

The background of the entire page is a grayscale photograph of a modern university building. The building features a prominent glass facade with vertical window lines. In the foreground, there is a paved courtyard with several trees and concrete benches. The overall scene is bright and clear.

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Temporary Employees as Real Options

by

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ABSTRACT

Choosing between temporary services workers and long-term employees involves a tradeoff between flexibility and commitment. Temporary employees provide both a buffer against unforeseen shocks and a secondary internal labor market to preview employees prior to long-term hire. We use real options theory to diagnose why firms pay premiums for temporary employees and to examine situations in which firms might prefer temporary employees to permanent employees. We believe a real options perspective on temporary employment offers firms more effective management of their human capital decisions, whether to hedge against exogenous shocks or increase validity and reliability in selection.

Key Words: Temporary employment, real options, selection

Firms turn with increasing frequency to the use of temporary services workers. By the end of 1998, the temporary labor force in the U.S. totaled over 2.9 million workers (Brogan, 1999), approximately two percent of total U.S. employment, and enjoyed an annualized mean growth rate of 11.8 percent during the period 1972-1995. By way of comparison, aggregate non-farm employment grew at only a two percent annual rate during the 1972-1995 period. Temporary services have even begun to account for a significant fraction of all employment growth, comprising one-fifth of total employment growth during the current economic expansion. The National Association of Temporary Staffing Services (NATSS) reports that the annual payroll for temporary services employees increased from \$3.5 billion in 1981 to \$43.4 billion in 1998 (Brogan, 1999). Temporary employment has exploded in other countries as well. For example, in Britain the number of temporary workers has increased by 350,000, or 30.2 percent between 1990 and 1995 (Financial Times, 1996). While growth in the U.S. has slowed to a still healthy annual rate of 9.0 percent by 1998, the Labor Department projects at least a 60 percent increase between 1996 and 2006 (Melchionno, 1999).

The term 'temporary employment' refers to individuals working through a temporary service agency (TSA) on a contract basis to client firms. The TSA recruits and screens these individuals to determine skills, abilities, employment history and background information, and maintains payroll and performance records for them. The TSA bills the client company for the worker's wages, along with a fee, or mark-up, for providing the worker placement service. Thus, with temporary employment the TSA retains its status as legal employer, while for many other types of contingent work and for permanent work, the designation of legal employer shifts to the client firm. This distinction is critical because it defines the legal relationship upon which the issue of commitment in hiring hinges.

One of the key reasons that firms use temporary employees is to gain flexibility - to avoid the commitment of hiring permanent employees. There are two important types of flexibility gained for the client firms. First, temporary workers can be used as a hedge against exogenous shocks, such as market fluctuations. Last year, corporations announced 677,795 job cuts, the highest number of any year this decade (Brogan, 1999). Laying off permanent workers has both real and psychological costs for the firm, while the use of temporary employees enables management to rapidly adjust its labor force downward as necessary while avoiding negative displaced worker and survivor effects. A second type of flexibility occurs when TSAs arrange for the individual to work with the client company for a trial period with the expectation that the assignment may lead to a permanent position with that company. According to data from the Upjohn Institute for Employment Research, more than half of companies that increased their use of temporary help workers in the 1990s were motivated by a desire to fill permanent positions: 24 percent did so to screen candidates for permanent jobs and 37% did so because they found it difficult to find qualified workers on their own. If temporary workers do not meet expectations, the client firm is under no obligation to permanently hire the individual.

In this paper, we use real option theory to explain the conditions where firms should seek flexibility through the use of temporary workers. Clearly, not all temporary workers seek permanent employment through their contact with client firms. Some work in temporary jobs to maintain their income or skills between permanent jobs. Others are new to a field or geographic areas and take up temporary jobs to better acquaint themselves with it. Still others prefer temporary assignments to permanent jobs. It is also true that client firms may use temporary workers for reasons other than flexibility. Sometimes it is a way for firms attempt to cut costs associated with labor, administrative overhead, training, selection and staffing, and productivity.¹

This paper focuses on situations in which a) individuals enter the temporary employment market for the express purpose of finding permanent employment and b) client firms intentionally use the temporary employment market as a means of identifying and evaluating candidates for permanent employment, or c) client firms use temps as a hedge against exogenous shocks.

The rapid growth in temporary employment, coupled with a radical shift in the way client firms assign temporary employees, compels our attention. Firms no longer use temporary workers simply as replacements for sick clerical workers. While the dominant job category continues to be administrative and clerical support (40.5 percent of temporary employment payrolls), the importance of the category has declined since 1991. In 1998, technical and professional sectors comprise nearly one-fourth of temporary help payroll (Brogan, 1999) and 11.0 percent of all temporary workers (Melchionno, 1999), and this sector is expected to grow most rapidly in the coming decade. It is clear that temps have become an integral part of many businesses' human resource strategies. Whether hiring clerical staff or management professionals, firms are using temps much more strategically than ever before. Through interviews, Lenz (1996) and von Hippel, Mangum, Greenberger, Heneman, & Skoglund (1997) identified three strategic motives for the use of temps. First, firms attempt to cut costs associated with labor, administrative overhead, training, selection and staffing, and productivity. Second, firms seek to increase flexibility with respect to customer service, market fluctuations, skills and work force distribution. Third, firms desire to avoid restrictions and consequences associated with labor relations, work force reductions, commitment to permanent workers, and perceptions of wage inequity. The themes of flexibility and commitment resound in these rationales. Unfortunately, theoretical work exploring flexibility as a corporate strategy has not kept pace with the growing use of temporary employees. Our purpose is to use real option theory to

examine when client firms should seek flexibility by preferring temporary employees over permanent employees.

TEMPORARY VS. PERMANENT EMPLOYEES

Temporary workers are one classification of contingent work. Matusik (1999) has classified research on contingent work into three broad categories: the macro-economic level, the organizational level, and the individual level. Throughout our paper we focus on the organizational-level and our perspective is that of the client firm's general managers. That is, our ultimate interest lies in considerations that help to make the firm competitive. In this sense, like Matusik and Hill (1998), we believe the strategic use of temporary employees may provide a source of competitive advantage.

Studies at the organizational level focus primarily on what predicts contingent work use from an Internal Labor Market, Agency Theory, or Transaction Cost Economics perspective. Ultimately, the decision to prefer temporary to permanent employees will depend on some implicit or explicit valuation process. The value of hiring temporary (V_T) or permanent (V_P) employees involves two components: the present value of productivity gains that the temporary (PV_T) or permanent (PV_P) employee provide, and the present value of the costs (C) associated with developing and maintaining the employee relationship. C_P represents these costs for permanent employees and includes expenses associated with wages, benefits, recruiting, selection, and training. C_T represents cost associated with hiring temporary employees and includes fees paid to TSAs for using temps plus any training expenses the client firm undertakes.

$$V_T = PV_T - C_T \quad (1-1)$$

$$V_P = PV_P - C_P \quad (1-2)$$

With these valuation equations, rational firm decision-makers will prefer temporary employees when their value to the organization exceeds the value that permanent employees could provide:

$$PV_T - C_T > PV_P - C_P, \text{ or} \quad (2-1)$$

$$PV_T - PV_P > C_T - C_P$$

Differences in Productivity Value

Some work has examined the relative productivity value of temporary and permanent employees ($PV_T - PV_P$). Pfeffer (1994) suggests that quality suffers when contingent workers are used. However, the evidence does not necessarily support that claim. Most studies find few significant differences between permanent and temporary workers in areas such as organizational or job commitment, cooperation, perceptions on amount of work, most symptoms of stress and burnout, communication needs, and perceptions of quality of care delivered (Pearce, 1993; Porter, 1995). Extra-role behaviors based on organizational citizenship scale (Kidder, 1995) and quasi-moral involvement (Pearce, 1993) are not significantly different either.

Differences in Cost

Other researchers have advocated the use of temporary employees because they cost less ($C_T < C_P$). However, once again, the evidence does not necessarily support that claim. Evidence does exist to support the notion that, on average, wages and fringe benefits for temporary workers are lower than for permanent workers, although the differences do not appear to be great after adjusting for demographic characteristics, geographic location, and the nature of the job. Using data from the Bureau of Labor Statistics, Segal and Sullivan (1997) calculated the wage difference at 7.7 percent. Even after making adjustments for worker or job characteristics, they

found that temporary workers were much less likely than permanent employees – 24 percent to 55 percent – to have private health insurance that is at least partly paid by their employer. Indeed, temporary workers seldom receive the fringe benefits that most other employees get. Consistent with these findings, Mangum, et al. (1985) found a positive correlation between savings to the firm in reduced benefit costs and the ratio of temporary employees to total employees. Davis-Blake and Uzzi (1993) pointed out reductions in administrative overhead resulting from TSA retention of payroll and records-keeping responsibilities, and Caudron (1994) noted the savings obtainable by taking on temporary employees who already possess skills for which the firm would otherwise be forced to train permanent employees.

Despite these findings, there is evidence to suggest that using temporary employees may be more costly than hiring permanent workers (i.e., $C_T > C_P$). The reduction of wages and benefit costs is offset, generally, by the high mark-up paid by client firms to compensate TSAs for expenses in overhead, recruiting, training and other administrative costs, as well as costs associated with Social Security, workers compensation and any benefits they provide to their workers. Although the actual amount varies significantly by skill level and client firm size, it has been estimated that client firms paid TSAs a 40 percent mark-up, on average, over what their temporary workers received in wages in 1995 (Segal & Sullivan, 1997). This estimate was calculated by taking the annual receipts of TSAs reported by NATTS and dividing by the total "temporary help payroll", or gross wages, paid to temporary employees assigned to clients. Using that measure, we calculated that the mark-up declined to 35.1 percent by 1998. These estimates seem to overestimate the mark-up, however, as no consideration is given to benefits paid by the TSA. We conducted our own estimate of the mark-up by exploring the income statements of individual firms, and calculating from financial reports on Compustat our own

"average" mark-up from a sample of fourteen firms having an SIC code of 7363 (indicating that the firm is in the Help Supply Services industry). Our mark-up was calculated by taking the TSAs' revenues and dividing by their cost of services. At this level of analysis, the cost of services represents payroll, payroll taxes, and benefits for temporary employees. The averages of several major TSAs, as well as our fourteen firm average are displayed in Table 1. It appears that the mark-up generally ranges from around 20% to 40%, with an average of around 28.0 percent.

Insert Table 1 about here

Premiums for Temporary Employees

Combining the 7.7 percent lower wages and benefits paid to temporary workers, and the 28.0 percent mark-up to compensate the TSAs for the services they provide, we calculate that firms pay approximately a 20.0 percent premium to hire temporary workers instead of permanent workers. On average, it appears that $PV_T - C_T < PV_P - C_P$.

We expect that the 20.0 percent premium will vary across job types. As Table 2 indicates, wage differences between temporary and permanent employees vary widely across job classification. For example, blue and "pink" collar temporary workers earn 15.6 percent and 12.0 percent less, respectively, than their permanent counterparts. Curiously, temporary workers in management classifications earn 2.1 percent more than their permanent counterparts. If we assume a 28.0 percent mark-up across all job classifications, the premium paid for temporary work is still positive, but considerably less than the 20.0 percent average for blue and pink collar workers, while it is much more for white collar, management types.

Insert Table 2 about here

It is very difficult to generate a picture for how mark-ups vary across job types. Such information is highly confidential. However, we gathered evidence from one firm, CDI Corporation, which provided income statements for each division of the company, where divisions were based on job types.² Based on our estimates the mark-ups were approximately, 36.7 percent for information technology services, 29.4 percent for technical services, 77.7 percent for management, and 33.1 percent for clerical staff. What is important is not the absolute level of the mark-up, rather the differences across job type. Relatively small differences exist between temporary employees in information technology services, technical services, and clerical staff. Particularly interesting is that temporary employees in management classifications generate more than twice the mark-up for TSAs. Consistent with this evidence, we expect that positions requiring specialized labor and those designated for white-collar temps command a higher mark-up than do positions requiring more general skills and those designated for blue-collar temps. The higher mark-ups reflect the TSA's increased difficulty in identifying and recruiting persons with more specialized or higher-level management skills.

In examining how wages and mark-ups vary across job types, we conclude that premiums far in excess of 20.0 percent (perhaps more than double) are paid for temporary employees in management positions. We also conclude that firms place a premium on blue and pink collar positions, but that the premium probably ranges between 5 and 20 percent.

Despite the premiums which client firms pay to acquire temporary employees versus permanent employees, and the apparent equality of their productivity values, firms are turning with increased frequency to the use of temporary employees. What motivates firm managers to

pay extra for temporary employees? We argue that the premium firms are willing to pay at least partially reflects the value they associate with flexibility in relation to hiring decisions and hedging against exogenous shocks. While this flexibility is inherent in the temporary employee relationship, we believe that there are important differences across firms and their environments that dictate a need for such flexibility. Furthermore firms vary in their capacity to implement human resource strategies that are flexible in nature. By ignoring the benefits from such flexibility decision-makers undervalue a strategy of using temporary employees. Real option theory is useful for valuing both types of flexibility.

TEMPORARY EMPLOYMENT AND THE DETERMINANTS OF OPTION VALUE

Several authors have employed option theory for other strategic decisions, including joint venture acquisition (Kogut, 1991) and technology positioning investments (McGrath, 1997). It has also been used to describe tenure decisions for permanent employees (Malos & Campion, 1995; Hurry & Jackofsky, 1992). Relative to these studies, our context is broader in its application of the real options perspective to the selection of permanent employees and the ability of firms to “buy” a hedge against market anomalies and uncertainties. We assert that, through the options perspective, firms can defer virtually all employment commitments and legal liability in the selection and layoff processes. We also believe the added value of real option theory is not that it describes a process, but that it offers a set of rigorously defined relationships that explain the choice between flexibility and commitment. As a valuation tool, option theory is useful for understanding the opportunity costs associated with making ‘irreversible’ commitments. In the next section we highlight key variables that should influence when commitment to permanent hire is costly, or said differently, when flexibility is valuable.

A basic inadequacy of theoretical approaches that rely on net present value approaches to capital budgeting is that they cannot properly capture management's flexibility to adapt future decisions to evolving information. They make implicit assumptions concerning an 'expected scenario' of cash flows and presume management's commitment to a certain 'operating strategy'. Compared to permanent workers, temporary employees involve less financial and organizational commitment, providing client firms more flexibility to adapt their hiring strategies. Management's flexibility to adapt its future actions, depending on the environment, introduces value to the decision-maker which net present value approaches ignore.³ This necessitates the use of an expanded valuation framework that incorporates both components of a temporary employee's value: (1) the present value of the productivity value minus the costs, and (2) a premium for the flexibility inherent in its real options, O_T .

$$\text{Expanded } V_T = PV_T - C_T + O_T \quad (3-1)$$

Hiring permanent labor represents a key commitment made by the firm, particularly for firms with strong implicit labor contracts or those operating in regions where layoff decisions are tightly regulated. Thus, hiring permanent employees does not provide the same degree of flexibility. On the other hand, temporary employment gives flexibility to employers who, in taking on temps, have neither an explicit nor an implicit contract for continuing employment (Nollen and Axel, 1996). Unfortunately, no study has theoretically or empirically examined the factors where it is most important to use temporary workers for reasons of flexibility. This inattention may be due in part to the fact that many studies combine all types of contingent workers. An important observation is that temporary employees are a unique breed of contingent workers in that individuals remain the employee of the TSA, and not the client firm. Thus, in the

case of temporary employees, it is extremely clear that the client firms do not undertake the same level of commitment as they would if they hired permanent employees.

As illustrated in Figure 1, we focus explicitly on two types of flexibility -- two real options -- provided by temporary employment: the *option to wait* before hiring workers permanently, and the *option to abandon* temporary employees..⁴ First, firms can use temporary employment to screen individuals for permanent hire. Following the upper path, the firm initiates a call option (3a) and holds it for an indeterminate period of time, during which it conducts an assessment of the temporary employee's suitability for permanent employment. This period also provides an opportunity for the temp to generate skills while simultaneously generating productivity for the firm. Once the firm receives a 'strike' signal (4a), it can exercise its call option (5a) by hiring the candidate as a permanent employee or abandoning the option by releasing the employee. Alternatively, it can continue to hold its option by retaining the employee in a temporary status. The value of such a strategy arises because the client firm has the flexibility of hiring, or not hiring, depending upon the signal received regarding the employee's skill-level or fit with the organization. It avoids the problem of hiring permanent workers that are sub-par.

The lower path illustrates the second type of flexibility provided by temporary workers - they can be used to hedge against environmental shocks which may warrant workforce reduction. Holding the option (3b) involves assessment of market and environmental conditions. Determination of the need for a layoff constitutes a strike signal (4b) in this case, and exercising the call option (5b) occurs through disposition of temporary employees. Once again, the client firm can choose to hold their option by retaining the temporary workers. The types of workers used for the abandonment strategy will likely have skills that are not core the company's success.

Using this strategy, the firm has the option of laying off temporary workers, as opposed to suffering real and psychological costs associated with laying off permanent workers.

With both the option to wait and the option to abandon client firms can maintain the productivity value of the temporary employee, while limiting the risks associated with hiring permanent workers. Management's flexibility to adapt its future actions, depending on the environment or on what it learns, expands the true value of using temporary employees by maintaining, and in the case of the option to wait – expanding, its upside potential, while limiting downside losses.

Real options are driven by the same fundamental factors that influence call options on financial instruments. While important differences exist between real and financial options (see Kester, 1984), we can use option theory as a framework for identifying changes in option (flexibility) value. In general, the value of real options is driven by several fundamental factors including (1) greater irreversibility associated with hiring permanent employees, (2) exogenous uncertainty, (3) endogenous uncertainty, and (4) option duration.

Irreversibility

Hiring permanent employees represents one of the key commitments made by firms. The decision to hire permanent employees is difficult to reverse due to the inability to recover many of the costs associated with termination. Given the difficulty of reversing permanent employee hiring decisions, forgoing either option creates an opportunity cost that firm managers must include as part of the cost of the hiring permanent workers. We consider that three types of commitment influence the irreversibility associated with hiring permanent workers: explicit commitment, implicit commitment, and labor-market rigidities.

Explicit Commitment. Wages and benefits are part of the explicit contract established with

permanent hires. When firms layoff or displace permanent workers they incur short-term costs, such as unemployment benefits, severance payments and other entitlements such as early retirement packages (Cascio, 1993). These costs represent opportunity costs for firms considering hiring permanent workers. Firms that pay permanent workers higher wages and more benefits than average have more opportunity costs associated with hiring permanent workers. The implication from real option theory is that to avoid the opportunity costs associated with hiring permanent workers, firms with higher explicit commitment should consider temporary employees. One example of a firm following this strategy is Microsoft. They have actively hired temporary and other contingent workers specializing in software development in order to avoid paying the large benefit packages they pay to their staff of permanent workers. For companies like Microsoft, the irreversibility associated with hiring permanent workers is accentuated, creating a need more flexible employment relations.

Implicit Commitment. Some firms have a greater need for flexibility in employment due to a higher emphasis placed on implicit contracts with employees and outsiders. In contrast to explicit commitments, we believe that implicit commitments may have long-term effects on the organization. Such effects may consist of reputational damage brought on by repeated layoffs (Osterman, 1988; Worrell, Davidson, & Sharma, 1991), as well as difficulty in attracting quality employees when needed. Long-term effects may also include reductions in the morale, trust, and productivity of surviving employees, or loss of identity within the organization (Appelbaum, Simpson, & Shapiro, 1987; Whetten, Keiser, and Urban, 1995).

The psychological contract refers to beliefs about the terms of an exchange agreement between individuals and their organizations that are formed largely on the basis of the firm's part in the agreement. While firms do not directly renegotiate psychological contracts, per se, they do

alter employees' explicit contracts by events such as layoffs, effectively redefining the exchange agreement. By definition, if the terms of the exchange agreement change, then the psychological contract changes as well.

Laying off permanent employees may effect firms' psychological contracts differently. Firm managers use a combination of explicit and psychological contracts with employees to elicit cooperation; certainly both are always present. This cooperation could take several forms, including investments in firm-specific human capital or unobservable effort. Even in cases where firms can fully specify explicit contracts, psychological contracts are sometimes preferred to explicit contracts because, inasmuch as these contracts are not legally binding, contracting parties cannot rely on third parties to enforce them, and must turn to other mechanisms such as reputation and social relationships. The potential for decreases in the personal contracting costs of subsequent transactions with other agents creates an incentive to honor present psychological contracts (Kreps, 1990; Shleifer and Summers, 1988). Thus, breaking psychological contracts creates dis-utility for managers, and the greater the weight placed on psychological contracts, the greater the costs to the firm associated with laying off permanent employees.

A real options perspective offers two important implications for managers considering the use of temporary employees. Firms where psychological contracts are important should more readily employ temporary workers. Second, the use of temporary workers may enable firms to empower the organization by establishing or reestablishing psychological contract over time. If firms can use temporary employees, as opposed to permanent ones, as a buffer against environmental shocks, then the morale and commitment of the core permanent staff may improve over time. Furthermore, careful screening of managers through temporary employment practices may preempt the intrusion of inadequate permanent managers that hinder the development of

individual commitment to the organization.

Labor-Market Rigidities. Many managers claim that it has become more difficult in recent years to dismiss poor performers, as an increasingly litigious society combines with the erosion of the legal doctrine of employment-at-will (Dertouszos & Karoly, 1992; Krueger, 1991) and the provisions of various equal employment opportunity laws. States and countries differ in their labor market rigidities. In France, where strong restrictions are placed on dismissals of regular workers, the use of temporary services tends to be greater. In concert with increased costs associated with hiring permanent employees who turn out to be poor performers, employers are increasingly reluctant to offer negative appraisals of former workers, and the associated liability concerns reduce the value of such references when offered. As a result, commitment to permanent employees exposes firms to hazards, particularly when facing high product demand uncertainty or when they find it difficult to assess the quality of prospective employees. The implication is that variation in state employment laws limiting the doctrine of employment-at-will will influence the need for flexibility across organizations. Even a single organization, with offices or subsidiaries spanning across geographic borders, should consider adapting its use of temporary employees to the legal environment.

Exogenous Uncertainty

The risks associated with irreversibility are greatest for uncertainty that is beyond the control of managers (Dixit & Pindyck, 1994; McDonald & Siegel, 1986). Real options literature labels this type of uncertainty 'exogenous uncertainty'. It refers to the uncertainty arising from aggregate economic conditions, product demand, industry infrastructure, and the legal environment confronting the firm, and is predominantly *resolved over time, not through hiring decisions*.

Commitment to permanent hires in the midst of exogenous uncertainty may expose the firm to firm, industry, or national or global shocks that devalue assets and motivate a reduction in the workforce. When exposed to such hazards, it may be necessary to drastically revise the number of employees in the workforce to remain competitive. Temporary employees provide a buffer against displacement of permanent employees in the event of firm or industry shocks (Mangum, Mayall, & Nelson, 1985), and significantly reduce the opportunity cost associated with hiring permanent employees. They provide increased flexibility over permanent employees due to the relative ease with which the firm can expand and contract its workforce or reorganize assignments (Christensen, 1989). In this case, firms have no intention of transitioning temps to permanent employee status.

In contrast to the detrimental impact of permanent employee layoffs on survivors' trust, morale, and productivity, Osterman (1988) found that the use of temporary employees to absorb downsizing and layoff actions creates enhanced job security, commitment and flexibility for permanent employees. Further, the firm's role as client rather than employer precludes any financial obligation to displaced temporary employees. As a result, and because temporary employees accept their assignment with an explicit understanding that either they or the firm may terminate the relationship at any time, firms risk neither the financial costs nor the intrinsic survivor or reputational costs attendant to laying off permanent employees. Taking into account reduced commitment on the part of the firm and the increased flexibility gained by the firm, the use of temporary employees represents an option to defer commitment to permanent hiring.

The implication from real option theory is that firms facing exogenous uncertainty should be more willing to pay premiums for temporary employees. Industries in early stages of development represent environments exposed to exogenous uncertainty. One challenge,

however, is that firms in such industries may also need to develop expertise and specialized knowledge. The use of temporary employees in such setting may undermine a firm's competitive strategy, as temps may take such knowledge with them (Matusik, 1999). Other industries ripe with exogenous uncertainty include industries that are highly competitive, where consolidation is likely, or where government regulation is anticipated. In each case, the use of temporary employees as a buffer may be particularly warranted, and firms should pay extra for such a hedge. We caution, however, that for such a purpose the use of specialized employees - those central to the firm's competitive advantage - may be detrimental.

Within an industry, firms may be differentially positioned to confront exogenous shocks. Firms that are well-diversified may be able to reposition employees seamlessly across divisions. The implication is that single-industry firms confronted by exogenous uncertainty may find temporary employees more valuable. Some firms may have different aptitudes for confronting exogenous uncertainty. For example, firms that actively explore new product or geographic domains are exposed to more uncertainty. Exploration may occur in greenfield development or in new joint ventures. The use of temps to complement permanent staff may prove a nice hedge in such environments.

Endogenous Uncertainty

Unlike exogenous uncertainty, endogenous uncertainty represents uncertainty that can be reduced by firm action. Endogenous uncertainty may arise from an inability to assess the compatibility of prospective employees through the hiring process, or it may relate to ambiguity in assessing an employee's qualifications or skill level. Positions where there is a strong emphasis on tacit knowledge or interpersonal skills represent those that are ripe with endogenous uncertainty. This kind of uncertainty can only be resolved through learning—actually previewing

the employee in action so that learning can occur incrementally. Thus, endogenous uncertainty makes hiring through the temporary employment market more attractive, because organizational interaction provides the temporary employee with an opportunity for in situ acquisition of tacit knowledge and reveals added information about employees to the firm prior to a permanent hire commitment. The ability to temporarily or permanently discontinue investing in a temporary employee who fails to meet expectations represents the key characteristic that makes using temporary employees most attractive with regard to endogenous uncertainty (Roberts & Weitzman, 1981). The possibility of stopping midstream makes temporary employment analogous to compound options; each stage completed gives the firm an option to commit additional resources to the opportunity. In the presence of endogenous uncertainty, firms will find it valuable to use temporary employment as a screening device before hiring permanently.

Endogenous uncertainty is ripe in positions that are managerial. Paul Dinte, President of Dinte Resources, argues that “eighty percent of failed executive appointments are due to incompatibility.” Temporary managers have the opportunity to prove both how they perform – including their command of two important management skills, leadership and communication – and how well they fit the company’s needs (Melchionno, 1999). As mentioned earlier, managerial positions represent the fastest growing segment of the temporary help services industry. According to our calculations, it also represents the segment where firms are willing to pay the highest premiums. Other positions, however, have endogenous uncertainty associated with them. Clerical staff positions, while requiring general skills, also require interpersonal skills that are hard to observe. Certainly, we expect job types to differ according to endogenous uncertainty.

Organizations will differ in the importance they place on reducing endogenous uncertainty. For example employers who strongly consider personal or organizational fit may find it valuable to using temps as a screening device for many types of positions. Organizations with strong corporate culture may be concerned about integrating a certain type into the firm. We expect these firms to be more willing to pay premiums for temporary employees.

Organizations will also differ in their ability to reduce endogenous uncertainty. This may impact the timing of the exercise decision, and consequently a firm's payoff to using temporary workers. The more quickly a firm can thoroughly assess a temporary employee's potential for contribution, the sooner they will move to exercise their option to either hire the employee permanently or layoff the employee. Thus, assuming that transition to permanent employment is the goal of the temp and the firm, it makes sense for the firm to provide an environment conducive to integrating the temporary employee in order to speed up the learning process.

Integrating mechanisms might be classified as either formal or informal. Formal mechanisms include team assignments, structured performance feedback, and solicitations by managers for suggestions on products or processes. Informal mechanisms might include attendance at social events inside or outside normal work periods. Firms with formal integrating mechanisms should be better able to resolve endogenous uncertainty. However, it is unclear whether formal mechanisms are desirable. Such mechanisms have greater real costs. Furthermore, it may be that formal mechanisms increase the rate at which knowledge leaves the organization. Matusik (1999) found that knowledge accumulation from contingent workers was improved with formal mechanisms, and negatively influenced by informal mechanisms. This may suggest that employees where formal mechanisms are present are more likely to remain satisfied and stay with the organization.

Firms having stronger implicit contracts with the organization may display more cooperation among employees. To the extent that such attitudes permeate the firm, formal and informal interactions may more readily occur in the organization, opening up opportunities to evaluate temporary employees. Firms with high absorptive capacity or combinative capability tend to learn more efficiently from internal and external parties. The factors which assist the learning of new capabilities may also bear upon learning about the qualities of temporary workers. One factor which should increase the capacity to learn about temporary workers is experience. Repeated involvement with temporary workers should enhance the speed at which firms can discern employee potential. It may make sense to allocate firm resources to develop organizational knowledge about the temp recruiting and evaluation process. This effort is important mostly for conditions where firms are hiring temporary workers as a screening strategy.

Option Duration

Option duration refers to the length of time the firm has until it must exercise the option to hire as permanent workers or abandon its temporary workers. In general, the longer the option duration, the more valuable is the option. It gives the firm more opportunities to reduce endogenous uncertainty, or provides a longer period over which exogenous shocks may occur. Most temporary assignments have fixed termination dates attached to them. If firms are pursuing temporary employees for reasons of flexibility, it is most valuable to institute a lengthy contract duration.

Recent legislation suggests that there may be some upward limit to the duration of the temporary employment relationship. Microsoft was recently ordered to compensate temporary

employees of more than one year for benefits they did not receive. The implication is that the “temporary” status of individuals only holds if they are employed for less than one year.

CONCLUSIONS AND DIRECTIONS FOR FUTURE RESEARCH

The use of temporary employees has increased dramatically in recent years, a trend which is expected to continue into the next century. Flexibility is one of the key benefits linked to the increased use of temporary employment. Our key assertion is that neither theoretical nor empirical research has kept pace with the popularity of temporary employment services. We examined the issue of flexibility using real option theory. In particular, we have accomplished three objectives: (1) argued that firms pay premiums for temporary employees, (2) explained why firms pay premiums for temporary employees, and (3) justified when firms should implement strategies for using temporary employees. Below we summarize these contributions and discuss implications of these findings.

Our work complements the study by Segal and Sullivan (1997) by examining mark-ups for temporary employees. While they exploited the wage differences between temporary employees and permanent employees, they left relatively unexplored the issue of mark-ups. Our study yielded some insight into average mark-ups, as well as differences across job types. Piecing our mark-up data with Segal and Sullivan’s wage data we determine that firms pay premiums for temporary employees and argue why those premiums exist. Given the growing research in the temporary services industry, it is rather surprising that the relative costs of temporary and permanent employees are yet known. Certainly, more systematic work needs to explore how wages, benefits, and mark-ups differ across job types, controlling for attributes of the individual, the client firms, and the TSAs. Our work provides a first glimpse at the relative cost picture.

We also explicitly characterize temporary employment as offering two types of real options. The option to hire temporary employees permanently, and the option to abandon temporary employees in the midst of exogenous shocks. Both options provide the firm with flexibility that can not be accurately appreciated using traditional net present value approaches. Using real option theory we uncover the determinants of option value, and suggest that firms will pay premiums for temporary employees in the presence of option value. In the presence of irreversibility in hiring permanent workers, exogenous uncertainty, endogenous uncertainty, and high long duration of the option, firms will find temporary workers more valuable. Exogenous uncertainty encourages a strategy of hedging with temporary employees that provide general skills. Endogenous uncertainty motivates the hiring of temporary employees as screening devices. Legislative limits on the duration to exercise the option may reduce the relative value of temporary employees.

Finally, real option theory provides insights into the differential ability of firms to use temps for reasons of flexibility. For example, the use of temporary employees may enable firms to place more emphasis on building reputations and psychological contracts, enabling them to find and develop more motivated employees. Geographically diversified firms should adapt their use of temporary employees according to the labor rigidities in their environment. Firms that can more quickly discern the productive value of temporary workers will benefit more from using them for reasons of flexibility.

There are implications to our real option perspective that we have not fully explored. For example, some may not agree with our call to use temporary employees as a screening device, since other alternatives exist. We believe temporary employment offers firms a selection method with improved predictive validity. Predictive validity refers to correlation of applicants'

selection test scores with their job performance after a given period of time, typically one year (Schriesheim, 1997). Researchers have examined a number of selection techniques in an attempt to develop increased predictive validity in practitioner selection measures, with only limited success. These measures include aptitude tests (Ghiselli, 1973), situational interviews (Latham, 1989), personality dimensions (Barrick & Mount, 1991), integrity tests (Ones, Viswesvaran, & Schmidt, 1993) and various combinations thereof (e.g., Hunter & Hunter, 1984; Reilly & Chao, 1982). The desire for selection measures with increasingly high validity arises precisely from the need to reduce uncertainty and information asymmetry in the hiring process, thereby increasing the ability of employers to accurately assess the 'fit' of candidates and reducing the costs associated with selection errors.

Directions for Future Research

We believe that the real options model we presented motivates many opportunities for empirical research. Logit, probit, and event history methodologies would all be useful in attacking the theoretical questions we have motivated. Examining the importance of external commitment, internal commitment, and labor-rigidities is an obvious starting point. What bearing do these factors have on the choice between hiring temporary and permanent employees. Do firms having a strong reputation in the market for labor, or firms emphasizing psychological contracts use temps more frequently? Examining whether firms having experience in the temp market demonstrate a greater use of temporary employment is an important starting point for understanding the role of firm learning. At the level of the individual, it is worth exploring whether experience influences the rate at which firms exercise their options.

One challenge facing researchers using our model is that the option value cannot be directly observed. It may be possible to infer factors that directly relate to option value by employing a

tobit model with unobserved stochastic threshold. Gimeno, Folta, Cooper, and Woo (1997) used such a model to examine the determinants of entrepreneur's unobservable threshold for staying in business.

We believe much remains to learn about the strategic use of temporary employees. This article represents an initial step in theoretically examining several questions pertaining to this increasingly important aspect of flexibility in human resource management.

¹ One example of a firm following these motives is Microsoft's use of temporary software specialists. One explanation for Microsoft's heavy reliance is an attempt to eliminate the need to pay stock options to employees.

² At the level of the divisions, the cost of services was not reported, however, the operating margin was reported. We backed into the cost of services by using the firm's average administrative expenses.

³ Flexibility to adapt introduces an asymmetry, or skewness, in the probability distribution of NPV that expands the investment opportunity's true value by improving its upside potential, while limiting downside losses relative to management's initial expectations.

⁴ Figure 1 represents a model adapted from the Malos and Campion (1995) model of career mobility in professional service firms.

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TSA	1998	1997	1996
Kelly Services, Inc.	21.7%	21.5%	22.8%
Manpower, Inc.	20.5%	22.0%	23.3%
Olsten Corporation	31.4%	36.4%	39.4%
CDI Corporation	33.9%	30.8%	29.4%
NATTS	35.1%	34.5%	38.6%
14-firm average from SIC 7363**	-	28.7%	28.3%
14-firm weighted-average from SIC 7363**		30.1%	

* calculated by taking firm's annual revenues and dividing by cost of services, which includes expenses associated with payroll, payroll taxes, and benefits. It appears that the NATTS average did not consider the cost of benefits.

** 14 firms represented in Compustat data base

TABLE 2
1977 Employed Workers with Temporary and Traditional Permanent
Work Arrangements by Occupation*

Occupation	Temporary Workers (1)	Permanent Workers (2)	Temporary Help as a Percent of Permanent Employment (3)	Wage Differences in Temporary vs. Permanent Employment ^a (4)
Executive, Administrative, and Managerial	6.90%	14.00%	49.3%	2.1% ^b White
Professional Specialty	6.60%	15.30%	43.1%	Collar
Technicians and related support	5.80%	3.40%	170.6%	Residual category
Sales occupations	1.70%	11.70%	14.5%	Residual category
Administrative support, including clerical	34.10%	15.30%	222.9%	-12.0% Pink Collar
Services	9.00%	13.50%	66.7%	Residual category
Precision production, craft, and repair	5.20%	10.30%	50.5%	
Operators, fabricators, and laborers	29.10%	14.30%	203.5%	-15.6% Blue Collar
Farming, forestry, and fishing	1.60%	2.20%	72.7%	
Total Percent	100.00%	100.00%		

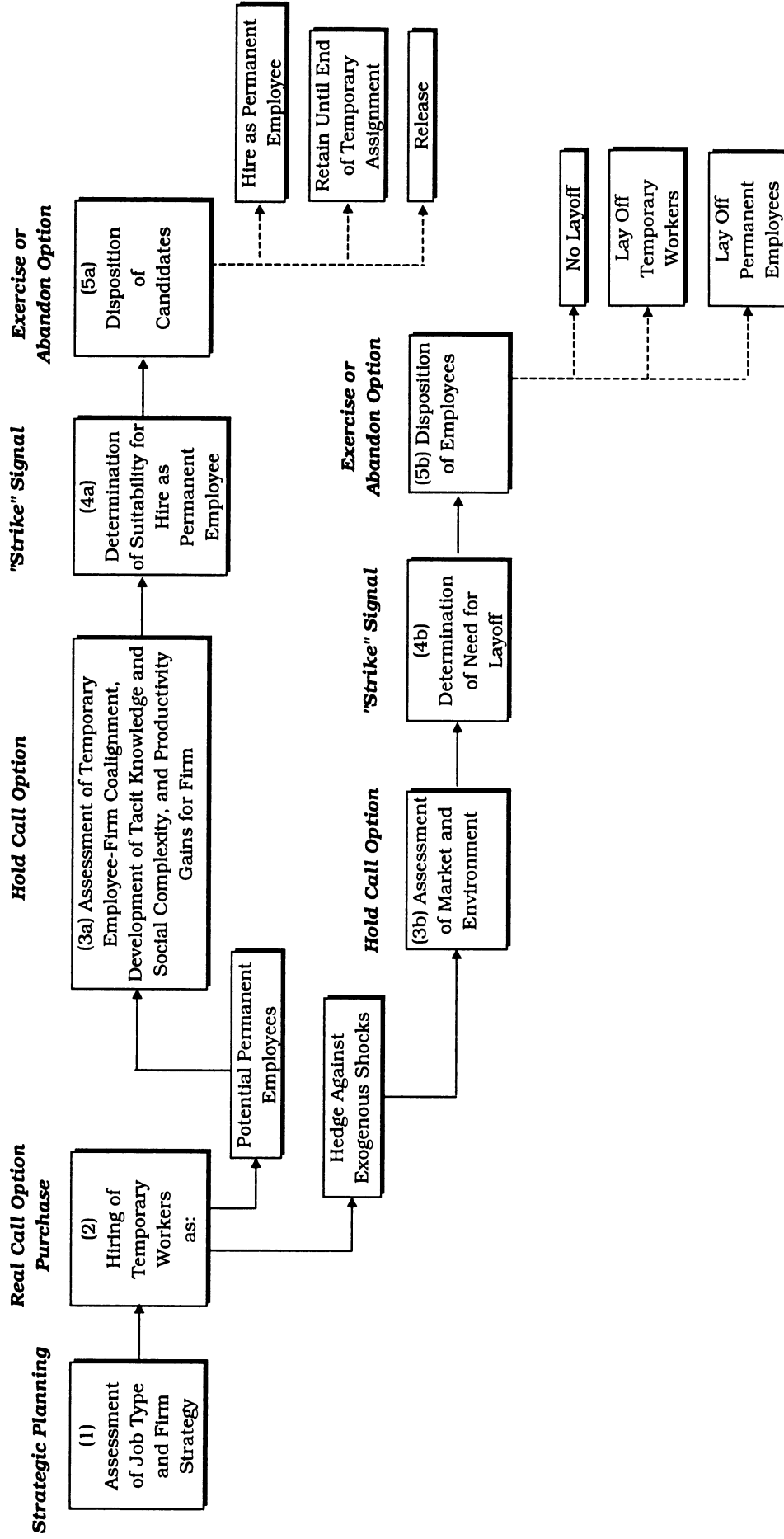
* Data is from Bureau of Labor Statistics (1997)

^a Data is from Segal & Sullivan (1997) who used Bureau of Labor Statistics data from 1983-1993.

These percentages were arrived at after controlling for age, race, sex, education, census division, metropolitan area, union status, part-time status, and one digit occupation.

^b Not statistically different from zero.

FIGURE 1
A Real Options Model for Temporary Employment



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