

Social Capital and Retraining¹

Peter Cappelli

The Wharton School

University of Pennsylvania

Philadelphia, PA 19104-6370

And NBER

215-898-2722

FAX: 215-898-5908

cappelli@wharton.upenn.edu

¹ Support for this study was provided by a grant from the U.S. Department of Education to the National Center for Post-secondary Improvement (NCPI) and by a grant from the Russell Sage Foundation. Thanks to Bill Carter for careful research assistance, to participants at the Carnegie Mellon/University of Pittsburgh Organizational seminar, and to Dan Levinthal for pointing me to the social capital literature.

Social Capital and Retraining

Abstract

Why are some employers willing to retrain workers who are at risk of layoff for new jobs in their organization while others “churn” their workforce through layoffs and outside hiring? The question seems central to understanding why some employers and some jobs are “good” while others are not and, more generally, for understanding employment security. The arguments below use national probability data to examine this question and find that the retraining option is associated with preserving the social capital among current employees. Employers who make greater use of work systems that rely on social capital are more likely to retrain their workers. Alternative explanations – that retraining is an employee benefit associated with employee-friendly policies or is part of overall strategy of investment in training – receive no support. These results extend our understanding of the role that social capital can play in organizations.

Introduction and Context

Interest in understanding why some jobs are insecure is a central topic in the social sciences and dates back at least to the reform movements of the early days of industrialization (see, e.g., Webb & Webb 1965; Commons 1964). In the contemporary context, corporate restructuring has become the main driver of job insecurity. An American Management Association survey, for example, finds 66 percent of the employers responding that downsizing in their companies during the 1990s was driven by internal restructuring and reengineering, in contrast to more traditional explanations that relate job loss primarily to business cycles (AMA 1997). And

roughly a third of all companies reported that they were hiring new workers during layoffs in order to get the new skills they need to accommodate their restructuring plans (AMA 2000).

This process of restructuring by laying off and hiring -- “churning” the workforce -- externalizes the costs of restructuring to the laid-off employees and increases the demands on other providers of skills in society. Retraining is in many ways the opposite approach to restructuring in that it internalizes restructuring costs, stabilizing employment and expanding overall skill levels in the process. Because of these very different consequences, the decision to “churn” or retrain is increasingly central to discussions about the responsibilities that employers have to workers and society.

The *Robert's Dictionary of Industrial Relations* (1986), which draws its definitions from usage in previous research studies, defines retraining as fundamentally *different* skills made necessary because of some exogenous change in skill requirements. A major drawback to this definition is that it can be very hard to distinguish retraining from the more general skill upgrading that happens routinely in the modern workplace when jobs change. How different the new skills have to be before regular skill upgrading becomes retraining is arbitrary, making the distinction less than completely helpful.

A more useful conceptualization of retraining turns on the fact that retraining embodies a fundamental “make-or-buy” decision: One either retrains the otherwise at-risk employees for new or substantially altered jobs or the alternative is to lay them off and hire new workers who already have the skills needed for the new jobs. Retraining, therefore, can be defined as the decision to invest in the skills of workers who would otherwise be at risk of losing their jobs

unless they acquire new skills. Jobs may be at risk even where the skill gap is small if it is easier to hire the new skills on the outside market. This definition has the advantage of drawing a conceptual distinction, rather than a point along an empirical continuum, between retraining and more common skill upgrading and does not require an arbitrary assessment of the size of the skill gap. It also focuses attention on a central policy outcome of retraining, avoiding layoffs and preserving jobs.

There is ample evidence that employers understand that they face a make-or-buy choice between hiring new skills on the market and retraining existing employees. Practitioner publications, for example, routinely examine the pluses and minuses of the two options (e.g., Bartholomew 1997, Asbrand 1993.) Public policy attention has also turned to the make-or-buy aspect of the employer's retraining decision, such as California's Employment Training Panel, which provides resources from the unemployment insurance fund for employers to retrain workers who would otherwise be displaced because of shortfalls caused by changing skill requirements (Osterman & Batt, 1993).

Explaining the Decision to Retrain

A logical place to begin understanding why employers retrain would be with prior findings about retraining, but there is very little there. Aside from proscriptive arguments, actual reports of employer practices are limited and suggest considerable diversity in the choice between hiring employees with new skills and retraining the ones they have (Bartholomew 1997). Case studies in Europe, where the retraining option would seem to be advantaged because of greater restrictions on layoffs, find that recruiting new employees seemed to work better for employers than attempts at retraining existing workers in part because it delivered the new skills so much

faster (JEIT 1995). On the other hand, where labor shortages are severe and outside hiring more difficult, employers seem more inclined to retrain current employees, as was the case with the introduction of client/server technology in information technology where 96 percent of firms surveyed engaged in some retraining (Melymuka 1995). In other contexts, however, information systems groups seemed particularly inclined to hire rather than retrain (see, e.g., Moad 1990). Other reports show that firms consider outsourcing as an alternative to retraining (Hoffman 1995), which is another form of buying skills on the outside market. Reports like these highlight the importance that labor markets play in shaping the decision to retrain because they shape the relative merits of the alternative to retraining, which is outside hiring.

Prior research related to the more general concept of employer training may offer more insight. Becker's (1964) now famous work on the financing of employer-provided training asserts that employers would find it difficult to provide any training, let alone retraining, where the skills required for the new or alternative jobs are general skills also useful to competitors, at least without mechanisms to have the employees share the costs. One would therefore not expect employers to retrain for general skills when they could hire those skills on the outside market. Where the new skills required are specific to the employer, the employer has to provide them because the option of buying such skills on the market does not exist. But whether the firm-specific skills should be provided to new hires or to otherwise redundant employees – that is, whether the employer should hire and train or simply retrain – is unclear.

Some part of the explanation about retraining no doubt turns on simple cost issues beginning with the fact that retraining spares the employer the costs associated with hiring. Understanding

the retraining decision should therefore consider the relative costs of hiring as compared to training, an issue I return to below. Another cost factor that would seem to be relevant in deciding which approach is cheaper is the relative wage of the retrained workers as compared to that for new hires from the outside market. But this factor ends up being endogenous to the employer's decisions and therefore difficult to evaluate. While the *market price* of workers who can perform a given job is exogenous to the employer, the employer may decide to pay its retrained workers something other than the market wage -- possibly less, at least during the training, to recoup the training investment but quite possibly more if pay policies in the firm incorporate seniority provisions or other arrangements that cause the wages of individuals to differ within the same job. The wage of retrained workers relative to new hires, therefore, is very much a function of the employer's internal wage policies. Unless driven by some outside factor such as union contracts (see below), these wage decisions appear to be part of the employer's choice set along with retraining decisions.

Organization-level studies of employer-provided training take a different approach, emphasizing the possible synergies between the decision to train and other practices. Knoke and Kalleberg (1994), for example, show how characteristics of internal labor markets are related to employer-provided training. In these situations, the decision to train may reinforce the operation of internal labor markets by facilitating internal promotions and helping to retain existing talent. A number of studies relate organizational characteristics such as size (Osterman 1994), capital intensity (Bartel 1989; Lynch & Black 1998), and unionization (Frazis et al. 1995) to training. The factors behind these findings – greater scale economies, opportunities for productivity improvements, and restraints on mobility – enhance the ability to provide training investments of

all kinds. Knoke and Janowiec (1998) examine a different make-or-buy training decision, whether training is outsourced or done internally, in part based on complementarities with other practices and characteristics such as internal labor markets. It is not obvious whether retraining is driven by the same factors as regular training, but the notion of synergies with other practices may be part of the explanation. Overall, however, it seems fair to say that the literature on training does not offer anything like a definitive explanation as to why some employers retrain their workers.

The Role of Social Capital

A more novel and useful explanation that also relies on the notion of synergies concerns the role of social capital in the workplace. The notion of social capital as articulated by Coleman (1988; 1990) emphasizes the potential value of relationships between individuals as a resource for facilitating a range of outcomes. Because it is an asset that exists *between* individuals rather than within each individual, social capital may suggest why it could make sense to reinvest in and retain individuals even if their job-specific skills are obsolete: The relationships they maintain with others may create value that extends beyond their ability to perform their current job.

There is now a considerable literature on social capital that suggests several mechanisms through which it is created and a range of benefits from it. Space constraints prevent a detailed review of this literature, but a brief summary suggests the following. First, there are different, but not necessarily conflicting, arguments about the source of social capital, all of which focus on the underlying idea of networks of relationships. A somewhat older set of studies emphasizes the value of “weak ties” in the sense of a network of acquaintances and other contacts (Grannovetter 1974). The information and obligations created by these networks can be useful to individuals in

the labor market as well as other activities (Bourdieu 1986). Another argument suggests the importance of the structure of network relationships, in particular, whether they provide opportunities for the individuals in them to act as a broker between other individuals or networks that have little contact with each other but that might benefit from such contact (Burt 1992).

Most of the research on social capital emphasizes the benefit of these social relationships to the individuals in them, especially how social capital affects employees within organizations. For example, Granovetter (1974) looks at how networks affect hiring prospects, and Podolny and Baron (1997) find that social ties affect promotion prospects. Some of the original research on social capital went on to suggest how the benefits to individuals aggregate up to social benefits, for example, that communities whose networks facilitate the employment of their members are healthier in related dimensions such as reduced unemployment, crime, etc. (e.g., Coleman 1988).

What has been under-represented in discussions of social capital are the potential benefits to organizations that result from these social relationships. Krackhardt and Stern (1988) provide an important exception by demonstrating that group performance was higher in situations where there were more cross-group friendships, and Pennings, Lee, and vanWitteloostuijn (1998) show that employee tenure is positively related to organizational survival. Two recent conceptual articles develop new arguments about social capital and organizational outcomes. Leana and Van Buren (1999) argue that social relationships within an organization (defined broadly) facilitate trust, which, in turn, makes it easier for the individuals in the organization to define and then enact collective goals. Positive social relations might therefore make it easier to pursue any organizational goal (although negative social relations, such as conflict, presumably would have

the opposite effect).

Nahapiet and Ghoshal (1998) take a different approach and suggest how social relationships within organizations can facilitate the development of intellectual capital by making the internal transfer of knowledge easier. It is an argument presaged by Blau (1955) who showed how advice about tasks in the workplace is passed along social networks. The Nahapiet and Ghoshal argument makes use of the equally large literature on organizational learning, which space constraints make difficult to review in detail. In brief, the argument turns on the importance of tacit knowledge for organizational success (Polyani 1967); how such knowledge is in many ways a characteristic of organizations rather than individuals (Nelson & Winter 1982); and on the considerable research showing how social relations between individuals either facilitate or block that transfer of knowledge (e.g., Weick & Roberts 1993).

These arguments suggest a direct connection between social capital and retraining that turns on the make-or-buy choice that underlies the retraining decision. If a firm chooses not to retrain, it replaces existing employees with new ones. In the process, social networks in the workplace are disrupted, and social capital is destroyed. If it does retrain, it preserves social networks and retains social capital. To the extent that retraining reduces turnover that might otherwise occur, it enhances social capital by retaining social networks. Krackhardt and Porter (1985) illustrate explicitly some of the potential costs to current employees and the organization that stem from layoffs that disrupt social networks. There is also an extensive body of research on the composition of teams and team performance that suggests the value of stability in team roles (Hackman 1990) in part because of the difficulty in getting a good fit between individuals and

teams (Klimoski & Jones 1995; more generally West, Borrill & Unsworth 1998). The issue of the composition of teams and its relationship to performance is a topic of growing importance (e.g., Stewart & Barrick 2000). In an economic sense, social capital can be thought of as a particular type of fixed investment that can be preserved through retraining. One way to think of this relationship is that it may take less of an investment to retrain redundant employees to make a contribution than to hire new ones because the former already have important firm-specific investments in social capital. But the investment is in relationships, not skills. The type of social capital that is relevant from this perspective is the Coleman variety about strong networks among participants rather than either the weak-tie (Granovetter) or structural hole (Burt) versions where diffuse networks provide information useful for individual career advancement.

One problem with the above arguments is that because they appear to suggest that preventing layoffs through retraining is valuable everywhere, they do not per se offer an explanation as to why some employers find it useful to retrain employees and others do not. A simple alternative is just that some situations make social capital more valuable than others. Some organizations, for example, rely on bureaucratic management and work organization practices based on rigid rules and procedures for decision making that are designed in part to be relatively impervious to social relations and resilient to employee turnover. The classic example of assembly line operations based on the principles of scientific management seem to fit that model in that they reduce opportunities for social relationships to affect the work process (e.g., Braverman 1974). In such circumstances, social capital should be much less important as a means of getting work done. Work systems based on teamwork and empowered groups, in contrast, rely much more heavily on the social relationships between employees and therefore on social capital to operate

effectively. (The considerable proscriptive literature on the requirements of teams asserts that communications and constructive interpersonal relationships are a necessary condition for their success. See, e.g., Wellins et al. 1994 and Hackman 1990 for a scholarly interpretation.) Much of the benefit of these work systems may also come from the social capital that they generate – the sharing of information and ideas in particular that facilitates organizational learning (see, e.g., Nahapiet & Ghoshal (1998) above). And this leads to the main hypothesis of the study:

H: 1 Employers Who Use Work Systems that Rely on Social Capital Are More Likely to Retrain Their Employees.

It is also plausible that the causation in the above arguments might be reversed. Firms that are actively engaged in retraining might find it easier to introduce work systems that make greater use of social relationships. The reasons relate to the findings in social capital research concerning “closed networks,” that norms and values conducive to getting work done are more easily developed in workplaces and social relations where there is limited entry and exit, in this case, reduced layoffs and subsequent hiring (Coleman 1990). I return to this issue below.

There are other factors that may influence the decision to retrain as well. It is important to consider them if for no other reason than to be certain that we do not attribute any of their influence to the social capital hypothesis above. One potential explanation relates to labor markets and shapes the costs and benefits of the “make or buy” or hire or retrain decision, and that is the magnitude of the fixed costs noted earlier that are associated with hiring and firing employees. Other things equal, employers should find it more efficient to retain and then retrain the existing workforce where those fixed costs are greater, that is, where the alternative of laying

off and hiring new workers is more costly. Greater hiring costs or dismissal costs, such as severance pay, should encourage employers to pursue the retraining route, other things equal.

H: 2. Employers with Greater Fixed Employment Costs Are More Likely to Retrain.

Another alternative to the social capital explanation is simply that there is something about an employer's operation that creates a comparative advantage in training of all kinds, including retraining. That is, employers who find it cost-effective to provide more traditional training may be more likely to provide retraining as well. Labor market circumstances, such as an isolated location, encourage all forms of training investments by making it difficult for employees to leave and take training investments with them. Employers that provide greater levels of regular training may therefore also find it easier to provide retraining – either because all forms of training are easier for them to deliver or because greater training proxies firm-specific skills. Similarly, employers whose jobs require relatively more general skills may be less inclined to train or to retrain and more inclined to hire the skills on the outside market.

H: 3 Employers That Invest More in Training Are More Likely to Retrain Their Employees.

As noted above, arguments about the benefits of stable employment in terms of individual employee morale and commitment to organizational goals are also a central part of the “best practice” literature in employee relations (e.g., Kochan & Osterman 1994; Pfeffer 1995). The arguments motivating the best practice literature are very much like traditional welfare capitalism arguments in their focus on the attitudes and behaviors of individual employees. They suggest, for example, that norms of obligation or reciprocity are created by employer practices

that protect or benefit employees, particularly practices that are not mandated by law or union contracts but that are in some ways voluntary. Employees may respond to them with enhanced commitment, greater initiative, and reduced resistance to organizational change efforts (e.g., Osterman 1994, among others).

The argument that employers retrain because it improves employee morale and contributes to individual performance is complicated, however, because the basic evidence that employee morale per se contributes to organizational performance is less than compelling (see, e.g., Cotton 1993 for a survey), and new research indicates that employee commitment, the central attribute in this model, may be much less related to the sense of obligation and reciprocity associated with the value of employer contributions than to other factors (see Rodgers 2000 for a survey).² More generally, some employers may pursue practices thought to be good for employees because they have paternalistic ideals; they may be trying to create a sense of obligation to drive improved employee performance; they may be interested in union avoidance through practices that substitute for union provisions; or they may simply follow the best practice literature and its advice. These motivations may be condensed at an aggregate level to the following hypothesis:

H4: Employers That Pursue Employee-Friendly Policies Are More Likely to Retrain Their Employees.

Data, Variables and Specific Hypotheses

In order to examine these hypotheses, we need data about work practices, technology, and

² Further, the best practice arguments like those above do not by themselves explain why some employers would pursue retraining while others do not. Some authors suggest that these practices should be, more or less, universally useful (e.g., Pfeffer 1995). One could construct an argument, similar to the one presented above, suggesting that some situations offer greater opportunities for employee attitudes to affect organizational performance than others, although it may not be so obvious how to identify those situations.

wages, a combination that has been difficult to find in the same data set. A recent establishment-level survey of employment practices conducted by the Bureau of the Census for the National Center on the Educational Quality of the Workforce (EQW) contains such data and allows us to address some of the above questions (see Cappelli 2001 for a detailed description of the data).

The EQW National Employers Survey was administered by the U.S. Bureau of the Census as a telephone survey in August and September 1994 to a nationally representative sample of private establishments with more than 20 employees. The survey represents a unique source of information on employment practices. It is structured to provide information on all categories of incumbent workers, not just new hires or those in core occupations.

The survey over sampled establishments in the manufacturing sector and establishments with over 100 employees. Public sector employees, not-for-profit institutions, and corporate headquarters were excluded from the sample. Although the survey excluded establishments with fewer than 20 employees (which represent approximately 85 percent of all establishments in the U.S.) the sampling frame represents establishments that employ approximately 75 percent of all workers. The target respondent in the manufacturing sector was the plant manager and in the non-manufacturing sector was the local business site manager. Because the goal is to learn about actual practice in the facility, not about policies, it is more important to have local operating managers respond than corporate officers in human resources. The survey was designed to allow for multiple respondents so that information could be obtained from establishments that kept financial information, for example, in a separate office – typically at corporate headquarters for multi-establishment enterprises. Computer Assisted Telephone Interviewing (CATI) was used to

administer each survey, which took approximately 28 minutes to complete.

The sampling frame for the survey was the Bureau of the Census Standard Statistical Establishment file, one of the most comprehensive and up-to-date listings of establishments in the United States. Of the 4,633 eligible establishments that were contacted by Census, 1,275 refused to participate in the survey. This represents a 72 percent response rate, which is substantially higher than similar establishment surveys. The usual reason given by employers for why they would not participate in the survey was that they did not participate in voluntary surveys or were too busy to participate. Probit analysis conducted by Lynch and Black (1998) of the characteristics of non-respondents indicates that there was no significant pattern at the two-digit industry level in the likelihood of participating in the survey. The only differentiating characteristic of establishments less likely to participate was that manufacturing establishments with more than 1,000 employees, 0.1 percent of the sample, were less likely to do so. For the analyses below, we restricted the sample to establishments reporting useable data for all questions used in any of the regressions to ensure that differences across specifications or across different dependent variables do not reflect changes in the sample.

The Dependent Variable

Finding appropriate measures of retraining activity is certainly one of the significant challenges in studying the retraining decision. As noted above, attempting to identify retraining by examining the content of training programs is problematic. A straightforward alternative relying on the definition of retraining outlined above is simply to ask employers directly whether they retrain employees who are otherwise at risk of layoff.

A question in the NES survey asks: “Does your establishment currently provide retraining opportunities to employees at risk of losing their jobs due to economic conditions?” The phrase “economic conditions” was designed to rule out situations where the potential job loss was within an employee’s control, such as that attributable to poor job performance. It is possible, despite the wording of the question, that some of the employers that answered “yes” were in fact retraining employees who were *already laid off* to find jobs at other employers. That is, the retraining was a form of outplacement assistance rather than an investment with direct benefit to the employer. The motivation for retraining employees to help them leave the organization might certainly be different from that suggested above. A search of the literature on these outplacement-based retraining programs suggests that, by 1994, they were rare and limited to a few collective bargaining agreements, most prominently in autos. Controlling for the presence of unions in the analyses that follow should control for any such instances.

The survey question has another complication that may affect its interpretation, however. Employers who answer “yes” to it clearly fit the definition of offering retraining. But the interpretation for those that respond “no” is potentially more complicated. A “no” response indicates that they do not retrain workers at risk. But it might possibly mean that they do not because they currently have no workers at risk and that they might offer retraining if they ever did have at-risk employees. The distinction between those that respond yes and those that respond no does correspond to those employers that do and do not have a practice of offering retraining. But it might not perfectly map onto the distinction between establishments that *would* offer retraining if it was needed, what we might think of as “good” employers, and those that *would* not. If the goal is to draw inferences about the characteristics of establishments that

currently offer retraining, then this issue presents no problem. But if the goal is the more general one of drawing inferences about the characteristics of good employers who would protect the job security of their workers, then this problem could generate measurement error in the dependent variable because some of the “no” responses would be incorrectly classified.

It is difficult to know the characteristics of such measurement error, but assuming it is classical measurement error, then the results are unbiased although the estimates will have larger standard errors and be less precise. One solution to the problem would be to have had answers to two separate questions: The first asking whether employees were at risk of layoff and the second asking whether retraining was provided. (Asking the more direct hypothetical question as to whether employers would retrain if they had workers at risk creates the potential for various biases. Employers may want to look good, or at least avoid sounding heartless. More generally, stated intentions do not necessarily predict actual behavior, especially where the behavior, as in this case, involve uncertainty and serious costs.) Retraining could then be estimated conditional on having employees at risk by estimating a system of equations where the first equation was an attempt to model the risk of layoff and the second models the retraining decision conditional on the results of the first equation. The problem with such an analysis, however, is that there is no clear model on which to estimate the risk of layoff. And the risk of layoff in any case is likely to be a continuum where it is not obvious how far along it one needs to be in order to be “at risk” versus not at risk of layoff.

A simpler and more straightforward alternative is to rely on two relevant variables in the data set that help eliminate the above complication by restricting the sample. The first variable measures

whether skill requirements for production workers have risen during the past three years (see Table 1). This variable should capture those situations where skill-biased technological change or other developments have raised skill requirements and made existing skills sets obsolete. The second variable addresses a different aspect of the above concern by measuring the extent to which the establishment was operating with excess operating capacity, a proxy for whether layoffs associated with economic conditions were likely (see Table 1).

By restricting the sample to those establishments that have seen rising skill requirements and that are operating below capacity, we are likely to focus only on employers where there were risks to existing job security. We therefore hope to eliminate from the sample those establishments that responded “no” to the retraining question because they have never had to confront the need to retrain at risk workers. The retraining question can then more easily be interpreted as distinguishing among employers that have seriously confronted the issue of layoffs and have decided whether or not to retrain their at-risk employees. (Note, however, that these restrictions still do not allow us to make inferences about what employers without at risk workers would do.) Restricting the sample is preferred to simply controlling for these variables because it allows for the restrictions to operate through all of the coefficients and not just through the intercept. In the analyses that follow, we test whether these restrictions matter in practice. Both variables are also included as controls in the full sample where they help address another potentially confounding explanation for retraining: Some firms that do not retrain may want to do so but have made the decision not to either because they have no demand for their output and, therefore, no jobs to fill or because no new skills are needed.

Independent Variables

The first and most important hypothesis concerns investments in social capital generated by an establishment's work systems. We use three variables to measure social capital in the workplace. The first is the percentage of employees operating in self-managed teams. There is considerable evidence that it takes a fair amount of time for such teams to come together and be effective. Communication and social relationships among the team members are central components of success in such teams. It is also clear that changes in the composition of teams – for example, if some team members were laid off – disrupts those social relationships and can damage the functioning of the teams in important ways (Dougherty & Bowman 1995; Hackman 1990; Klimoski & Jones 1995; West, Borrill, & Unsworth 1998). Establishments that make greater use of self-managed teams therefore have more social capital in the form of relationships that are necessary to allow those teams to operate successfully, capital that would be at risk if employees were laid off.

Similar arguments can be made about total quality management (TQM) programs, which involve employees through team settings in important operating decisions associated with quality and performance issues. Hackman and Wageman's (1995) study of TQM finds that the concept does demonstrate convergent validity in the sense that there is considerable agreement about the practices that constitute TQM and that the implementation of TQM does in fact involve those practices. But there is more than one practice associated with TQM, raising the question of construct validity. The most frequently used of the five practices of TQM described by Hackman and Wageman is problem-solving teams while the second is training, most typically for interpersonal skills (Conference Board 1991; Olian and Rynes 1991). Both seem to tap the notion of social capital as drawing on relationships among employees. Two of the other

practices, building relationships with suppliers and with customers, may also rely on social capital, albeit relationships with stakeholders outside the firm. It is not possible to sort out the “outside” and “inside” aspects of social capital with the data here, although it would be a very interesting topic for future research.

While it seems that social capital issues are squarely at the heart of TQM, it is also possible that the interest in pursuing TQM may reflect other characteristics of the establishments such as having more skilled workers able to use some of the numerical techniques or having a more sophisticated management team (the remaining practice from the Hackman and Wageman list making top-down communication of quality a priority). The question is whether those other characteristics have an independent effect on retraining that could confound the interpretation of the TQM variable, an issue I attempt to address below.

One of the complications of using self-managed teams and TQM programs in the same model is the potential for collinearity given that both capture aspects of teamwork, albeit in different forms. The correlation between the two variables is only 0.10, however, which also indicates that it is unlikely that respondents are routinely “double counting” by including the teams used in TQM as self-managed teams.

To examine whether the social capital affecting retraining extends beyond teamwork, I include another management practice that makes use of social capital in ways that are unrelated to teams. That practice is flextime, a work scheduling arrangement whereby employees are allowed some latitude in the scheduling of their working hours so long as the overall needs of the workplace

are met. Approximately 30 percent of U.S. workers report that they have flexible work schedules (BLS 2001). A slightly greater percentage of establishments in the data below (38 percent) report that they have such practices, a figure that comports well with other establishment-level estimates (Golden 2001). The typical flextime system is one that defines “core” working hours (e.g., 10 to 4) when all employees must be at work. Around that there is a band of “flexible hours” (e.g., 7 to 10 and 4 to 7) within which employees can adjust their schedule on an ad hoc basis (Conference Board 1989). Social capital comes into play with flextime in two ways. Some organizations negotiate the initial work schedules within work groups to balance out the workflow -- if one person wants to leave early, e.g., then someone else must agree to stay late in order to cover the work. Most require some adaptations on the part of other workers when enough individual employees want to change their own schedule. The work schedule that results is in many ways a balance among the employees, one that in practice has to be renegotiated to be maintained and can be disrupted if an individual leaves (Avery and Zabel 2000; see Fletcher 2000 for examples). The second and more common social capital requirement of flextime is that employees must manage the handoff of tasks across schedules that overlap, typically using informal relationships to do so (Avery and Zabel 2000). Clearly the level of social capital involved in flextime is much more modest than in self-managed teams, and the interpretation of the flextime variable is potentially confounded because it is also an example of an employee-friendly practice of the kind associated with H:4. When controlling for other measures of employee-friendly practices (see below), its interpretation as a measure of social capital may be clearer. It represents a more modest form of social capital but also one that is different from teamwork per se, which helps establish whether the relationship with retraining is truly driven by social capital.

The hypothesis that employers retrain as part of a general employee-friendly approach to management (H:4), can be tested with the following variables. These include employer-provided medical and health insurance, having a family leave policy, gainsharing/profit sharing/bonus plans, and stock options. Medical and health insurance would seem to be a minimum requirement for employers that are interested in taking care of the needs of their workers. The compensation variables are consistent with the “best practice” recommendations for managing employees (e.g., Pfeffer 1995; Kochan and Osterman 1994). They would seem to provide a means of sharing the wealth with employees, but they also put pay at risk for employees, suggesting that they may not be entirely employee-friendly policies.³

We should expect to find a positive relationship between these benefits and retraining if retraining is in fact part of a policy of pursuing employee-friendly practices. As noted above, controlling for these measures of employee-friendly practices also allows one to interpret any relationship between flextime and retraining as driven by the social capital aspects of flextime. The stock option variable may also have another, albeit more tenuous relationship with retraining. Employers that offer employees an implicit bargain of extra effort now in return for payments later through back-loaded compensation, as in the form of stock options, may be interested in retraining workers to avoid layoffs that would otherwise break that relationship. It is worth noting that the employer’s short-term incentives might be to break these deals and save the payments, so it is only those employers with back-loaded compensation who are also concerned about their reputation that would be interested in retraining.

I address the second hypothesis concerning the fixed costs of employment with two variables.

The first is whether the employer offers severance payments to laid-off employees.

Establishments with these payments have a greater incentive to retrain at-risk employees because they must otherwise make payments to those laid off. The second variable measures the employer's expenditures associated with selecting and recruiting employees. These costs reflect something about what the establishment must spend to hire new employees if it does not retrain and then keep its current workers.⁴ No doubt there are other important aspects of fixed employment costs that are not captured by these measures.

The third hypothesis, that retraining is an integral part of a firm's general approach to training and is driven by the same factors that drive training more generally, is examined using a variable measuring total expenditures on training. The variable measures only formal training costs because it is extremely difficult to estimate the amount of informal training and associated costs. We want to examine to what extent retraining may be driven by an establishment's overall training policy and whether differences in the incidence of retraining across establishments are simply due to differences in capabilities or the in the nature of jobs. Some establishments, for example, may have jobs whose skills are predominately general and would therefore train less and be less likely to retrain as well, other things equal.⁵

³ Bonus plans in particular may be tied to individual-level performance, providing an incentive to work harder.

⁴ While we know and include in the equation the number of employees in the establishment, we do not know the number of hires per year. The recruiting and hiring cost variable therefore measures total costs given employee levels, but that may not correspond to costs per hire. Because some of these hiring costs are variable, such as interviewing, it is possible that establishments could have high overall hiring costs and still have low costs per hire if they do a great deal of hiring and the variable hiring costs were proportionately greater.

⁵ Other studies have found relationships between formal training and teamwork and suggested that teamwork requires new skills, which, in turn, require training (e.g., Osterman 1994, Gittleman, Horrigan, & Joyce 1998, and Lynch & Black 1998). If retraining is in fact driven by formal training, then one might expect to find a positive – but spurious – relationship between

Expenditures on employee training may also capture something about the fixed costs of employment. Training investments are obviously lost if employees are laid off. Some proportion of past training investments may represent sunk costs in that they were for skills that are now obsolete, but some proportion of training investments no doubt represents skills that new hires must have as well, such as orientation and safety training. These expenditures would have to be made again if the employer laid off current workers and replaced them with new ones. The training variable may therefore have several interpretations, but the common theme is to control for explanations that may confound interpretation of the social capital variables.

Control Variables

In order to test the above hypotheses, it is important to control for other characteristics of the establishments and their employees that might be associated both with the above independent variables and with the retraining decision. The control variables concerning the establishment's characteristics include industry (two-digit SIC code and not reported in the results), establishment size (number of employees), employment growth and its square, whether the establishment is part of a larger firm, capital-labor ratios, age of the establishment, a management assessment of the proportion of the workforce that is fully proficient at their jobs, value added per employee, and unionization. These variables capture factors such as the ability to fund training of all kinds as well as factors influencing the risk of layoffs. Unionization should capture any collective bargaining agreements that mandate retraining. It may also capture the extent to which seniority or related wage practices make retrained workers more expensive than

the self-managed team variable and retraining; self-managed teams drive overall training which then drives retraining. Something similar might be expected for the TQM variable. Including overall training investments in the model may control for that spurious relationship.

new hires.

An extensive literature in labor economics examines how the characteristics of the workforce affect training investments. Altonji and Spletzer (1991), for example, show how employee characteristics such as education levels affect the incidence of employer-provided training. Research like this suggests that employer decisions about training might be influenced by the attributes of their current employees. Control variables concerning workforce characteristics are therefore included: average education of the workforce and the percentage of the workforce that is part-time, temporary, female, represented by a union, and with less than one year of tenure. While it is not obvious that these variables would be correlated with the independent variables, it is important to control for that possibility. All of the variables used in the analyses are described in Table 1, which presents their definitions, means, and standard deviations.

[Table 1 about here.]

Analyses and Results

Table 2 presents the results of a logit regression model estimating the incidence of employer-provided retraining across establishments. Table 2a repeats the analysis with the sample restricted to establishments with rising skill requirements and excess operating capacity, effectively excluding those where employees might not be at risk of job loss. Listwise deletion of observations for missing data reduced the working sample considerably. Observations were removed if they were missing information for any of the variables used in the analysis in order to keep the sample consistent across coefficients (no apparent difference was discernable in the characteristics of the observations that were removed).

[Table 2 about here.]

The results of the equations strongly support the main hypothesis, H: 1, that employers are more likely to retrain employees when they make use of work systems that rely on social capital. All three of the relevant variables are significant at conventional levels, and the TQM and flextime have among the largest coefficients in the equation. Both self-managed teams and TQM are significant, suggesting that they are not collinear in this context.

The results provide little support for the alternative hypotheses. H: 2 asserted that retraining is higher where establishments have greater fixed employment costs. The presence of severance pay policies was positively and significantly related to retraining in the main sample, although it was negatively and significantly related in the restricted sample: Perhaps where establishments are cutting jobs, severance pay and related practices associated with outplacement are explicitly used as a substitute for retraining. Recruiting and selection costs do not show significant relationships with retraining.

H: 3 asserted that retraining should be positively associated with overall training investments and is rejected. The relationship is insignificant in the full sample and, in the restricted sample, establishments making greater expenditures on formal training are significantly *less likely* to engage in retraining of at-risk employees. This is especially notable given that expenditures on retraining are included in the overall measure of total training expenditures, which should otherwise cause the two to be positively correlated. A sensible interpretation of the results in the restricted sample where jobs are more at risk is that retraining represents an alternative to the apparently greater training expenditures associated with having to hire new workers. To the extent that overall training expenditures reflect the skill requirements in jobs, other things equal,

we might believe that the establishments that have invested more in training, controlling for other factors, would also be those with more firm-specific as opposed to general skill requirements. The fact that there is no positive relationship between overall training expenditure and retraining may therefore suggest that the retraining is not driven by the distribution of general versus firm-specific skill across establishments.

Finally, H: 4, suggesting that retraining is a practice associated with employee friendly policies, is not supported by the results. None of the employee benefits examined are significantly and positively related to retraining, with the exception of stock options for employees in the restricted sample, and the coefficients for several of the other benefits have the wrong sign. The fact that stock options was the only variable of the employee friendly measures to be positively and significantly related to retraining is consistent with the argument noted earlier that retraining protects back-loaded compensation arrangements by making it possible for employees to stay in the firm and receive the option payout.

The fact that the relationship between retraining and flextime is positive while other employee friendly practices are largely unrelated to retraining suggest that the relationship with flextime is not driven by an overall “good employer” strategy. Flextime was very weakly correlated with these other practices ($p < 0.06$). Instead, its relationship with retraining is more likely be driven by social capital, a different form of social capital than that in the team or TQM measures.

The sample restriction designed to eliminate observations where employers had no need for retraining produced only slightly different results. The establishments in the restricted sample

where jobs are more likely to have been at risk show a modest three percentage point higher incidence of retraining than in the full sample, suggesting that if any respondents were reporting that they did not retrain because they had no need to do so, they formed a small group. The social capital variables were significant in both samples.

An issue that is difficult to address adequately given the cross-sectional nature of the data is the direction of causation. Given space constraints, this issue is most relevant to examine for the main hypothesis for which there is support, the social capital hypothesis. It may seem reasonable to assume that employers introduce work reform practices like TQM and self-managed teams first because they are practices that fundamentally change the way the workplace operates and then introduce retraining to support them. But it is also possible that employers decide first to retrain their at-risk employees (perhaps as a matter of principle or a policy of employment security) and then introduce the practices associated with the social capital variables. It is not obvious why retraining would make an employer more likely to introduce something like flextime, but retraining might make it easier to introduce self-managed teams and TQM by supporting the need for stability in teams.

If the above argument is true, then employers may think about these relationships as essentially being simultaneous: retraining and TQM or self-managed teams, for example, should be thought of as a package. If the relationships are simultaneous, however, then the independent variables used in the above models are endogenous and are correlated with the error term. The estimates, as a result, would be biased. One way to examine whether such bias is an issue is with a test for endogeneity of the variables. The test used below is a regression-form version of the Hausman

Test suggested by Kennedy (1993). The basis of these Hausman tests is to compare the estimator in question with one generated from instrumental variables, where the assumption is that the instruments will be independent of any correlation between the regressors in question (in this case the social capital variables) and the error term. The test begins by generating predicted values for each of the potentially endogenous social capital variables from instruments for those variables. The predicted values are then added to the equation along with the original estimators for social capital. If the regressors for the predicted values are (jointly) significant, then it suggests that the independent variables are likely to be endogenous and, if so, the relationships would be simultaneous.

The test relies on finding good instrumental variables, which are defined as being correlated with the independent variables thought to be endogenous – TQM, self-managed teams, and flextime – but not with the dependent variable, retraining (see Appendix for a correlation matrix). The instrumental variables used were whether the establishment had 1) job rotation, 2) pay for skill, 3) job sharing, 4) the number of management levels in the establishment, and 5) the ratio of subordinates to first-line supervisors. The relationship between the predicted values from the instruments and the logit model of retraining is jointly insignificant (Chi-Square = 1.2; $p = .00$), suggesting that the relationship between the original social capital variables and retraining is not endogenous. Different instrumental variables and different sample restrictions can yield different results, of course, so it is important to note that tests like these are not necessarily definitive. (Details of these test results are available on request.)

Conclusions

Retraining employees at risk of layoff to handle new jobs represents an approach to

organizational restructuring that is fundamentally different from one where employers “churn” their workforce, laying off existing workers with redundant skills and hiring new ones. The results above suggest that employers who retrain workers do so at least in part to preserve the social capital that exists in worker relationships. Specifically, the use of work practices like self-managed teams and TQM rely on that social capital to operate effectively, and employers with those practices have an interest in retraining to preserve that workplace social capital. The TQM result may also reflect social capital beyond coworkers, including relationships with customers and suppliers. These results point to the importance of “strong-tie” social capital of the kind that develops in close working relationships. It would be useful for further research to examine explicitly the extent to which “weak-tie” social capital and more informal relationships in the workplace matter for issues like retraining and, more generally, the relative importance of strong and weak-tie social capital in shaping work organization and other employment practices.

How best to address the issue as to whether employers that have no current employees at risk would have a retraining policy raises a more general issue about how to measure employer practices and policies. An analogy here may be to the behavioral intentions arguments in psychology where the practice of asking individuals what they intend to do is used to predict what they ultimately do. Many of the important questions about employer practices involve responses to events that have yet to happen – how will the employer respond to a downturn in business or a merger, what will happen to work-life programs when business declines, as well as will they retrain at-risk employees? An interesting topic for future research would be to see how well employer statements about such practices predict what they actually do.

Finally and perhaps most important, the above results help us understand why some employers appear to be “good” or responsible employers who protect their workers from the risk of job loss while others do not. Explanations for these differences often turn on the ethical standards or principles of the leaders in charge of the organizations. But these results suggest that an important part of the explanation turns on the characteristics of the establishments themselves and the relative value of the social capital that is preserved through retraining.

Bibliography

- Altonji, Joseph G. and James R. Spletzer. 1991. "Worker Characteristics, Job Characteristics, and the Receipt of On-the-Job Training." *Industrial and Labor Relations Review*, 45(1): 58-79.
- American Management Association, 1997. 1997 American Management Association Downsizing Survey. New York: AMA Research.
- American Management Association, 2000. 2000 American Management Association Survey Staffing and Structure. New York: AMA Research.
- Asbrand, Deborah. 1993. "Downsizing Poses a Delicate Staffing Question: Should Corporations Retrain or Replace Their Mainframe Support Employees?" *Infoworld*, 15(9): 47.
- Avery, Christine and Diane Zabel. 2000. *The Flexible Workplace: A Sourcebook of Information and Research*. Westport, CT: Quorum.
- Bartel, Ann. 1989. "Formal Employee Training Programs and Their Impact on Labor Productivity: Evidence from a Human Resource Survey." Working Paper No.3026. Cambridge, MA: National Bureau of Economic Research.
- Bartholomew, Doug. 1997. "To Retrain or Not to Retrain?" *Industry Week*. 246(16): 48. Sep 1.
- Becker, Gary S. 1964. *Human Capital: A Theoretical and Empirical Analysis with Special Reference to Education*. Chicago: University of Chicago Press.
- Blau, Peter M. 1955. *The Dynamics of Bureaucracy: A Study of Interpersonal Relationships in Two Government Agencies*. Chicago: University of Chicago Press.
- Bourdieu, P. 1986. "The Forms of Capital. In *Handbook of Theory and Research for the Sociology of Education*, edited by John G. Richardson, pp. 241-258. New York: Greenwood Press.

- Braverman, Harry. 1974. *Labor and Monopoly Capital: The Degradation of Work in the Twentieth Century*. New York: Monthly Review Press.
- Bureau of Labor Statistics (BLS). 2002. "Workers in Flexible and Shift Schedules in 2001: Summary." U.S. Department of Labor, Bureau of Labor Statistics *News*, April 18 2002.
- Burt, Ronald S. 1992. *Structural Holes*. Cambridge, MA: Harvard University Press.
- Cappelli, Peter. 2001. The National Employer Survey: Employer Data on Employment Practices. *Industrial Relations*, 40(2): 635-647.
- Coleman, James S. 1988. "Social Capital in the Creation of Human Capital." *American Journal of Sociology*, 94: S95-S120.
- Coleman, James Samuel. Equality and achievement in education. Boulder, CO: Westview, 1990.
- Commons, John R. 1964. *Labor and Administration*. New York, NY: A.M. Kelley.
- Conference Board. 1989. *Flexible Staffing and Scheduling in U.S. Corporations*. New York: Conference Board, Research Bulletin 240.
- Conference Board. 1991. *Employee Buy-in to Total Quality*. New York: Conference Board.
- Cotton, John L. 1993. *Employee Involvement: Methods for Improving Performance and Work Attitudes*. Newbury Park, CA: Sage.
- Dougherty, Deborah and Edward H. Bowman. 1995. "The Effects of Organizational Downsizing on Product Innovation." *California Management Review* 37(4): 28-44.
- Fletcher, Lee. 2000. "Workers Help Define Flexible Schedules." *Business Insurance*, March 27.
- Frazis, Harley J., Diane E. Herz, and Michael W. Horrigan. 1995. "Employer-Provided Training: Results from a New Survey." *Monthly Labor Review* 118(5): 3-17.
- Gittleman, Maury; Horrigan, Michael; Joyce, Mary. "'Flexible' Workplace Practices: Evidence From a Nationally Representative Survey," *Industrial and Labor Relations Review*, vol. 52, no. 1, Oct. 1998, pp. 99-115.

- Granovetter, Mark S. 1974. *Getting a Job*. Cambridge, MA: Harvard University Press.
- Golden, Lonnie. 2001. "Flexible Work Time: Correlates and Consequences of Work Scheduling." *American Behavioral Scientist*, 44(7): 1157-1178.
- Hackman, Richard (ed.). 1990. *Groups That Work (and Those That Don't): Creating Conditions for Effective Teamwork*. San Francisco: Jossey-Bass.
- Hackman, Richard and Ruth Wageman. 1995. "Total Quality Management: Empirical, Conceptual, and Practical Issues." *Administrative Science Quarterly* 40: 309-342.
- Hoffman, Thomas. 1995. "Retraining, Outsourcing Rule the Roost at Chase." *Computerworld* 29(40) 93 October.
- Journal of European Industrial Training (JEIT)*. 1995. "Recruitment Preferred to Retraining." 19(11): iii. 1995.
- Kennedy, Peter. 1993. *A Guide to Econometrics*. Cambridge, MA: MIT Press.
- Klimoski, Richard J. and ? Jones. 1995. "Staffing for Effective Group Decision Making." In *Team Effectiveness and Decision Making in Organizations* edited by Richard A. Guzzo and Eduardo Salas. San Francisco: Jossey-Bass.
- Knoke, David and Arne L. Kalleberg. 1994. "Job Training in U.S. Organizations." *American Sociological Review*, 59:537-546.
- Knoke, David and Lisa Janowicz. 1998. "Make or Buy? The Externalization of Company Job Training." *Research in the Sociology of Organizations*. 16:84-106.
- Kochan, Thomas A. and Paul Osterman. 1994. *The Mutual Gains Enterprise: Forging a Winning Partnership among Labor, Management, and Government*. Boston: Harvard Business School Press.
- Krackhardt, David and Robert N. Stern. 1988. "Informal Networks and Organizational Crisis:

An Experimental Simulation. *Social Psychological Quarterly* 51:123-140.

Krackhardt, David and Lyman W. Porter. 1985. "When friends leave: A Structural Analysis of the Relationship between Turnover and Stayer's Attitudes." *Administrative Science Quarterly*, 30: 242-261.

Leana, Carrie R. and Harry J. Van Buren, III. 1999. "Organizational Social Capital and Employment Relations." *Academy of Management Review* 24 (3): 538-555.

Levine, David. 2002. *Quarterly Journal of Economics*

Lynch, Lisa and Sandra E. Black. 1998. "Beyond the Incidence of Employer-Provided Training." *Industrial and Labor Relations Review* 52(1): 64-81.

Melymuka, Kathleen. 1995. "The School of Hard Knocks." *Computerworld* 29(28): 97-99..

Moad, Jeff. 1990. "It's Time to Retrain!" *Datamation* 36(15): 20-24.

Nahapiet, Janine and Sumantra Ghoshal. 1998. Social Capital, Intellectual Capital, and the Organizational Advantage. *Academy of Management Review*, 23(2): 242-266.

Nelson, Richard R. and Sidney G. Winter. 1982. *An Evolutionary Theory of Economic Change*. Boston: Belknap Press.

Olain, Judy D. and Sarah L. Rynes. 1991. "Making Total Quality Work: Aligning Organizational Processes, Performance, and Stakeholders." *Human Resource Management*, 30: 303-333.

Osterman, Paul. 1994. "Internal Labor Markets: Theory and Change." In *Labor Economics and Industrial Relations: Markets and Institutions* edited by Clark Kerr and Paul Staudohar. Cambridge, MA: Harvard University Press.

Osterman, Paul and Rosemary Batt. 1993. "Employer-Centered Training for International Competitiveness: Lessons from State Programs." *Journal of Policy Analysis and Management* 12(3): 456-477.

Pennings, Johannes M., Kyungmook Lee, and Arjen vanWitteloostuijn. 1998. "Human Capital, Social Capital, and Firm Dissolution. *Academy of Management Journal* 41(4): 425-440.

Pfeffer, Jeffrey. 1995. *Competitive Advantage through People*. Boston, MA: Harvard Business School Press.

Podolny, Joel M. and James N. Baron. 1997. "Resources and Relationships: Social Networks and Mobility in the Workplace. *American Sociological Review*, 62 (October): 673-693.

Polyani, Michael. 1967. *The Tacit Dimension*. London: Routledge, and Keegan Paul.

Rodgers, Ronald. 2000. "Commitment-based Employment Relationships and High Performance Work Systems: A Theory-driven Research Strategy to Bring the Traditional Concepts in Line with the Empirical Evidence. Working Paper, Singapore: National University of Singapore Faculty of Business Administration.

Stewart, Greg L. and Murray R. Barrick. 2000. "Team Structure and Performance: Assessing the Mediating role of Intrateam Process and the Moderating Role of Task Type. *Academy of Management Journal* 43(2): 135-148.

Webb, Sidney and Beatrice Webb. 1965. *Industrial Democracy*. New York, NY: A.M. Kelley.

Weick, Karl E. and Karlene H. Roberts. 1993. "Collective Mind in Organizations: Heedful Interrelating on Flight Decks." *Administrative Science Quarterly* 38: 357-381.

Wellins, Richard S., William C. Byham, and George R. Dixon. 1994. *Inside Teams: How 20 World-Class Organizations Are Winning through Teamwork*. San Francisco: Jossey-Bass.

West, Borrill, and Unsworth. 1998. "Team Effectiveness in Organizations." In *International Review of Industrial/Organizational Psychology* edited by Cooper and Roberston. New York: John Wiley, Volume 13.

Table 1: Variable Definitions, Means, and Standard Deviations

Variable	Definition	Full Sample		Restricting Skill
		Mean	S.D.	Mean
Retraining	= 1 if "establishment currently provide[s] retraining opportunities to employees at risk of losing their jobs due to economic conditions?" = 0 if not.	0.356		0.3
Self-managed teams	"Percentage of non-managerial and non-supervisory employees [who] are currently involved in self-managed teams."	12.0	24.7	1
TQM	= 1 if establishment has "adopted a formal Total Quality Management program," else = 0.	0.344		0.4
Flextime	= 1 if establishment has flextime, else = 0.	0.383		0.4
Severance Pay	= 1 if establishment's "employees are covered by ... Severance Plan," else = 0	0.253		0.3
Recruiting Costs	"Percentage of total labor costs spent annually on the recruitment and selection of employees for [the] establishment."	3.8	6.0	
Training costs	"Percentage of total annual labor costs spent on formal training programs."	5.1	7.4	
Over-capacity	= 1 if "establishment is currently operating above capacity;" else = 0.	0.060		
Below-Capacity	= 1 if "establishment is currently operating below capacity;" else = 0. [Left-out category is "at or near capacity."]	0.337		
Skills Rising	= 1 if "in the last 3 years, ...the skills required to perform production or support jobs [for non-manufacturing, "primary or front-line services or support jobs"] at an acceptable level have ... increased in [the] establishment;" else = 0.	0.548		
Skills Declining	= 1 if "skills required...", as above, have "decreased;" else = 0. ["Remained the same" is the omitted category.]	0.056		
Health Insurance	= 1 if establishment's "employees are covered by Medical or health insurance," else = 0	0.894		0.9
Gain Sharing	= 1 if "company [has] a profit sharing, bonus or gain-sharing plan for any of the following categories of workers:" "Technicians; Office/ clerical/sales/customer service [for non-manufacturing establishments, "Office/clerical"]; or Production [Sales/customer services or other front-line employees];" else = 0.	0.530		0.6
Gain Sharing/ Mangers	= 1 if profit sharing, bonus, or gain-sharing, as above, for either or both of "Managers," and "Supervisors" categories.	0.721		0.8
Stockoption	= 1 if establishment's "employees are covered by ... Stock options," else = 0	0.168		0.3
Family	= 1 if establishment's "employees are covered by ... Family leave," else = 0	0.620		0.6

leave Multiple Location Employment	= 1 if establishment is part of a multi-establishment firm, else = 0.	0.510		0.4
	Total employment at the end of 1996--defined as the maximum of (a) response to question asking the "total number of workers on your payroll," and (b) the sum of the responses to three questions asking for the respective numbers of "full-time workers," "part-time workers," and "temporary or contract workers."	119	415	1
(ln)Employment	Logarithm of employment.	4.0	1.0	
(ln(Employment) ²)	Variable (ln)Employment squared (i.e., squared after taking the logarithm).	16.8	9.2	1
Employment Change	The "percentage [by which] employment changed," if, "in the past three years, the number of employees at [the] establishment increased or decreased;" else zero.	5.7	31.8	
Employment Change ²	The signed square of employment change.	75.9	1224.9	2
Education	The average number of years of education of the workforce--share-weighted average of average education for 5 occupational categories.	12.7	1.1	1
Parttime	Number of part-time employees as a percentage of TOTEMP	21.2	29.1	1
Temps	Number of temporary help workers	177.8	7.9	
Women	"Percentage of full-time employees [who] are...women."	42.6	30.3	4
Union	= 0 if establishment is not "represented by a union or unions," else equal to the "percentage of [establishment's] employees covered by a collective bargaining agreement."	8.3	24.2	1
% New Hires	"Percentage of [establishment's] currently employed workers [who] have been with the firm for less than one year."	21.7	21.6	1
% Proficient	Percentage of establishment's workers regarded "as being fully proficient at their job."	80.0	19.8	7
(ln(establishment age))	Logarithm of 1995 minus "In what year did you begin operations in this location (if before 1900, enter 1900)."	2.6	0.8	
Establishment age < 5	Dummy variable equal to 1 if began operations at this location in or after 1990.	0.137		0.1

Means and standard deviations are weighted by the sampling weights used in the regressions in Table 2.

Incidence of Retraining

Table 2: Full Sample

Number of obs = 1458
 chi2(49) = 121.1
 Prob > chi2 = 0.000
 Pseudo R2 = 0.237
 Log Likelihood = -724.60

Variable	Coef.	Std. Err.	z	P> z
Self-managed teams	0.010	0.004	2.38	0.02
TQM	0.978	0.265	3.70	0.00
Flexitime	0.787	0.250	3.15	0.00
Severance Pay	0.755	0.273	2.77	0.01
Recruiting Costs	0.016	0.025	0.64	0.52
Training costs	-0.022	0.019	-1.14	0.25
Over-capacity	-0.506	0.500	-1.01	0.31
Below-capacity	-0.423	0.265	-1.60	0.11
Skills Rising	0.602	0.275	2.19	0.03
Skills Falling	0.183	0.700	0.26	0.79
Health Insurance	-0.203	0.469	-0.43	0.67
Gain sharing	-0.445	0.323	-1.38	0.17
Gain sharing/managers	0.052	0.348	0.15	0.88
Stockoption	0.129	0.346	0.37	0.71
Family leave	0.424	0.311	1.37	0.17
Multiple locations	0.031	0.258	0.12	0.90
(ln(Employment))	1.276	0.601	2.12	0.03
(ln(Employment)) ²	-0.121	0.059	-2.03	0.04
Employment Change	-0.018	0.007	-2.44	0.02
Employment Change ²	0.037	0.013	2.98	0.00
Education	-0.085	0.117	-0.73	0.47
%Parttime	-0.005	0.006	-0.83	0.41
%Temp	-0.009	0.010	-0.97	0.33
%Women	0.013	0.006	2.27	0.02
%Union	0.001	0.005	0.19	0.85
% new hires	0.008	0.007	1.07	0.28
% Proficient	-0.012	0.007	-1.77	0.08
(ln(establishment age))	0.145	0.183	0.79	0.43
Establishment age<5	0.286	0.487	0.59	0.56

Table 2a:
Restricted Worker
Sample: Below Skill
Capacity and Require
ments
Rising

Number of obs = 322
chi2(45) = 79.8
Prob > chi2 = 0.001
Pseudo R2 = 0.400
Log Likelihood = -128.59

Variable	Coef.	Std. Err.	z	P> z
Self-managed teams	0.027	0.009	3.02	0.00
TQM	0.949	0.441	2.15	0.03
Flextime	1.030	0.554	1.86	0.06
Severance	-1.279	0.574	-2.23	0.03
Recruiting Costs	0.090	0.058	1.55	0.12
Training Costs	-0.110	0.049	-2.26	0.02
Health Insurance	0.412	1.284	0.32	0.75
Gain sharing	-0.073	0.599	-0.12	0.90
Gain sharing/managers	-0.512	0.662	-0.77	0.44
Stock option	1.334	0.585	2.28	0.02
Family leave	0.015	0.489	0.03	0.98
Multiple location	0.978	0.544	1.80	0.07
(ln)Employment	0.602	0.951	0.63	0.53
(ln (Employment)2	-0.048	0.090	-0.53	0.60
Employment Change	-0.059	0.018	-3.32	0.00
Employment Change2	0.228	0.123	1.86	0.06
Education	0.553	0.241	2.30	0.02
%Parttime	-0.009	0.014	-0.64	0.52
% Temps	-0.004	0.021	-0.19	0.85
% Women	0.028	0.011	2.52	0.01
% Union	-0.011	0.011	-1.01	0.31
% Tenure	0.007	0.017	0.42	0.68
% Proficiency	-0.002	0.012	-0.20	0.85
(ln)Establishment Age	0.145	0.403	0.36	0.72
Establishment Age<5	-0.185	0.993	-0.19	0.85

Appendix Variable Correlation Matrix

	Retraining	Self-manage	TQM	Flexitime	Severance	Recruiting Costs	Training Costs	Health Insurance	Gain-Sharing
Selfmanaged	0.136	1							
TQM	0.279	0.103	1						
Flexitime	0.251	0.180	0.139	1					
Severance	0.269	0.089	0.145	0.099	1				
Recruiting Costs	0.158	0.102	0.241	0.118	0.067	1			
Training Costs	0.109	0.080	0.149	0.120	0.115	0.352	1		
Health Insurance	-0.013	0.014	0.070	-0.041	0.200	-0.103	-0.097	1	
Gainsharing	-0.087	0.025	0.080	-0.056	0.029	-0.061	-0.009	0.298	1
Gainsharing for Mangers	0.009	0.039	0.166	0.012	0.039	0.058	-0.096	0.173	0.594
StockOptions	0.158	0.039	0.334	0.038	0.220	0.164	0.149	0.155	0.080
Familyleave	0.218	0.091	0.199	0.065	0.309	0.112	0.191	0.076	0.108
OverCapacity	-0.037	0.015	0.030	-0.038	0.025	0.000	0.045	0.045	0.087
BelowCapacity	-0.047	0.114	-0.027	0.060	0.002	-0.054	-0.029	0.013	0.094
SkillsRising	0.159	0.086	0.139	0.169	0.104	0.119	0.064	0.113	0.091
Skills Declining	0.043	0.085	-0.037	0.117	0.092	-0.008	0.187	0.079	-0.040
	Gain-Sharing	Stock Options	Familyleave	Over capacity	Below Capacity	Skills Rising			
StockOptions	0.196	1							
Familyleave	-0.006	0.182	1						
Overcapacity	0.030	0.057	-0.005	1					
Belowcapacity	-0.043	-0.114	-0.055	-0.180	1				
SkillsRising	0.152	0.074	0.048	0.080	-0.058	1			
Skills Declining	-0.115	0.057	0.016	-0.044	0.226	-0.2674			

N= 1458