particularly difficult to monitor, so that it is very expensive to use flexible staffers in these positions. It may also be relevant that managerial/administrative and sales personnel are most likely to represent the organization to the outside world.

Reasons for Using and Perceived Importance of Flexible Staffing Arrangements

Let me turn next to the question of whether employers' stated reasons for using flexible staffers are consistent with the theoretical models developed in Section II. The choices made by survey respondents from a list intended to capture a variety of possible motivations for using flexible staffers suggest that the theoretical discussion does capture important elements of the decision to use flexible staffers. As shown in Table 3, among those using at least one of the three flexible staffing arrangements, 90 percent checked at least one factor that might be put under the broad heading of "variability in demand": "special projects", "seasonal needs" or "provide a buffer for regular staff against downturns in demand". While only 22 percent of the user population checked "provide a buffer against downturns in demand", 42 percent of the top 10 percent of users indicated that this was one of their reasons for using flexible staffers. In addition, 89 percent of users included at least one factor that might be put under the broad heading of "fluctuation in the labor supply of regular employees": "fill vacancy until a regular employee is hired" or "fill in for absent regular employee".

How important are flexible staffers in employers' overall staffing strategies? The fact that flexible staffing arrangements account for less than 2 percent of employment at responding firms over the course of the year might at first blush suggest that they are of little strategic importance. But on further reflection, it is obvious that flexible staffers could account for an even smaller part of total average employment but still absorb a substantial fraction of the day-to-day and month-to-month fluctuation in demand and/or labor supply. Table 4

Table 3: Percent of Respondents Reporting Various Reasons for Use of Agency Temporaries, Short-Term Hires and On-Call Workers

	Agency Temporaries	Short-Term Hires	On-Call Workers	Any of the Preceding
Special projects	70	56	51	77
Seasonal needs	24	53	39	52
Provide a buffer for regular staff against downturns in demand	14	8	20	22
Any of the above	79	84	73	90

Fill vacancy until a regular employee is hired	61	15	34	60
Fill in for absent regular employee	74	42	68	80
Either of the above	88	48	72	89

Identify good candidates for regular jobs	16	14	9	23
Special expertise possessed by flexible staffer	12	13	34	29
Prefer not to hire regular employees for some ongoing jobs	15	10	13	20
Other	2	10	9	11
Sample size	338	282	158	412
Total number of users	339	282	161	413

reports respondents' answers to a set of questions concerning the importance of each of a number of strategies for absorbing fluctuations in the responding organization's workload. The strategy most often mentioned as "very important" or "somewhat important" for absorbing workload fluctuations was the use of overtime; however, the second and third most frequently mentioned strategies were the use of agency temporaries and the use of short-term hires. Altogether, 36 percent of the survey respondents said that at least one of the three flexible staffing arrangements was "very important" for absorbing workload fluctuations and an additional 48 percent said that at least one was "somewhat important". Not surprisingly, heavy users of flexible staffers -- those in the top 10 percent of the overall use intensity distribution -- were even more likely to say that at least one of the three flexible staffing arrangements was "very important" (78 percent) or "somewhat important" (17 percent) for absorbing workload fluctuations.

Organizational Characteristics Associated with Flexible Staffing Use

Perhaps the most interesting question concerning U.S. employers' use of flexible staffing arrangements is what accounts for the tremendous cross-organization variation in the share of labor input accounted for by flexible staffers. The theoretical discussion implied that the use of flexible staffers is likely to be greatest where: the relative cost of using flexible staffers is low; demand is highly variable; and the costs of alternative shock-absorbing strategies are high. The survey questionnaire was designed to yield proxies for a number of these organizational characteristics.

The fraction of the organization's workforce represented by a union can be thought of as one proxy for the relative costs of using

Table 4: Importance of Various Approaches to Absorbing Fluctuations in Organizations' Workloads

	Percent of all organizations reporting approach:[a]	
	Very Important	Somewhat Important
Overtime	55	36
Reduced work weeks	7	18
Temporary layoffs	18	20
Management of inventories	26	15
Agency temporaries	19	46
Short-term hires	13	42
On-call workers	18	17
Any of the above three flexible staffing arrangements	36	48

[a]The percentages in this table are based upon 433 responses. Other responses include "not important", "not applicable", and "don't know"; in addition, some respondents did not indicate every approach's importance.

flexible staffers; unions typically oppose the use of flexible staffers and thus likely raise the costs associated with using them. The survey included two questions which asked respondents to indicate whether the demand for their organization's product or service was highly or somewhat seasonal, and whether it was highly or somewhat variable across years. The answers to these questions serve as proxies for the variability in organizations' demand. One might also expect organizations that had recently experienced either rapid growth or rapid shrinkage to be more uncertain concerning their future staffing needs and thus to place greater reliance on flexible staffing arrangements; the absolute value of the proportional change in the organization's employment between December 1980 and December 1985 serves as an employment trend measure.[17] No questions pertaining to the costs of alternative modes of accomodating demand and/or labor supply fluctuations were included on the survey questionnaire; however, one might expect these costs to differ across industries, particularly between manufacturing and nonmanufacturing industries, and possibly across units of different sizes. In addition, organizations with a stronger emphasis on job security and long-term employment relationships for their regular employees might find it more difficult to adjust through hiring and firing and, thus, make greater use of flexible staffers; to assess this hypothesis, I compared flexible staffing usage by low turnover, high-wage nonunion organizations that had not laid off any workers in the past five years to that by other organizations.

Table 5 reports some simple tabulations of the mean

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[17] This absolute value measure is more highly correlated with flexible staffing use intensity than the proportional change in employment growth itself.

Table 5: Mean Characteristics of High Intensity Users, Low Intensity Users, and Nonusers of Flexible Staffing Arrangements[a]

	Top 10 percent of users	Bottom 50 percent of users	Nonusers
Proportion of nonexempt workforce unionized	.097 (30)	.264 (154)	.229 (25)
Demand highly seasonal (yes=1)	.028 (31)	.020 (167)	.000 (29)
Demand somewhat seasonal (yes=1)	.232 (31)	.295 (167)	.345 (29)
Demand highly variable from year to year (yes=1)	.119 (30)	.049 (168)	.071 (28)
Demand somewhat variable from year to year (yes=1)	.707 (30)	.624 (168)	.750 (28)
Absolute value of proportional change in employment, 1980-1985	.829 (29)	.396 (150)	.265 (26)
Manufacturing (yes=1)	.638 (31)	.633 (170)	.620 (29)
Number of employees in unit	715 (31)	1618 (170)	647 (29)
Low turnover, no layoff, high-wage nonunion employer (yes=1)[b]	.148 (30)	.061 (142)	.043 (23)

[a]The number of responses on which each estimate is based is shown in parentheses. The estimates in the first and second columns are based upon the observations falling in the relevant percentiles of the use intensity distribution for all three categories of flexible staffers combined, weighted as described in Table 1, footnote c.

[b]Employers in this category are nonunion organizations reporting turnover rates in the bottom quartile of the distribution, no layoffs during the past five years, and wages in the top quartile of the distribution.

characteristics of high intensity users, low intensity users and nonusers of flexible staffing arrangements.[18] High intensity users have much lower unionization rates than either low intensity users or nonusers. High intensity users are also more likely to say that their demand is highly seasonal and to say that it is highly variable across years. Both the mean absolute percentage change in employment between 1980 and 1985 and the proportion of low turnover, no layoff, high wage nonunion employers were larger among high-intensity users than among low intensity users or nonusers. There were no systematic differences across user groups in the proportion of manufacturing organizations or in mean unit size.

The univariate relationships which emerge from Table 5 could, of course, be misleading. The logical next step is to specify an appropriate multivariate model for analysis of the factors affecting flexible staffing use intensity. Let Y_i represent organization i's underlying propensity to use flexible staffing arrangements. Suppose that:

$$(15) \qquad Y_i = X_i\beta + \varepsilon_i,$$

where X is a vector of organizational characteristics, β is a parameter vector and ε is a normally distributed error term. For an organization that does not use flexible staffers, we know only that Y_i is less than or equal to zero. The contribution to likelihood for such an organization is:

$$(16) \qquad Pi_i = P(X_i\beta+\varepsilon_i \leq 0) = F(-X_i\beta/\sigma),$$

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[18] High intensity users are defined here as those in the top 10 percent of the use intensity distribution, and low intensity users as those in the bottom 50 percent. Qualitatively similar results were obtained with different high intensity and low intensity cutoffs.

where F(.) is the cumulative standard normal density and σ is the standard deviation of the error term in equation 15. For a user organization that provides valid information on use intensity, the contribution to likelihood is:

$$(17) \qquad P2_i = P(X_i\beta+\varepsilon_i=Y_i) = (1/\sigma)*f((Y_i-X_i\beta)/\sigma),$$

where f(.) is the standard normal density. Specifying the contribution to likelihood for an organization that uses flexible staffers but provides no information or incomplete information on intensity of use is slightly more complicated. For a user organization that provides no use intensity information, we know only that its use intensity is positive; in this case, Y_i^r, the lower bound on total flexible staffing use intensity, equals zero. For an organization that uses more than one category of flexible staffer but provides valid information for only a subset of the categories used, Y_i^r equals the intensity of use in that subset of categories. The contribution to likelihood for a user organization with missing or incomplete use intensity information is:

$$(18) \qquad P3_i = P(X_i\beta+\varepsilon_i>Y_i^r) = 1-F((Y_i^r-X_i\beta)/\sigma).$$

The log likelihood for the entire sample is thus:

$$(19) \qquad \ln L = \sum_{i=1}^{k_1} \ln P1_i + \sum_{i=k_1+1}^{k_1+k_2} \ln P2_i + \sum_{i=k_1+k_2+1}^{k_1+k_2+k_3} \ln P3_i$$

where k_1, k_2 and k_3 are the number of observations on nonusers, users with valid use intensity information and users with missing or incomplete use intensity information, respectively.[19]

Estimates of the use intensity model just described are reported

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[19] This is just a Tobit model with both lower and upper truncation. See

in Table 6. The column (1) specification includes the proportion of the organization's workforce that is unionized and dummy variables which capture whether the organization's demand was reported to be seasonal or to vary from year to year. The union variable takes on a large and statistically significant negative coefficient; that is, unionized firms make less use of flexible staffing arrangements than nonunion firms.[20] Organizations that report their demand to be either highly seasonal or highly variable from year to year make greater use of flexible staffing arrangements than other organizations. The column (2) specification is like that in column (1), but with the absolute value of the proportional change in the organization's employment between 1980 and 1985, a manufacturing dummy variable, the logarithm of the number of employees in the unit, and a dummy variable intended to capture the organization's employment philosophy added as a separate control variables. The unionization, seasonal dummy and year-to-year demand variability dummy coefficients in this model are almost identical in magnitude to those in the previous model. Somewhat surprisingly, however, none of the added variables take on significant coefficients.[21]

Tobin (1958).

[20] In contrast, preliminary analysis indicates that unionized firms are significantly more likely to contract work out than nonunion firms.

[21] Requiring valid values for the four variables added in the column (2) model cuts the sample size available for estimation from 396 to 320; however, a model like that in column (1) estimated using the larger sample yields coefficient estimates very similar to those reported. The qualitative findings reported in Table 6 are very robust to changes in model specification.

Table 6: Organizational Characteristics Associated with the Use of Flexible Staffing Arrangements[a]

	Mean [S.D.]	Dependent variable = overall intensity of flexible staffing use	
		(1)	(2)
Proportion of nonexempt workforce unionized	.207 [.334]	-1.71 (.67)	-1.72 (.68)
Demand highly seasonal (yes=1)	.028 [.166]	2.03 (.70)	2.08 (.70)
Demand somewhat seasonal (yes=1)	.319 [.467]	-.14 (.39)	-.12 (.41)
Demand highly variable from year to year (yes=1)	.059 [.237]	2.73 (.64)	2.74 (.66)
Demand somewhat variable from year to year (yes=1)	.650 [.478]	.47 (.56)	.47 (.57)
Absolute value of proportional change in employment, 1980-1985	.415 [.812]	---	.17 (.22)
Manufacturing (yes=1)	.575 [.495]	---	.05 (.38)
ln(number of employees in unit)	6.313 [1.244]	---	-.05 (.17)
Low turnover, no layoff, high-wage nonunion employer (yes=1)[b]	.063 [.242]	---	-.27 (.97)
Constant	---	1.47 (.51)	1.73 (1.16)
ln(likelihood)	---	-658.41	-657.85

[a]Both models were estimated using a tobit procedure written by Robert H. Meyer which allows for both lower and upper truncation of the dependent variable. Among the 320 organizations for which all explanatory variables could be constructed, there were 20 nonusers, 252 users providing complete use intensity information, and 48 users providing no or only partial use intensity information.

[b]Employers in this category are nonunion organizations reporting turnover rates in the bottom quartile of the distribution, no layoffs during the past five years, and wages in the top quartile of the distribution.

Can the Survey Results Be Generalized?

Given the nonrandom nature of the survey sample, an obvious question is whether the survey findings are at all generalizable. Two specific concerns are, first, that the pattern of answers might have looked significantly different had the industry composition of the sample more closely mirrored that in the economy as a whole, and, second, that the organizations responding to the survey are unrepresentative in ways that are less easy to observe. Weighting the survey responses to correct for the discrepancy between the industry distribution of survey responses and the industry distribution of, alternatively, employment in establishments with 50 or more employees and total employment produced no noteworthy changes in the pattern of use frequency, use intensity, reasons for use or reported importance of use.[22] Of course, it should be kept in mind that the survey did not reach very small firms.

Beyond possible distortions related to the industry distribution of the responding organizations, I was concerned that organizations that did not use flexible staffers might have felt that the survey questionnaire did not apply to them and therefore been less likely to reply. For this reason, the short letter accompanying the followup mailing to those we had not heard from by the end of June emphasized that we were interested in answers from all organizations, including those that made no use of flexible staffing arrangements. If my concern

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[22] A six industry classification was used in constructing these weights: durables; nondurables; transportation, communication and utilities; finance, insurance and real estate; health care; and trade and other services. With a larger sample, it would have been possible to use finer industry classifications in constructing the weights, but this was not feasible here.

were warranted, one might expect the answers of those who replied following the first mailing to differ systematically from the answers of those who replied only after receiving this second letter. However, there were only minor differences between early and late responders' answers.[23]

It would be particularly reassuring if estimates of use frequency and use intensity based on the survey data could be shown to correspond to estimates from other sources. Unfortunately, there is little other information on flexible staffing use available; indeed, the paucity of information on flexible staffing usage was the primary motivation for carrying out the survey in the first place. The Bureau of Labor Statistics does collect information on employment in the temporary help industry that provides one useful benchmark. As reported in Table 1, my survey results indicate that 77 percent of employers used agency temporaries during 1985 and that agency temporaries added an average of 0.76 percent to these firms' employment levels over the course of the year, which implies that agency temporaries accounted for an average of 0.58 percent of total employment during 1985. BLS statistics on nonsupervisory employment in the temporary help industry compared to total nonagricultural payroll employment, adjusted for the difference between average weekly hours in the temporary help industry compared to the economy as a whole, imply that agency temporaries accounted for an

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[23] Early responders were slightly more likely than late responders to use short-term hires (68 percent versus 55 percent). However, early responders who used either agency temporaries or short-term hires also made slightly less intense use of these flexible staffing arrangements than late responders. In all other respects, the two groups' answers were statistically indistinguishable.

average of 0.60 percent of hours worked during 1985.[24] My 0.58 percent estimate of aggregate agency temporary help use intensity and the 0.60 percent estimate based on the BLS data are remarkably close.

IV. Conclusions

This paper represents a first look at employers' use of agency temporaries, short-term hires and on-call workers. My starting point was to hypothesize that variability in demand and stochastic variation in regular employees' labor supply should lead many employers to make use of one or more of these flexible staffing arrangements. The models in Section II developed these hypotheses more formally, and also yielded some additional implications concerning the likely characteristics of flexible staffing assignments and the characteristics of organizations likely to make the greatest use of flexible staffers.

Over 90 percent of the employers responding to the survey described in Section III make at least some use of flexible staffing arrangements. On average, flexible staffers add 1.5 percent to annual average employment at user firms; use intensity at a majority of

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[24] Nonsupervisory employment in the temporary help industry averaged 691,300 and total nonagricultural payroll employment for the year averaged 97,519,000 in 1985. The ratio of these two numbers would overstate agency temporaries' contribution to total employment, since the payroll survey counts everyone who received any pay during a week as employed, and agency temporaries are more likely than the typical employee to work less than a full week. A reasonable adjustment is to weight each person on the temporary agency payrolls by the ratio of average weekly hours worked by nonsupervisory employees in the temporary help industry (30.2 hours) to average weekly nonsupervisory hours in the economy as a whole (35.9 hours, assuming that private sector supervisory employees average 40 hours per week and that weekly hours in the public sector average the same as in the private sector).

organizations is well below 1.0 percent, but it exceeds 10.0 percent and even 20.0 percent for a small number of organizations. Office/clerical, professional/technical and production/service assignments are common. Variability in product demand and in regular employees' labor supply are reported by most employers to be among the factors motivating their use of flexible staffers and over 80 percent of survey respondents indicate that flexible staffers play an important role in absorbing workload fluctuations. Finally, organizations with a low percentage of their nonexempt workforce covered by collective bargaining agreements and organizations that report their demand to be either highly seasonal or highly variable across years make greater use of flexible staffing arrangements than other organizations.

While fluctuations in both output and input markets do provide a central motivation for using flexible staffers, this does not imply that other reasons for using flexible staffers are never important. One possible alternative motivation is that flexible staffing arrangements permit employers to do a better job of screening candidates for regular positions.[25] Although very few organizations report this as a reason for their use of flexible staffers, a substantial number say they often or occasionally hire these flexible staffers into regular jobs. Identification of potential permanent hires thus seems to be, at this point, mainly an unanticipated benefit of the use of flexible staffing

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[25] Bull and Tedeschi (undated) discuss this possibility. Fine and Gibbons (1986) consider screening of temporary workers in a somewhat different context, in which temporary workers never become permanent workers, but the firm keeps some temporary workers on the job longer than others.

arrangements.[26]

With better data, one might be able to say more than I have done here about the determinants of flexible staffing use, and also something about whether and under what circumstances firms that incorporate flexible staffing use into their overall staffing strategy outperform firms that do not. Some of the same factors that lead firms to use flexible staffers may also lead to decisions to contract work out; these decisions are another important subject for future study.

Considerable recent interest has been focused on the question of how and why employers' decisions to use flexible staffers and to contract out have changed over time. Answers to questions concerning the relative magnitude of flexible staffing use in 1985 compared with 1980 suggests that agency temporary use, short-term hire use and on-call use have all grown.[27] The cross-section analysis carried out in this paper suggests two demand-side changes that could have contributed to growing use of flexible staffing arrangements: the decline in union coverage among U.S. workers; and what some evidence suggests may have

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[26] In response to a question which asked whether flexible staffers were "often", "occasionally", "seldom" or "never" hired into regular positions, "often" or "occasionally" was checked for 62 percent of 339 organizations using agency temporaries, 55 percent of 281 organizations making short-term hires and 44 percent of 151 organizations using on-call workers. The survey questionnaire also included an open-ended question concerning unanticipated benefits and unanticipated drawbacks of using flexible staffers. Identification of potential permanent hires was mentioned as an unanticipated benefit more often than anything else, by 35 of the 81 respondents who cited any unanticipated benefit.

[27] Altogether, 40 percent of the 441 organizations providing information on changes in flexible staffing use intensity reported greater use of agency temporaries in 1985 than in 1980, while only 15 percent reported less use; the corresponding percentages for short-term hires are 25 percent and 12 percent; and for on-call workers, 15 percent and 4 percent.

been an increase in the variability of demand for many organizations' products and services.[28] But other factors seem likely to have been at work as well. Still on the demand side, the growing strength of anti-discrimination legislation and the erosion of the employment-at-will doctrine may have raised the perceived cost of reliance on a hire/fire adjustment strategy. In addition, many observers have pointed to the growing proportion of youth and women in the labor force; if these workers are more willing than adult men to take temporary and on-call positions, the relative wages of flexible staffers may have fallen and thus encouraged their greater use. Slack labor markets may also have contributed to employers' ability to restructure their employment relationships in ways they find advantageous. These hypotheses merit more careful investigation.

Finally, this paper has focused exclusively on employers' decisions concerning the use of flexible staffing arrangements and the role played by flexible staffers within the firm. The broader social implications of employers' reliance on flexible staffing arrangements should also be explored.

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[28] See Freeman and Medoff (1984) and Pindyck (1984).

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