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IRLE WORKING PAPER
#68-98
April 1998

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Cite as: Teresa Ghilarducci and Michael Reich. (1998). "Training and Pensions: Substitutes or Complements?" IRLE Working Paper No. 68-98. http://irle.berkeley.edu/workingpapers/68-98.pdf

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Title:
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Publication Date:
04-03-1998

Series:
Working Paper Series

Publication Info:
Working Paper Series, Institute for Research on Labor and Employment, UC Berkeley

Permalink:
http://escholarship.org/uc/item/2xq878qt

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We are grateful to Michael Ash and Judith Ruha for excellent research assistance. We received helpful comments on an earlier draft from Clair Brown, David Card, Kirsten Spalding, John Turner and seminar participants at Berkeley, Notre Dame and the center to Protect Workers' Rights. The Ford Foundation, the Institute of Industrial Relations at UC Berkeley and the Higgins Labor Center at Notre Dame provided research support.

Institute of Industrial Relations
Working Paper Series
Working Paper No. 68

Abstract

We compare firm-optimizing and institutional models of labor contracts to investigate how certain types of pension plans affect training. Unlike previous studies, we consider an expanded voice model of training and pension coverage in which worker and union preferences feed back upon firm decisions and we test for this bi-directional causality between pensions and training. The data consist of merged 1991 CPS samples, using the January training supplement and the March and April files, which contain information on pension coverage and union membership. When pension coverage is treated as endogenous in a two-stage least squares regression, pensions have a negative effect upon training, and they can be viewed as substitutes. This finding is inconsistent with the standard view that firms optimize training expenditures by providing pensions. In contrast, when pension coverage is in a defined benefit multiemployer plan, training and pensions are complements, consistent with both optimizing and institutional models.

1. Introduction: Pensions, Training and Workplace Commitment

Labor economists have long investigated the conditions under which the enhancing of workplace commitments solves market failures of spot labor markets (Oi 1962, Mincer 1983, Lynch 1994). Employer investment in worker training for firm-specific skills, for example, has been modeled as a function of employment security policies that bind workers to firms, such as pension and other tenure-related compensation mechanisms designed to elicit long-term worker commitment until retirement age.[2] This literature suggests that optimizing employers can benefit from long-term employment relations and that both training and pensions will be greater under such conditions.

Institutional voice models of employment contracts also suggest that unions want more training and pensions, but not necessarily of the amount and type optimal for employers. Voice models of unionism and of union-management cooperation have been shown to enhance long-term employment relations and to encourage productivity growth (Freeman and Medoff 1984; Black and Lynch 1997). Union interests in and success at enhancing pensions are well-documented (Freeman 1981), and a basic voice model has long been considered an alternative to the optimizing personnel model of pension provision. Previous research on pensions has not, however, attempted to expand the voice model by incorporating adaptive employer responses to union effects.

Compared to pension effects, the role of union voice in training is less clear. Union membership generally is not highly correlated with the level of worker training, since training tends to be concentrated among exempt managers and professionals. Unions can affect workplace training directly by negotiating employee involvement and worker training agreements; examples include the labor-management training and employee involvement programs bargained

in the 1980s in a number of basic industries (Ferman et al 1991). Unions can affect training indirectly if unions increase job tenure, which reduces employers' unit training costs; however, empirical studies show this effect to be weak.[3] As with the pension literature, research on training has not incorporated adaptive behavior by employers to union effects (Brown et al 1997).

Unions may be more effective in enhancing training when jointly-negotiated programs are combined with negotiated contracts that make the employment relationship less casual. Such an example comes from the role of hiring halls and apprenticeship programs in the construction industry (Belman and Belzer 1997), where multiemployer pensions allow construction workers to accrue benefits with a variety of employers. In this case, enhancing worker training and pensions can create long-term benefits for both employers and workers.

Despite some benefits of long-term employment relations, economic trends suggest that many companies are reducing their long-term commitments to their workers.[4] Recent declines in defined benefit pension coverage constitute one such indication. Although there is some controversy over trends in pension coverage rates, household data (Current Population Survey, April supplements) show a decline in pension participation for men, from over 54 percent in 1972 to 50 percent in 1993. Overall participation declined during the same period, from 46 percent to 43 percent.

Moreover, primary pension coverage increasingly is located in defined contribution plans, which do not provide as many incentives to employers or employees to maintain long-term relations as the heavily tenure-weighted defined benefit plans (Ippolito 1997). The number of active private sector participants with primary coverage in defined benefit plans fell from 30 million in 1980 to 26 million in 1990 (amounting to a drop from 36 percent of private sector employment to 26 percent); during the same period primary defined contribution coverage rose

from 6 million members to 16 million (EBRI 1995, Table 5.1). Increasingly, defined contribution plans are moving away from wholly employer-financed to partly employer-financed (EBRI 1995, Table 2.17).

These indicators of declining commitment require investigating the connections between certain kinds of pensions and worker training. Relative to the previous literature, we develop the institutional aspects of firm behavior that affect firm pension and training practices. More specifically, we consider union voice impacts upon pensions and training and relate these to bonding and shirking models of the labor contract.

We also consider the possibility that causal effects between pensions and training are bi-directional and model these with simultaneous equations. We already described the half of the model where the firm's need for trained workers and long term employment relationships necessitates the use of pensions. The second half of the process is modeled to account for unions' influence on the provision of pensions, which are a mandated bargaining topic. The empirical strategy thus uses unionism as the instrumental variable in a two-stage least squares estimation. We estimate first the institutional and individual determinants of pension coverage; then in the second stage we estimate training as a function of predicted pensions.

If pensions cause more training when the endogenous determinant of pensions and training are properly taken into account, then we can infer that firms choose to provide training in response to an institutional environment that favors pensions. Pensions and training would then be complements.

We also examine the impact of industry-wide multiemployer pension plans and training programs. In some industries, such as construction, unions are said to increase significantly the amount of pension coverage -- mostly defined benefit -- and training. Therefore, we explicitly

account for their institutional effect by including a construction multiemployer variable. The paper proceeds by first reviewing related studies and then developing alternative models of the relationship between pensions and training. After discussing the data and the empirical strategy, we present the results and conclusions.

2. Related Studies on Pensions and Training

Labor economists have long viewed employers' choice of employee benefits as a calculated paternalism (Ross 1958; Oi 1962; Lazear 1979). Firms adopt defined benefit plan pensions to encourage workers to stay longer on the job – DB plans make the age-compensation profile steeper – in order to reap returns from firm-invested specific human capital. Although the theory enjoys wide currency, empirical attempts to test the connection between pensions and training directly are few in number. Even fewer studies examine differences between the effects of defined benefit (DB) and defined contribution (DC) pension plans upon tenure and the incentives to train. DB plans almost always improve pension benefits with job tenure, whereas DC plans generally do not. Vesting in DB plans usually begins after no more than five years. [5]

An earlier literature examined the pension-training link indirectly, by investigating the effects of pensions upon job tenure. Workers covered by pensions do experience lower turnover-- as much as 50 percent lower-- than those who are not covered. It is not clear, however, that pensions provide the turnover-reducing mechanism.

Gustman and Steinmeier (1995), for example, find that defined benefit and defined contribution plans are associated with similar reductions in separation rates, contrary to their different incentive effects. Gustman and Steinmeier suggest that lower turnover may result from efficiency wage premia rather than to pensions. A related study (Montgomery and Shaw 1992)

suggests that pensions exceed opportunity wages - implying that pensions are extracted rents - and that the premium rises with firm size. They find that wages and pensions are complements or weak substitutes. Also, workers in large firms give up fewer wages to get pensions than do workers in small firms. They did not distinguish between DB and DC plans.

Even and MacPherson (1996) also test the relationship between pensions and labor turnover. They hypothesize that firms concerned about turnover due to monitoring difficulties offer pensions that raise the cost of turnover and that monitoring concerns increase with firm size. Even and MacPherson claim to find support for the optimal pension theory because firms without pensions exhibit a weak relationship between firm size and turnover. (They are puzzled by the finding that DC and DB plans have similar effect -- the data on DC plans is older – 1983.)

A recent study by Dorsey and MacPherson (1997) examines the empirical link between pension coverage – again, the type of pension is not specified-- and worker training. They find a positive and significant relationship between pension coverage and the amount of worker training, after controlling for wage rates, company size, union status, marital status, age, race and gender. The likelihood of pension coverage is 7 to 10 percent higher with worker training than with no training. Dorsey and MacPherson do not use industry control variables and they do not attempt to examine how training decisions may be affected by the existence of pensions. They do find that union status is correlated positively with pensions and negatively with training but do not control for occupation. We address their causality conclusion in this paper.

Johnson (1996) considers the evidence that employer pension programs are structured to elicit the desired quantity of firm-specific training by their workers. Instead of looking at quit rates to infer this connection, Johnson connects pensions directly with worker training. Johnson's theoretical model suggests that there is no under-investment in private sector training since workers are assumed

to bear the entire costs and to receive the entire benefit of specific training. This assumption is not tested. Nonetheless, Johnson's empirical finding, based on retirement data from 1963 to 1983, of a positive relation between pensions and training remains suggestive that the technological need for training causes firms to optimize and offer pensions.[6]

3. Models of the Labor Contract

Under what circumstances do contracts between firms and workers yield high levels of both training and pension security? In human capital models, firms optimize their personnel policies subject to the technological constraints of firm-specific skills; in bonding and shirking models firms optimize to diminish monitoring costs. In institutional models, firms adapt to and create social-institutional forces. What may look like a unilateral choice may actually be an adjustment to social and industrial constraints concerning pension coverage. These constraints include tax favoritism and subsidies, government regulations, the preferences of workers, and the ability of unions to identify and give enhanced voice to collective worker preferences.

We also include a model in which firms are affected by actions of other firms in the industry. Firms garner rents if there is implicit collusion with other firms to take wages out of competition. Each firm also benefits if all firms in an industry – especially regionally -- share in the cost of providing industry-specific public goods, such as legislative lobbying, promotion of the industry and, the focus of our study, general training and worker attachment to the industry. Industry-wide defined benefit pensions can increase worker attachment to the industry.

Expanding from the above discussion, we discuss five models of the labor contract. Although some of the models are more neoclassical in flavor and others are more institutional, they are not necessarily mutually exclusive.

Model One: Spot Market Model-- Pensions and Training as Substitutes

The spot market model for labor assumes that firms have no monitoring or information costs regarding their employees, and no firm-specific skills whose acquisition requires an investment that must be amortized over time. Under these conditions the firm has no particular interest in a long-term relationship with workers and therefore has no interest in providing a pension. Employers optimize by paying workers the value of the current marginal product and are indifferent between paying compensation as wages or as benefits. If workers have a pension, they have paid for it with a decreased wage. If workers have training, they have paid for it themselves.

In this model, if unions are present, they express a median voter workers' interest and trade wages for pensions (Freeman 1981). Although training and unions may be each positively correlated with pensions, this could be a spurious relationship with other factors, such as firm size, that may influence workers' tastes for unions, training, and pensions. In the spot market model, i.e., in the short term, pensions and employer-provided (but employee-paid) training are alternative media in which workers receive wages. Pensions and training are perfect substitutes, not complements.

Model Two: Firm Optimizing Models-- Pensions and Training as Complements

In traditional neoclassical models of long-run firm behavior, some firms work with firm-specific technologies. The resultant need for investment in specific skills provides incentives for these firms to train their workers and to encourage low turnover through various bonding mechanisms, such as steep earnings profiles and pensions. We therefore expect to find that

training and pensions are positively correlated. In this model, after controlling for the other factors that determine pension coverage, training should be a positive predictor of pensions.

The causation can appear in the opposite direction as well. Consider firms that provide pensions for reasons other than protecting their training investments; for example, from a desire to meet quality competition for workers from other firms. Such firms will be more likely to provide training. Therefore, in the Firm-Optimizing model, pension coverage should be a positive predictor of training: training and pensions are complements.

Another version of the Firm Optimizing model focuses on the firm's need to have a bonding contract because of the costs of detecting shirking. In large firms, where monitoring is more costly, pensions and job tenure are likely to be positively related (as was found by Even and MacPherson 1996). Since tenure creates the opportunity for training, especially in large firms, in this Firm Optimizing model training and pensions are complements as well.

One of Even and MacPherson's findings constitutes an anomaly for the monitoring model. Large firms in the retail and wholesale industry do not have pensions and tenure is lower than expected by size of firm. Even and MacPherson suggest that large firms in this industry have small establishments, so monitoring costs are small, and workers are not skilled, so shirking is not a big issue. They do not test this explanation; it is a presumption based upon the absence of a relationship between size of firm and tenure among firms that do not provide a pension.[7]

Model Three: Institutional-Voice Models with Bargained Pension Coverage

A problem with Model Two is that workers are presumed to be passive receivers of firms' optimizing offers and that only technology or monitoring costs are motivating the desire for firms desire to have long term contracts. Yet workers can influence the mix of wages, training

and pensions. In these conditions, firms are adaptors and pensions and training can be substitutes or complements.

The industry norm and customs, public policy and unions all induce pension coverage. Instead of just choosing training and then optimizing on the wage profile, firms may also be pushed into providing a pension (and other aspects of a long term contract). They then respond and adapt by taking advantage of the pressure for a pension and provide training. The result may be a higher level of training than employers would otherwise provide. In this scenario pensions and training are positively correlated. This view is Model 3a.

An alternative scenario – we shall refer to it as Model 3b - would have employers adapt differently to pension costs that increased beyond their desired amount because of tax law and union pressure. Overly high pension costs might motivate employers to reduce other nonwage labor costs, such as the amount of training. In this scenario pensions and training become substitutes.

Gross time series data do provide a *prima facie* case for one link in this model: from unionism to pension coverage.[8] The postwar growth and more recent decline of defined benefit plans are highly correlated with the growth and decline of unionism. The emergence of defined benefit plans occurred during World War II, when wage, price and excess profit controls encouraged the growth of nonwage compensation. Pensions, vacations, health insurance and training programs satisfied national goals to curb inflation because they constituted either in-kind or deferred compensation or increased productivity. Advance-funded, defined benefit pension plans allowed firms to put profits in a nontaxable form and helped unions acquire a popular benefit for their members.[9]

In 1949 the Supreme Court upheld an NLRB ruling that pensions constitute a component of pay and hence fall in the category of mandatory bargaining topics. This key decision contributed to subsequent growth in union-negotiated plan coverage. The leveling off of primary defined benefit coverage in the mid1970s and its subsequent decline correlate with the decline of unionism since 1979.

Cross-sectional data from the 1979 CPS pension supplement also show a strong union-nonunion differential in pension coverage, as well as a substantial impact of union-bargained pensions upon nonunion white collar employees (Freeman 1981). Our tabulations of 1991 data for full-time private sector workers reveal a similar pattern: 76 percent of unionized workers were covered by a pension, compared to 50 percent of nonunion workers (see Table 1). By 1991, however, the union-nonunion differential is smaller than in 1979.

Model Four: A Model with Non-Bargained Pension Coverage

A substitute rather than complement relation between pensions and training can also be present if employers are providing a different kind of pension coverage, rather than just more than they want. While unions are strong advocates of defined benefit plans (Ippolito 1990, McDonald 1985),. employers prefer defined contribution plans because they are cheaper to administer and they shift financial risk from employers to workers (Turner and Watanabe 1995).

The shift toward defined contribution plans has taken several forms. In some cases employers terminate their defined benefit plans and substitute defined contribution plans. In others, defined contribution plans (and also 401k plans) are expanded while defined benefit plans are contracted. In still others, the initial pensions offered are defined contribution. These considerations predict that, once the union effect upon pensions is estimated, the remaining

pensions are more likely to be defined contribution plans that do not contain bonding incentives and thus have negative effects on training.[10]

Model Five: Multiemployer Models – Pensions and Apprenticeships

A special type of pension plan-- the multiemployer plan-- was established in 1946, when the United Mine Workers negotiated a major multiemployer plan with joint union-management governance. The Taft-Hartley Act of 1947 then mandated that union-initiated multiemployer pension plans be structured so that the number of union trustees does not exceed the number of management trustees. From 1948 to 1959, multiemployer plans grew from 750,000 participants to more than 3 million (U.S Bureau of Labor Statistics 1960).

The multiemployer model spread to construction and other industries in the 1950s and 1960s, especially due to highway building. By 1975 there were 8.4 million participants in defined benefit multiemployer plans. The number of participants in these plans peaked in 1984 at over 8.6 million and then flattened out by 1993 at 8.5 million (Turner and Beller 1992, 592). In 1993, multiemployer plan participants represented 20 percent of workers in defined benefit pension plans. Since approximately half of these participants are in construction trades pension plans (PBGC 1996), we focus further on this one industry.

The link between multiemployer plans in construction and the presence of negotiated and jointly-administered training programs is apparent in both crude time series and in our cross-tabulations of the 1991 data. The growth and decline of registered apprenticeships, which are highly concentrated in construction, correlates closely with the growth and more recently the flattened growth in multiemployer defined benefit plan coverage. In 1970, about 378,000 apprentices were registered with state and Federal authorities (Employment and Training Reports

of the President, various years). Registration peaked in 1979 with over 425,000 apprentices, followed by a steep decline and a leveling off at 342,000 apprentices by 1993. Apprenticeships in construction are also highly correlated with the growth and recent steep decline in unionism (Bilginsoy and Philips 1996; Ghilarducci et al 1995).

Belman and Belzer (1997, 204-6) argue that unions play a central role in resolving the challenges faced by construction employers, workers, and the industry. Employers need access to a pool of skilled labor on short notice. Workers need an orderly way to locate their next job, contribute to pension and health plans, and maintain their skills. Hiring halls, apprenticeship programs and industry multiemployer plans tailored to regional concerns meet these needs. However, changes in the legal environment in construction have led to a sharp decline in union density in the industry, from over 41 percent in 1970 to 22 percent in 1992 (Belman and Belzer 1997, 207).

Our tabulations of 1991 CPS data (see Table 1) show that union-nonunion differentials in both pension and training coverage are greater in construction than in any other one-digit industry. Over half as many union construction workers report having training compared to nonunion construction workers. The advantage in pensions is large as well; the percent of unionized construction workers with pensions is 170 percent higher than the coverage rate for nonunion construction workers.

The existence of multiemployer pension plans presents a high profile anomaly for the hypothesis that pensions and training are substitutes, as in Model Two above. In some labor markets, employee careers typically involve numerous short stays with individual employers, who are often small and undercapitalized. These industries need a workforce with high levels of long-term investments in *industry*-specific skills. However, the industry is characterized by

work that is sporadic -- for example: discrete construction projects, the finding of a wide coal seam, a movie contract. Firms in such an industry want workers attached to their skills; but they have no incentive, given the nature of their production processes, to form long-term calculated paternalistic relationships with their workers.

In a number of such labor markets, unions have obtained contracts for the entire industry. These contracts have established multiemployer social insurance plans, especially pensions and health insurance. In the construction industry, these contracts have also established quite-developed industry-wide apprenticeship training programs.

Such multiemployer institutions resolve a problem derived from industry structures. The employers, as a group, have an interest in sharing the costs of industry-wide specific training if some entity would enforce the collective action to prevent the free rider problems. Often the only incentives for such firms to provide training and pensions arise from belonging to a multiemployer plan. By providing a public good, multiemployer plans have the potential to create complementarities that enhance skill development, productivity and pay without penalizing firm performance. Multiemployer plans help to correct a major public good problem when skills are industry, rather than firm-specific.

Figure One summarizes our discussion by indicating the predictions of each of the models. The figure show how we model causation from a number of mechanisms. Figure One also emphasizes the bi-directional nature of the pensions and training decisions.

4. The Data

We merged samples from the January 1991 CPS Training Supplement and the 1991 March and April CPS, following a method introduced by Dorsey and MacPherson (1997). The

merged dataset comprises over 11,000 full-time private sector employees between the ages of 25 and 64. For our purposes, this dataset has the great advantage of including data on pension coverage and participation (but not type of pension or generosity level); union membership and coverage; and training received since beginning current job. The absence of information on whether pension coverage is defined benefit or defined contribution is a weakness. The training question asks "Since you obtained your last job, did you take any training to improve your skills?" Because the timing of the training is not asked, measured training is not independent of job tenure. [11] Although the measures are imperfect, no other dataset contains all of these variables.

Table 2 presents summary statistics for the sample. The first column covers the full sample and the remaining columns present summary statistics separately by pension coverage, training and unionization. The summary statistics indicate a positive correlation between pension coverage and unionization. They also show a positive relationship between pension coverage and training, which is consistent with the complementarities among these variables suggested earlier. These patterns motivate a more careful examination using multivariate methods.

5. Estimating Strategy

Given the above discussion of bi-causality in labor market models, it makes sense to describe the relationship in a simultaneous model and estimate it via a two-stage least-squares model. In the first equation we predict the probability of being in a pension using industry, occupational and demographic control variables and unionization as the omitted exogenous variable. We also add a variable to capture the effect of multiemployer pension plans in the construction industry that are initiated by the union, but not by the firm. Unionization is added to

include the constraints and opportunities that firms face in collective bargaining. The predicted value of pensions is then used in the second stage of the regression to predict training.

Union membership is useful as the instrument because it is highly correlated with pension coverage and not correlated with training. In 1991, twice as many of union members had pension coverage compared to nonunion members. Moreover, while pensions constitute a mandatory topic for bargaining, training is not.

In summary, the pension equation is estimated with all the right hand variables, and training is estimated similarly, with the addition of predicted pension coverage and the exclusion of unionization.

Training = f (estimated pension, a dummy equal to one when the worker is in a pension and in the construction industry, age, age squared, education, marital status, being female, 1-digit industry and 1-digit occupation).

6. Regression Results with Endogenous Provision of Pensions and Training

Tables 3 and 4 provide the results of probit estimations of pension coverage and training using unidirectional models. The results can be interpreted to confirm a firm-optimizing model. Pension coverage appears positively and significant -- which implies they are complements -- when we reproduce and extend the Dorsey and MacPherson results, by controlling for industry and occupations in Table 4. One comes to the same conclusion, however, when we reverse the implied causation and model pension coverage as the consequence of training decisions.

An expanded consideration of the institutional features of pension and training decisions helps untangle the confused causality. Consideration of the voice effects of workers requires a bi-directional model and a two stage estimating procedure to eliminate the now recognized

correlation with the error term. The weakly significant coefficient on the unionization variable lends further support to its use as an instrument in the two-stage estimation reported below. An exogeneity test on the unionization instrumental variable verified its usefulness.[12]

In the training and pension unidirectional probits the demographic variables have the expected signs – married and more educated workers are more likely to have both pensions and training (see Tables 3 and 4). Large employers are also more likely to have pensions and provide training. Managerial and professional workers have more pensions when compared to service and operative classifications and also more training when compared to other classifications.

Table 5 presents the two-stage results where the predicted value of pensions is used to estimate the relation between training and pensions. We obtain a surprising result that does not support the standard complementarity story. Compared to the results in Table 4, the coefficient on pensions switches signs and is now negative, and it remains significant. One explanation is that pension coverage (in the first stage, pension coverage was estimated controlling for factors determining pensions -- including unionization and training) is provided at the expense of training dollars. This finding, which runs contrary to previous studies (Johnson 1996; Dorsey and MacPherson 1997) may suggest that pensions and training are substitutes and that one can have too many dollars spent on pensions because training will be reduced! This result may be more plausible if pension coverage is predominantly in defined contribution plans. Perhaps it is the defined contribution pension plans – with their very weak bonding properties -- that force a tradeoff between pensions and training spending.

Next, we include multiemployer plans as a particular subset of defined benefit pensions that are institutionally linked with training institutions. Table 6 provides the results when a defined benefit multiemployer proxy in construction is added to the model.[13] The coefficient on

the construction multiemployer plan proxy is quite strong, positive and significant. Unlike the results when general pension coverage is included, it appears that certain kinds of pension plans induce additional training.

Unionized workers in construction on average are highly trained; in many cases workers complete a four-year apprenticeship program. Yet such training is concentrated among younger workers and does not explain the overall training levels. Interviews with representatives of the construction trades suggested that the respondents to the CPS training supplement may be referring to safety training for all workers, which is included in most large construction projects and inherently embodies introductions to new machinery and work processes.

Table 7 presents similar second stage results but uses a alternative instrumental variable -- the union density of the state in which a respondent resides -- and adds more variables. One goal is to explore the hypothesis that industry and community norms influence a firm's decisions to provide pensions and training in order to prevent unionization and remain competitive. Union density in a state picks up the norm effect. Detailed industry controls are added. Lastly, a control for wages (the natural log of earnings) takes into account any efficiency wage effects.

The results are similar to the first set of regressions that use union status of the worker rather than the state unionization density as the instrumental variable. The coefficient on the pension variable is still negative, suggesting that pension coverage (when type of pension coverage is suspected to be defined contribution coverage) is paid for with decreased training spending. However, as in the first set of regressions, the relationship between training and pensions is reversed when the pension is a defined benefit multiemployer plan in the construction industry. Controlling for wages does not alter the substitute relationship between general pension coverage and training, nor the complementarity effect between training and defined benefit,

multiemployer construction pension plans. Higher wages do induce more training. Disaggregating manufacturing into durable and nondurable, and breaking down trade into retail and wholesale trade, and services into business, personal and entertainment services reveals that those in professional services and durable manufacturing will get slightly more training but, again, the results on the pension variables do not change. Finally, the length of tenure on the job slightly increased training but did not take away from the pension results.

In yet more two-stage least squares regressions, not reported here, we omitted the occupational variables and added a variable for the concentration of industry employees in managerial and professional occupations. The coefficient on the pension variable remained negative although insignificant while the defined benefit multiemployer construction variable stayed positive and significant. Another variable-- percent of the industry organized-- was slightly positively related to training and again did not change the results on the pension variables.[14]

To summarize, in firm optimizing models a firm's decision to provide pensions that presumably increase job tenure is related with technological imperatives for specific training . These models conclude that pension and training are complements. We find support for an expanded voice model in which pensions could be either complements or substitutes, depending upon the context in which pensions and training decisions are made. Our two-stage, **bi-**directional model shows that pensions negatively affect the amount of training, which implies that training and pensions are substitutes if workers demonstrate a preference for pension benefits. The finding of a negative relationship suggests that pensions are becoming more concentrated in defined contribution plans and more short-term oriented. We also control for multiemployer pensions and the effects of collective action of workers and unions upon defined benefit plans and

apprenticeships; in those contexts, we find that pensions and training are complementary. We find that this results hold when we use alternative methods of controlling institutional effects: unionization by state, and controlling for industry, occupation and employer size.

7. Conclusions

We have addressed the view that pensions (and other benefits) result from a calculated paternalism that ties workers to firms and induces firms to invest in human capital that requires large upfront costs. This view focused on firms that were optimizing their labor compensation dollar without facing pressures from unions. We explored a variant of this model by proposing that firms adopt benefit and training programs when facing union and worker preferences for both. This adaptation model, which presupposes a simultaneous process, adds important insights to the standard theory and results that pensions are correlated with more training.

We showed that although pensions in general are weak substitutes for training, not all pensions are alike. Certain types of institutional contexts of pension provision induce worker training. Multiemployer plans in construction do induce complementary training effects.

Although the trend in multiemployer pension participation is flat and the number of apprenticeships is falling, recent union initiatives are leading to some new multiemployer plans. Many of these are in the service sector and provide further examples of how pensions and training can become complements. In San Francisco, for example, the major hotels are working together with the union to expand multiemployer plans and training programs in order to enhance the skills and career tracks of their workers and compete on the basis of quality service. In New York City, hospitals and unions have sponsored similar programs. Whether such initiatives will continue to spread remains to be seen.

References

Belman, Dale and Michael Belzer 1997. "Regulation of Labor Markets: Balancing the Benefits and Costs of Competition." In Bruce Kaufman ed. Government Regulation of the Employment Relationship. Madison, WI: Industrial Relations Research Association, 179-220.

Bilginsoy, Cihan and Peter Philips 1996. "Regulation and Training: Prevailing Wage Laws and Apprenticeship in Construction." Department of Economics. University of Utah.

Bishop, John 1994. "Worker Training: a Survey of the Literature." Paris: OECD.

Black, Sandra E. and Lisa M. Lynch 1997. "How to Compete: the Impact of Workplace Practices and Information Technology on Productivity." Working Paper 6120. Cambridge, MA: National Bureau of Economic Research.

Blinder, Alan S. 1982. "Private Pensions and Public Pensions: Theory and Fact." Working Paper no. 902. Cambridge, MA: National Bureau of Economic Research.

Brown, Clair, Yoshifumi Nakata, Michael Reich and Lloyd Ulman 1997. Work and Pay in the United States and Japan. New York: Oxford University Press.

Dorsey, Stuart and David A. MacPherson 1997. "Pensions and Training." Industrial Relations 36, 1 (January): 81-96.

EBRI 1995. EBRI Databook on Employee Benefits, Third Edition . Washington, D.C.: Employee Benefits Research Institute.

Even, William E. and David A. MacPherson 1996. "Employer Size and Labor Turnover: the Role of Pensions." Industrial and Labor Relations Review 49, 4 (July): 707-728.

Farber, Henry S. 1980. "Unionism, Labor Turnover and Wages of Young Men." Research in Labor Economics 3: 33-53.

Ferman, Louis A. et al 1991. Joint-Training Programs: a Union-Management Approach to Preparing Workers for the Future. Ithaca, NY: ILR Press.

Freeman, Richard B. 1981. "The Effect of Trade Unionism on Fringe Benefits." Industrial and Labor Relations Review. 34. 4 (July).

Freeman, Richard B. and James S. Medoff 1984. What Do Unions Do? New York: Basic Books.

Ghilarducci, Teresa, Garth Mangum, Jeffrey Petersen and Peter Philips 1995. Portable Pension Plans for Casual Labor Markets. Westport, Conn: Greenwood Press.

Gustman, Alan S., Olivia S. Mitchell and Thomas L. Steinmeier 1994. "The Role of Pensions in the Labor Market: A Survey of the Literature." Industrial and Labor Relations Review 47 (April): 417-38.

Ippolito, Richard A. 1997. Pension Plans and Employee Performance: Evidence, Analysis, and Policy. Chicago: University of Chicago Press.

Ippolito, Richard 1990. "Pension Plan Choice 1980- 990: Clarifications and Extensions." Washington D.C.: Pension Benefit Guaranty Corporation.

Johnson, Richard W. 1996. "The Impact of Human Capital Investments on Pension Benefits." Journal of Labor Economics 14, 3: 520-554.

Lazear, Edward 1979. "Why is there Mandatory Retirement?" Journal of Political Economy 87 (December): 1261-84.

Lynch, Lisa ed. 1994. Training and the Private Sector: International Comparisons. Chicago: University of Chicago Press and NBER.

McDonald, Jeffrey 1985. Pension Plans Under Collective Bargaining . Washington D.C.: Bureau of National Affairs.

Mincer, Jacob 1983. "Union Effects: Wages, Turnover and Training." In Ronald Ehrenberg ed. Research in Labor Economics, Supplement no. 2. Greenwich, CT: JAI Press, 217-52.

Newey, Whitney 1985. "Generalized Method of Moments Specification Testing." Journal of Econometrics: 229-56.

Oi, Walter Y. 1962. "Labor as a Quasi-Fixed Factor." Journal of Political Economy 70:6 (December): 538-555.

Pension Benefit Guaranty Corporation 1996. Annual Report. Washington. D.C.: PBGC.

Ross, Arthur 1958. "Do We Have A New Industrial Feudalism?" American Economic Review 48: 903-920.

Turner, John A. and Daniel Beller 1992. Trends in Pensions 1992. U.S. Department of Labor, Pension and Welfare Benefits Administration. Washington, D.C.: U.S. Government Printing Office.

U.S. Bureau of Labor Statistics 1960. Multiemployer Pension Plans Under Collective Bargaining Washington D.C.: U.S. Government Printing Office. .

U.S. Department of Labor (various years). Training and Employment Report of the Secretary of Labor. U.S. Department of Labor, Employment and Training Administration.

Valletta, Robert G. 1997. "Declining Job Security." Unpublished paper. Economic Research Department. Federal Reserve Bank of San Francisco.

Figure 1

ARE TRAINING AND PENSIONS SUBSTITUTES OR COMPLEMENTS?

Theoretical Predictions and Testing Methods

	PREDICTIONS AND TESTING METHODS	
CLASS OF THEORIES	Short run relationships	Long term relationships
FIRM OPTIMIZING MODELS **(technologically driven; uni-directional training and pension probits)**	This model would show pensions negatively affect the amount of training. Pensions and training would be substitutes. The pension would be either DC or DB. (Models One and Four)	This model would show pensions positively affect the amount of training. Pensions and training would be complements. The pension would be DB. (Model Two)
BASIC VOICE MODELS **(bidirectional; two stage least squares)**	A bidirectional model would show that unions impose pensions and employers react by reducing training to a suboptimal level. Thus pensions and training are substitutes. The pension would be either DC or DB. (Model 3b)	A bidirectional model would show that unions impose pensions which induces the employer to train. Thus they are complements. The pension would be DB. (Model 3a)
ADAPTIVE VOICE MODELS **(bidirectional; two stage least squares. Collective action problems solved)**	This model would presume most employment relationships are longer term.	This model would show pensions positively affect the amount of training and pensions and training would be complements. The pension would be defined benefit. (Model 5)

Table 1

Effect of Union Membership
Upon Training and Pensions, by Industry[1]

	Training	Pension
Mining	-38.9	17.5
Construction	50.4	169.9
Manufacturing	-23.4	24.6
Trans., comm., public utilities	10.4	38.9
Wholesale and retail trade	-31.2	50.1
Services	-14.8	51.6
All industries	-11.5	54.0

[1] Percentage for union members less percentage for nonunion members.

Source: Matched January, March, and April 1991 CPS. Sample includes private sector, non self-employed individuals age 20-64 usually working 35+ hours per week.

Table 2
Summary Statistics

	Full Sample	Pension	No Pension	Union	Non-Union
Age	38.0	39.6	36.2	40.4	37.7
Married, spouse present (%)	63.8	69.6	57.1	69.8	62.8
Female (%)	43.3	38.8	48.3	23.5	46.4
Years of schooling	13.2	13.5	12.7	12.4	13.3
Ln(annual earnings)	10.0	10.2	9.7	10.2	9.9
Union membership (%)	13.6	19.5	6.9		
Training at current job (%)	44.1	52.7	34.2	39.6	44.8
Pension coverage (%)	53.1			76.2	49.5
	% of Full Sample	% with Training	% with Pension	% in Union	
Establishment size					
<25	20.4	34.7	19.3	4.4	
25-99	15.4	36.2	40.1	9.8	
100-499	17.5	40.9	54.0	14.1	
500-999	6.8	47.1	63.3	14.9	
1000+	39.9	52.8	73.3	19.3	
Occupation					
Managerial and professional	26.7	59.9	62.4	4.3	
Technical, sales, admin. support	32.6	46.4	51.6	6.5	
Service	22.4	37.5	45.5	22.7	
Operators, fabricators, laborers	17.1	25.1	54.1	30.0	
Other	1.2	21.6	15.8	6.5	
Industry					
Agriculture	1.2	22.7	14.4	7.6	
Mining	1.3	45.2	70.5	20.5	
Construction	4.5	33.3	40.2	25.0	
Manufacturing	29.0	42.8	66.4	19.8	
Trans., comm., public utilities	8.1	51.3	67.9	34.1	
Wholesale and retail trade	29.1	41.6	45.5	5.5	
Services	26.7	48.7	45.6	7.4	
Other	0.1	-	25.0	12.5	
N	11,280				

Source: Matched January, March, and April 1991 CPS. Sample includes private sector, non self-employed individuals age 20-64 usually working 35+ hours per week.

Table 3
Pension Probit

Dependent variable: Pension at current job

	dF/dx	z-statistic
Training at current job	0.086	7.68
Age	0.016	4.41
Age-squared	0.000	-3.14
Years of schooling	0.011	4.06
Married, spouse present	0.054	4.75
Female	0.011	0.89
Ln(annual earnings)	0.226	22.27
Union membership	0.183	10.93
Establishment size (1)		
25-99 employees	0.197	11.27
100-499 employees	0.282	17.15
500-999 employees	0.330	16.28
1000+ employees	0.441	29.85
Industry (2)		
Mining	0.232	2.57
Construction	0.127	1.47
Manufacturing	0.243	2.92
Trans., comm., public utilities	0.169	2.01
Wholesale and retail trade	0.122	1.44
Services	0.132	1.56
Other	0.193	0.84
Occupation (3)		
Technical, sales, admin. support	0.031	2.06
Service	-0.042	-2.30
Operators, fabricators, and laborers	-0.003	-0.16
Other	-0.056	-0.65
Log likelihod	-5871	

Note: dF/dx is for a change in the dummy variables from 0 to 1.
Omitted categories:
(1) less than 25 employees; (2) agriculture; (3) managerial and professional.

Table 4
Training Probit

Dependent variable: Training at current job

	dF/dx	z-statistic
Pension	0.087	7.67
Age	0.005	1.34
Age-squared	0.000	-1.76
Years of schooling	0.022	8.75
Married, spouse present	0.037	3.51
Female	0.048	4.17
Ln(annual earnings)	0.113	12.36
Union membership	-0.041	-2.63
Establishment size (1)		
25-99 employees	-0.009	-0.52
100-499 employees	0.009	0.54
500-999 employees	0.045	2.01
1000+ employees	0.080	5.35
Industry (2)		
Mining	0.044	0.50
Construction	-0.001	-0.01
Manufacturing	0.063	0.82
Trans., comm., public utilities	0.096	1.22
Wholesale and retail trade	0.025	0.33
Services	0.073	0.95
Occupation (3)		
Technical, sales, admin. support	-0.033	-2.44
Service	-0.065	-4.02
Operators, fabricators, and laborers	-0.204	-11.31
Other	-0.109	-1.48
Log likelihod	-6981	

Note: dF/dx is for a change in the dummy variables from 0 to 1.
Omitted categories:
(1) less than 25 employees; (2) agriculture; (3) managerial and professional.

Table 5

Two Stage Least Squares Estimates

Dependent variable: Training at current job

Instrument for pension: Union membership

	Coefficient	t-statistic
Constant	-1.539	-6.46
Pension	-0.204	-2.04
Age	0.009	2.51
Age-squared	0.000	-2.67
Years of schooling	0.021	8.96
Married, spouse present	0.046	4.28
Female	0.043	4.03
Ln(annual earnings)	0.149	7.57
Establishment size (1)		
25-99 employees	0.036	1.62
100-499 employees	0.079	2.63
500-999 employees	0.132	3.38
1000+ employees	0.187	4.34
Industry (2)		
Mining	0.097	1.22
Construction	0.024	0.34
Manufacturing	0.108	1.57
Trans., comm., public utilities	0.125	1.79
Wholesale and retail trade	0.046	0.68
Services	0.092	1.36
Other	-0.200	-1.13
Occupation (3)		
Technical, sales, admin. support	-0.035	-2.63
Service	-0.084	-5.51
Operators, fabricators, laborers	-0.207	-12.09
Other	-0.102	-1.53
R^2	0.06	

Omitted categories:

(1) less than 25 employees; (2) agriculture; (3) managerial and professional.

Table 6

Two Stage Least Squares Estimates
with Construction Multi-employer Plan

Dependent variable: Training at current job

Instrument for pension: Union membership

	Coefficient	t-statistic
Constant	-1.832	-6.20
Pension	-0.357	-2.71
Construction multi-employer plan	0.402	4.09
Age	0.011	2.90
Age-squared	0.000	-2.96
Years of schooling	0.023	8.78
Married, spouse present	0.051	4.41
Female	0.043	3.90
Ln(annual earnings)	0.174	7.05
Establishment size (1)		
25-99 employees	0.055	2.16
100-499 employees	0.114	3.10
500-999 employees	0.179	3.72
1000+ employees	0.246	4.47
Industry (2)		
Mining	0.127	1.51
Construction	-0.033	-0.44
Manufacturing	0.136	1.86
Trans., comm., public utilities	0.147	2.01
Wholesale and retail trade	0.055	0.78
Services	0.103	1.47
Other	-0.184	-1.00
Occupation (3)		
Technical, sales, admin. support	-0.033	-2.42
Service	-0.095	-5.86
Operators, fabricators, laborers	-0.210	-11.77
Other	-0.109	-1.58

Note: Individuals are considered to be in a multi-employer plan if they have a pension, are in a union, and are in a nonmanagerial occupation in the construction industry.

Omitted categories:
(1) less than 25 employees; (2) agriculture; (3) managerial and professional.

Table 7

Two Stage Least Squares Estimates
with Alternative Instruments

Dependent variable: Training at current job

Instrument for pension: Percent unionized in state (col. 1&2), Union membership (col. 3&4)

	Coefficient	t-statistic	Coefficient	t-statistic
Constant	-2.350	-4.73	-0.459	-3.23
Pension	-0.714	-2.90	-0.512	-3.20
Construction multi-employer plan	0.611	3.78	0.551	4.53
Age	0.015	3.01	0.022	4.48
Age-squared	0.000	-3.07	0.000	-5.07
Years of schooling	0.022	7.16	0.035	8.90
Married, spouse present	0.062	4.10	0.064	4.82
Female	0.016	1.24	-0.040	-2.70
Ln(annual earnings)	0.224	5.27		
Tenure			0.015	6.55
Establishment size (1)				
25-99 employees	0.103	2.54	0.089	2.84
100-499 employees	0.192	3.04	0.163	3.55
500-999 employees	0.278	3.37	0.243	4.05
1000+ employees	0.390	3.85	0.322	4.66
Industry (2)				
Mining	0.167	1.66	0.200	2.19
Construction	-0.072	-0.87	-0.005	-0.07
Manufacturing-durable goods	0.184	2.07	0.177	2.26
Manufacturing-nondurable goods	0.168	1.88	0.156	1.98
Trans., comm., public utilities	0.180	2.07	0.180	2.31
Wholesale trade	0.071	0.84	0.098	1.26
Retail trade	-0.044	-0.56	-0.046	-0.63
Finance, Insurance, and Real Estate	0.214	2.50	0.224	2.89
Business and Repair Services	0.021	0.25	0.054	0.72
Personal Services	-0.129	-1.49	-0.106	-1.35
Entertainment and Recreational Services	-0.061	-0.63	-0.021	-0.24
Professional and Related Services	0.202	2.42	0.195	2.60
Occupation (3)				
Technical, sales, admin. support	-0.013	-0.80	-0.049	-3.43
Service	-0.074	-4.05	-0.132	-6.78
Operators, fabricators, laborers	-0.187	-9.11	-0.252	-12.94
Other	-0.144	-1.87	-0.209	-2.88

Omitted categories: (1) less than 25 employees; (2) agriculture; (3) managerial and professional.

Table A1

Two Stage Least Squares Estimates

First Stage Results

Dependent variable: Pension at current job

	Coefficient	t-statistic
Constant	-2.038	-20.74
Union	0.145	11.44
Age	0.014	5.16
Age-squared	0.000	-3.88
Years of schooling	0.010	5.09
Married, spouse present	0.044	5.07
Female	0.008	0.90
Ln(annual earnings)	0.173	24.90
Establishment size (1)		
25-99 employees	0.153	11.30
100-499 employees	0.248	18.64
500-999 employees	0.323	17.98
1000+ employees	0.392	33.64
Industry (2)		
Mining	0.168	2.47
Construction	0.067	1.09
Manufacturing	0.164	2.77
Trans., comm., public utilities	0.107	1.78
Wholesale and retail trade	0.062	1.05
Services	0.070	1.19
Other	0.095	0.61
Occupation (3)		
Technical, sales, admin. support	0.016	1.43
Service	-0.043	-3.14
Operators, fabricators, laborers	-0.023	-1.50
Other	-0.028	-0.49
R^2	0.29	

Omitted categories:
(1) less than 25 employees; (2) agriculture; (3) managerial and professional.

Endnotes

[1] We are grateful for excellent research assistance from Michael Ash and Judith Ruha and for suggestions from David Card and John Turner.

[2] See Gustman et al (1994) for a recent review of this literature.

[3] Mincer (1983) argued that a) union seniority rules regarding promotions and wages implied that workers need less general training for advancement; and b) unions help reduce turnover, inducing firms to provide more specific training. Thus Mincer predicted that unions reduce general training but increase specific training. Mincer himself found no measured effect of unionization upon the amount of specific training. Other studies find that firms invest in general training even when employment security is weak (Brown et al 1997), and that union reduction of turnover can induce general training investments (Farber 1980; Freeman and Medoff 1984). The union impact may be greater when there are fewer reasons to provide training, as is the case in smaller firms.

[4] Valletta (1997), using PSID and CPS data for 1976-92 and a firm-theoretic model, finds declining employer commitment to men, especially those in skilled white-collar occupations.

[5] Ippolito (1997) has argued that firms use DC plans to screen for employees who care less about security and prefer to be mobile.

[6] Johnson's dataset (NLS for Older Males) begins with men who retired in 1966 and ends in 1983, limiting its relevance to the present and its comparability to other datasets, such as the biennial CPS Benefit Supplements. Moreover, the NLSOM cannot connect the source of the pension to the jobs held, if multiple jobs were held over the respondent's career; and the dataset has no information on employer size. Dorsey and MacPherson (1997), using the 1991 supplement, do not find greater complementarity of pensions with specific training than with general training, contrary to Johnson's findings.

[7] A prediction of complementarity is not unique to bonding models. The complementarity of pensions and training could also obtain if firms share rents with workers. This hypothesis could be tested by looking for positive relationships between pensions and training in industries with high concentration ratios, or some other measures of industry rents.

[8] There are no comparable aggregate time series on training. We discuss below trends in one type of training: four-year apprenticeship programs, which are most common in construction.

[9] John L. Lewis, president of the United Mine Workers of America, is credited with goading other unions to negotiate pensions. In 1946 Lewis implemented a multiemployer plan that offered $100 per month for a long-time worker.

[10] Unfortunately, the 1991 CPS does not contain data on type of pension plan and so cannot be used to test this hypothesis directly.

[11] The training questions also include information on type and location of training. Types of training include: basic reading, writing or math skills; computer-related skills; other technical skills that are occupation-specific; and managerial or supervisory skills. Location of training refers to whether offsite in a school or onsite, in a formal company training program or informally on-the-job (OJT). The Training Supplement also asks questions about skills required for the present job, training received previous to the current job, whether the training was through a joint labor-management program, and whether it was an apprenticeship program leading to journey worker status. We used the additional questions on type and location of training (and interaction terms) to check the robustness of our results and found no changes in the results.

[12] We tested the exogeneity of the union instrument using Newey's GMM test by regressing the residuals from the first-stage OLS equation upon the identifying variables. The results strongly supported the exogeneity of the instrument.

[13] Since multiemployer coverage was last identified in the 1983 CPS, we had to construct a proxy for multiemployer plans. We know from interviews and the Form 5500 data that unionized construction worker with a pension are almost all in jointly-managed multiemployer plans. Research on other industries entails constructing a proxy for multiemployer plans by using the Form 5500 to predict multiemployer coverage given a set of characteristics.

[14] Also unreported are tests for self-selection into training. When we excluded training since beginning current job that occurred at schools and colleges, and which may not have been initiated by employers, the results in all of our tables were basically unchanged.