Abstract

Union influence over pension management can have either positive or negative effects on risk adjusted returns. On the positive side, a union can improve monitoring of pension advisors and asset managers. On the negative side, the union may sacrifice returns to make investments that promote union goals. The union’s ability to sacrifice returns to promote union goals differs depending on whether investment management decisions are controlled by the employer, the union, or the individual union members. Using panel data on over 36,000 pension plans drawn from IRS Form 5500 filings between 1988 and 2008, we find the lowest performing plans are unionized multi-employer plans. Among defined contribution plans, under-performance of multi-employer union plans disappears when the pension is controlled by individual participants.

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I. Introduction.

Union leadership has a long history of encouraging its membership to use pension assets to promote union objectives. As an example, in 1980 the AFL-CIO encouraged unions to direct pension investments toward firms with good labor relations and a largely domestic work force, and toward communities where union workers live (Bennett and Johnson, 1981; Freeman, 1985). Opponents of such behavior argue that union pension activism reduces risk adjusted returns and thus violates the fiduciary requirements of the Employee Retirement and Income Security Act of 1974 (ERISA).¹ Union leadership argues that pension activism does not necessarily reduce risk adjusted returns.

Unions could positively affect pension performance by serving as a monitor of the fund managers or the companies that they invest in. Since the union represents the interests of all its members, it has a greater incentive to monitor the pension manager or a corporate board than any individual worker. This improved monitoring could improve risk adjusted returns.

While earlier work has examined the effect of unions on pension performance, the most recent comprehensive study of union pension performance is over 20 years old. Our study provides more recent empirical evidence on the topic, and specifically addresses how the pronounced change in the design of pensions that has occurred over the past 20 years could alter the union influence. As background to our empirical work, we first review the controversy over whether ERISA restricts various types of union pension activism. We then discuss how the union’s ability to implement activist policies will vary depending on whether the pension is a single- or multi-employer plan; a defined benefit or defined contribution plan; or a trustee- or participant-directed plan. Our empirical analysis of IRS Form 5500 filings over the past two decades shows that pension structure significantly alters the union impact on performance. While risk adjusted returns are lower for multi-employer

¹ See, for example, Vernuccio (2009) or Entine (2008).
defined benefit (DB) and defined contribution (DC) plans, there is no evidence of a negative effect among participant directed DC plans

II. Background.

Unions have a long history of encouraging the use of pension assets to advance union goals. In June 1980, the AFL-CIO announced that labor unions should become more actively involved in the administration of pension fund activities (Bennett and Johnson 1981). This pension activism includes a wide range of activities including selection of trustees, investing assets in unionized companies, making loans to support projects that favor union labor, and the exercise of voting rights on stock owned by the pension fund. There is considerable controversy regarding the legality of such activities since ERISA requires that pension fiduciaries manage a plan for “the exclusive purpose of providing benefits to participants” (Section 404(1)(a)). Some argue that this language prevents unions from using pension assets to advance their goals. In 1998, however, the Department of Labor provided an advisory opinion indicating that the fiduciary standards of ERISA do not preclude consideration of collateral benefits so long as “the investment offering the collateral benefits is expected to provide an investment return commensurate to alternative investments having similar risks”. This interpretation makes it clear that union pension activism is acceptable so long as there is no reduction in the risk-adjusted return of the pension portfolio. Disagreement remains, however, about the impact of union pension activism on risk-adjusted returns. Undoubtedly the answer to this question depends upon the particular manner in which the union attempts to advance its goals.

One way that unions promote their goals with pension funds is by investing in companies that employ union labor. This can be accomplished by direct purchases of the company’s stock, but more

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2 Advisory opinion 98-04A issued by the Pension and Welfare Benefits Administration can be found at http://www.erisaadvisoryopinions.com.
recently, registered investment companies, insurance companies and banks are designing investments that are diversified across a wide spectrum of union employers so as to offer greater risk diversification. For example, the Housing Investment Trust (HIT) and the Building Investment Trust (BIT) are bank-managed trusts that serve union pension plans. These trusts managed over $6 billion in assets in 2012 and invest entirely in residential or commercial projects that employ union labor. Another example is the IAM fund managed by State Street Group that invests the majority of its assets in companies that either “(1) have entered into collective bargaining agreements with the International Association of Machinists and Aerospace Workers (“I.A.M.”) or affiliated labor unions; or (2) are listed in the S&P 500 Index and have not been identified by I.A.M. as having non-union sentiment.”

Some banks attract union pension funds by offering “target CDs” that provide a guaranteed rate of return but the bank agrees to make loans to finance projects that employ union labor. One such agreement includes the purchase of a CD by a Roofers union pension fund with the agreement that low interest loans be provided for roofing projects performed by an approved union contractor.

Calabrese (1999) reports that over 80 percent of targeted investments by union pension funds in the 1990s were dedicated to financing union-built construction, though there is some evidence of rising use of private debt and equity purchases to promote union goals. For example, the Union Labor Life Insurance Company (ULLICO) has a private equity fund that invests in small start-up firms in exchange for an agreement that the firm confer collateral benefits to the union – such as union neutrality or card check recognition.

Unions can use also promote their own goals through shareholder activism. Prevost et al. (2012) point out that union sponsored pension funds submitted 43 percent of shareholder corporate governance proposals in 2004. Union proposals vary in their objectives. Some restrict executive

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3 For details on asset holdings and objectives, see www.aflcio-hit.com and www.aflcio.bit.com.
4 See http://mypension.iampf.org/media/13784/IAM_National_Investment_Option_Summary.pdf
5 Calabrese (1999) provides specific examples of such agreements.
compensation, others place restrictions on takeover defenses, while others require that union representatives be included on corporate boards or that managerial pay be tied to employee welfare.

Unions have also pressured mutual funds to vote proxies in accordance with union objectives. Partly in response to union pressures, the Securities and Exchange Committee has mandated disclosure of mutual fund proxy voting since 2003. In the same year, the AFL-CIO issued proxy voting guidelines for its union membership and began rating mutual funds their voting behavior (Cremers and Romano, 2011). In 2005, the AFL-CIO went a step further by informing investment firms that organized labor would consider a firm’s position on Social Security privatization when choosing mutual funds for pension investments (Furchtgott-Roth, 2008).

The effect of any particular type of activism by a union pension fund on risk-adjusted performance will depend upon the specifics. Consider, for example, a policy that tilts investments toward the stock of companies that employ union labor. On the surface, one might think that such a policy would reduce pension performance if unions reduce firm profitability – but there is conflicting evidence on that point. In theory, unions can increase or decrease profits depending on whether any increase in labor costs associated with unionization exceed any positive effects on productivity. Lee and Mas (2012) find that a union election victory reduces a firm’s stock value by about 10 percent. However, they also note that if financial markets are efficient, the decline in the stock price should reflect the expected effect of the union on the present value of all future profits so that the risk-adjusted return on stock in union and non-union companies should be identical after the election result is made public. In this case, union activism that tilts the pension fund toward investments in unionized companies would not impact pension performance. On the other hand, if unions use pension assets to fund loans at below market rates for projects that employ union labor, the efficient markets theory is

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6 Hirsch (2007) reviews the conflicting evidence on how unions affect firm profitability and discusses how omitted variables problems and the potential endogeneity of unionization efforts to firm profitability make it difficult to properly estimate the union effect.
irrelevant and the pension will sacrifice risk-adjusted returns to promote collateral benefits for union members.

Shareholder activism by a union pension fund could have positive or negative effects on risk-adjusted performance depending on the specific governance changes that the union proposes. For example, if the union promotes changes in corporate governance leading to increased union bargaining power and this lowers corporate profits, there will be a reduction in risk-adjusted returns as the stock price falls to reflect a lower expected stream of future profits. If the change in corporate governance improves corporate performance (e.g., by improving corporate board structure or executive compensation rules), risk-adjusted performance would be enhanced.

Renneboog and Szilagyi (2009) and Prevost et al. (2012) show that union sponsored proposals for changes in corporate governance can have either positive or negative stock price reactions depending on the nature of the proposal and the governance structure of the firm that is targeted. Agrawal (forthcoming) finds that union voting behavior on corporate governance proposals varies depending on whether the targeted company employs union labor. For example, corporate governance proposals eliminating “poison pills” would make hostile takeovers easier and may improve stock performance. However, a hostile takeover could also result in layoffs for existing workers. Consequently, the union might favor elimination of poison pills when the firm has a nonunion workforce, but oppose elimination if it increases the risk of layoffs for union labor.

Unions might also have an effect on pension performance by improving monitoring of pension fund sponsors, service providers, or money managers. GAO (2009) and Turner and Muir (2012) point out that there are many conflicts of interest for parties involved in pension plan administration. For example, the fact that pension advisors are often compensated by the mutual fund industry with commissions could cause advisors to steer the pension plan toward funds that pay high commissions
by charging high fees. The fees in pension funds can be quite substantial. Purcell and Topoleski (2009) point out that the median fee for both money management and administration in a sample of 401(k) plans was 0.72% of assets. There is significant variation in fees across plans types with a rate of 0.35% at the 10th percentile and 1.72% at the 90th percentile.

While plans are required by law to disclose most of the fees that plan participants pay, the information is provided piecemeal and it is not easy for participants to compare fees across plan options (GAO 2006). In a DB plan, the employer has an incentive to keep fees low because any shortfall in return comes at its expense. In a DC plan, however, the fees are passed through to the participants and the employer has little incentive to keep fees low without pressure from the participants. Without a union, it may not be cost effective for any single worker to spend the time and effort necessary to monitor the money managers to assure that expenses are kept to a minimum. With a union, pension participants are able to act collectively, reduce the free rider problem with monitoring, and potentially improve monitoring of the pension fund manager.7

The Importance of Plan Design.

While the union has a variety of ways to leverage pension assets to promote union goals, several pension design features could affect the union’s ability or incentive to pursue activist policies. These design features include (1) whether the pension is a single or multi-employer plan; (2) whether the plan is a DB or DC plan; and (3) whether the plan is trustee- or participant-directed.

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7 This argument is similar to that institutional ownership of a corporation improves monitoring because large equity positions make research and monitoring expenditures more cost effective. Thus, for example, corporations with many small owners may be monitored less closely than those with a few large institutional owners. See, for example, Agrawal and Mandelker (1990), or Shleifer and Vishny (1986).
In collectively bargained single-employer plans, the firm chooses the pension manager and the union is not guaranteed any control over the pension assets. In most cases, the union has no direct control over pension management, though it can use the collective bargaining process to pressure the firm to promote union goals with the pension assets. In a limited number of single-employer plans, unions have bargained for joint-trusteeship (Cook 2002). Unfortunately, we are unaware of any good information on how common this is.

Unions have the greatest control over investments in multi-employer (also called Taft-Hartley) pension plans where the plan covers workers from multiple employers. Such plans are most common where workers are not attached to a particular firm – for example, in the building trades and trucking industries. The Taft-Hartley Act requires that such plans be jointly trusteed by union and management.

Consistent with the premise that unions have little influence in single employer plans, Dorsey and Turner (1990) found that unions had no impact on the performance of single-employer plans, but that unionized multi-employer plans underperformed. However, they also found that the inferior performance of the multi-employer plan that existed in the late 1970s disappeared during the 1980s. They suggest that the shortfall in performance was eliminated when the Department of Labor issued advisories in 1980-81 warning that an explicit sacrifice of earnings for nontraditional objectives was a violation of ERISA fiduciary requirements.8

Whether the pension is a DB or DC plan could alter the union’s willingness to sacrifice returns for collateral union benefits. If the firm has a DB plan, the employer is liable for employee benefits and any shortfall in returns is at the expense of the employer. Consequently, with a DB plan,

8 An alternative explanation for the underperformance of union pension funds is that union plans tilt equity investments toward unionized companies and the stock returns were lower for unionized companies in the late 1970s and early 1980s, but were similar for union and nonunion firms both before and after these time periods (Hirsch and Morgan 1994).
employers will be reluctant to sacrifice returns to accommodate union investment preferences that sacrifice returns unless the union is willing to provide some other concession in the bargaining process to offset this loss. On the other hand, if the firm has a DC plan, the employer is liable only for contributions to the pension, and any shortfall in returns reduces the employee’s account balance at retirement. Consequently, DC plans could make employers complacent and make it less likely that they object to union activities that reduce returns, or to practices that drive up fund expenses. On the other hand, the DC plan could make union membership less willing to allow investment activities that damage returns since it comes at their expense. However, if the union leadership is able to convince their members that “pro-union” investment policies are, on net, beneficial to the workers, the shift to a DC plan could increase pro-union policies that might reduce pension performance.

Whether a DC plan is trustee- or participant-directed could affect the extent to which union pension funds sacrifice returns to promote union goals. In a trustee-directed DC plan, each participant receives shares of a common portfolio in proportion to his or her contributions and investment earnings. In participant-directed plans, the pension sponsor chooses the list of investment vehicles offered by the plan, but each individual decides how much to invest in the various investment options. Among DC plans, there has been a pronounced shift from trustee- to participant-directed plans over the past 20 years. Between 1988 and 2005, the percentage of defined contribution participants who manage some or all of their pension assets increased from 15 to 86 percent (Even and Macpherson 2010).

A switch from trustee to participant direction could reduce union pension activism if workers believe it reduces risk adjusted returns. The logic for this hypothesis is that pension activism may create a sort of “public good” for the union membership. As a group, the membership may believe that the benefits of the pension activism (e.g., increased employment of union labor) exceed the cost
(reduced pension returns). Consequently, the group favors activism in the trustee directed plan.

With participant direction, each worker is allowed to decide on whether the benefits of activism with their own contribution exceed the costs. A free rider problem is now introduced because most of the benefits of a given worker’s pro-union investments will accrue to others. Hence, while the group may favor pension activism in the trustee directed plan, the individual may decide against pension activism in the participant directed plan.⁹

In review, union influence could have positive, negative, or zero effects on risk-adjusted returns. Targeting investments that generate collateral benefits for union members could reduce risk-adjusted returns, but it could have zero effect if the investments are made in a competitive and efficient asset market. Shareholder activism by unions could have either positive or negative effects on performance depending on the nature of the governance proposals. Finally, unions could improve performance by improved monitoring of pension fund managers.

The union influence over pension investment practices may differ depending on the specifics of the plan type. A union’s ability to exercise control over pension assets is arguably greatest in multi-employer plans where they are directly involved in management of the pension. Employers may allow unions to exert greater influence in DC than DB plans since the DC plan shifts the cost of any underperformance to the workers. On the other hand, the membership may be less willing to support activism that reduces returns in a DC than a DB plan since the reduced returns come at their expense. If a DC plan is participant directed, the union membership should be more inclined to act in their individual interest (instead of the union’s interest) when deciding whether to invest in a pro-union

⁹ While participant direction could reduce investments in union projects when risk-adjusted returns are reduced, this same logic does not apply to shareholder activism since passage of proxy votes requires collective action – regardless of whether the plan is participant directed. Consequently, individual participants will consider spillover benefits to all members when deciding whether to support proxy votes.
project that could reduce risk-adjusted returns. Hence, participant direction of DC plans should reduce the pension’s willingness to sacrifice returns for union goals.

III. Data and Empirical Methodology.

To investigate the effect of unions on pension fund performance, we draw data from pension plan filings of IRS Form 5500 for private sector plans between 1988 and 2008. This data contains information on asset values, investment income, and administrative and asset management expenses that can be used to estimate an annual rate of return. Because plans with less than 100 participants fill out an abbreviated form and are not included in the public release database annually, we restrict our analysis to plans with 100 or more participants and exclude any plan-year observations with missing data on union status. We also exclude Employee Stock Ownership plans because they are uncommon in collectively bargained environments, not designed to be well-diversified portfolios, and present special issues when calculating the rate of return. Since we are interested in estimating risk-adjusted returns, we need panel data on pension returns and restrict the sample to plans that have at least 10 years of data. The resulting sample includes 38,895 pension plans of which 6,434 are collectively bargained plans. Because our sample excludes small plans, ESOPS, and plans with too few observations, our 2008 sample covers only 9 percent of all private sector pension plans. Nevertheless, the plans in our sample are relatively large plans and cover 70 percent of the active participants and 68 percent of the assets.

To estimate the rate of return on pension plans in the Form 5500 data, we use the approach described in McCarthy and Turner (1989). The rate of return is calculated as investment income (dividends, interest, and both realized and unrealized capital gains) divided by assets at the beginning

10 See Conte (1994) for a discussion of the issues with calculating the rate of return on ESOP plans.
of the year. \footnote{To be precise, the annual rate of return is calculated as net income from assets divided by invested assets. The net income from invested assets is defined as the sum of interest, dividends, rents, royalties, net realized gain or loss on sale or exchange of assets, other income, unrealized appreciation or depreciation of assets, and net investment gain from trusts minus unrealized appreciation or depreciation of buildings and depreciable property used in plan operations. Investible assets are defined to reflect assets at the beginning of the year plus additional purchases of assets through the year with the assumption that all purchases are made midyear.} This is the same methodology used by the Employee Benefits Security Administration in their annual summary of pension returns from the form 5500.

The rate of return estimates are net of any expenses charged by external money managers (e.g., master trusts, registered investment companies, or investments with insurance companies) and also subtract any administrative, advisory, or asset management expenses explicitly charged to the pension plan. The Form 5500 data may understate administrative expenses because an employer could absorb some of these expenses and fail to report them on the Form 5500. \footnote{Both Mitchell and Andrews (1981) and Dorsey and Turner (1990) note that administrative expenses are rarely reported in single employer plans because the firm frequently absorbs the costs as part of their everyday operations. However, when pension funds are externally managed (e.g., registered investment companies, insurance companies, or master trusts) there are typically explicit charges for administration of the plan and investment management fees are subtracted from the returns on the funds that they manage.}

Figure 1 compares the annual net of expense rate of return on union and nonunion plans between 1988 and 2008. The value weighted return on all NYSE, AMEX and NASDAQ stocks is presented as a benchmark. \footnote{The returns on the overall market are drawn from Kenneth French’s website at \url{http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/Data_Library/f-f_factors.html}. The sample used to generate the plot of annual returns is restricted to the 81\% of pension plans whose filing year matches the calendar year. There are relatively few observations in most of the other months which reduces the precision of the estimated mean for those months.} The average annual returns on union and nonunion plans track each other closely. Average pension returns are highly correlated with stock market returns, but there is less volatility in pension returns. This is to be expected since most pension funds have a significant share of assets in bonds. For example, in 2009, 39\% of assets in pensions sponsored by the S&P 1500 firms were in bonds (Hartsohn, 2010).

One concern with our panel data set is that it could create a survivor bias in estimated rates of return. \textit{Ex ante}, we have no strong priors on the direction of any survivorship bias since plans could
have fewer than 10 years of data for a number of reasons that could be uncorrelated with pension performance. For example, plans that started in 2000 or later would all be excluded since it would be impossible for them to generate 10 years of data by the end of our sampling period (2008). Also, plans that existed prior to 2000 could have been terminated if there was a merger of firms, if one plan was shut down and replaced by another (e.g. a DB is replaced by a DC), or if the sponsoring firm went bankrupt.14

To determine whether survivor bias is a problem, we estimate a regression of net pension returns as a function of whether it survives the requirement for 10 years of data, controlling for plan characteristics and fixed year effects. The results indicate that the difference between the average net return in the survivor sample and full sample (the “survivor bias”) is +13 basis points for nonunion plans, +12 basis points for single employer union plans, and +16 basis points for multi-employer union plans.15 Consequently, controlling for plan characteristics and year effects, the effect of restricting the sample to plans with 10 or more years of data results in slightly higher returns for all three plan types, but the effect on differential performance across plan types is negligible.16

Table 1 provides the sample characteristics for the union and nonunion pension plans in our panel data set. Over the sample period, the average rate of return for union pension plans is 1.4 percentage points higher than that for nonunion plans, but 0.5 percentage points of this is offset by

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14 If pensions hold some share of assets as company stock, bankruptcy or mergers could be related to pension performance. However, our elimination of ESOP plans reduces this potential source of survivor bias.
15 In an OLS regression of returns on a survivor dummy and other controls using all plans (survivors and non-survivors), the regression line passes through the mean so that \( \bar{r} = \bar{a}_0 + \bar{a}_1 \bar{S} + \bar{X} \bar{\beta} \) where \( \bar{r} \) is the mean return for all plans, \( \bar{S} \) is the mean of a dummy variable indicating whether a plan is a survivor, and \( \bar{X} \) is a vector containing the means of the plan characteristics and year effects. Controlling for plan characteristics and year effects, the difference between the mean return of a sample with only survivors (\( \bar{S} = 1 \)) and the entire sample is \( \alpha_1 (1 - \bar{S}) \). This logic is applied separately for each type of plan by introducing interaction terms between dummies for plan type (non-union, union single employer, union multi-employer) and the survivor dummy.
16 The comparison of survivor and non-survivors is conditioned on the plan characteristics and controls for year effects. Without controlling for these differences in plan characteristics, the survivor bias appears larger since, for example, the survivors tend to be larger and older plans that have performance advantages for reasons we discuss below. Also, since any plan started after 2000 is excluded from the survivor group, the survivor group includes fewer observations from this time period which had below average returns.
their higher reported administrative expenses. Union plans also have a slightly lower standard
deviation of returns within plans (9.7 versus 12.0 percent) suggesting that the average union pension
experienced less volatile returns over time.

A naïve interpretation of these simple statistics is that unions improve returns and lower risk,
but this ignores several important facts. First, union and nonunion plans are not in the sample for the
same years. The returns need to be adjusted for which years of data are used to calculate the rate of
return. Second, the average union plan has nearly three times as many participants as the nonunion
plan and slightly more assets per participant. Since there are scale economies in pension
administration with respect to both the number of participants and assets per participant, this should
ceteris paribus, result in superior performance among union plans.\footnote{Investment Company Institute (2009) provides a good review of the factors affecting administrative costs and shows economics of scale in administration with respect to balance per participant and number of participants.} Third, economies of scope in
the administration of pension plans should give union plans an advantage because union employers are
more likely to offer more than one pension plan.\footnote{The fact that an employer offers more than one pension plan does not necessarily mean that the same workers are covered by multiple plans. That is, for example, a given employer may offer two pension plans and these two plans may cover the same workers or two entirely different groups of workers. Regardless of whether the plans cover the same workers or different workers, there is the potential to take advantage of economies of scope in administration.} Fourth, union plans are three times more likely
than nonunion plans to be a DB plan (68.2 versus 22.0 percent). Since DB plans are more expensive
to administer than DC plans, this should reduce the average performance of union plans relative to
non-union plans.\footnote{Hustead (1998) shows that administrative expenses are higher in DB than in DC plans. He also provides evidence that regulatory reforms have driven up the cost of DB relative to DC plans over time and may partially account for the shift from DB to DC plans, particularly at small firms.} Union plans are also less likely to be participant directed, have a 401(k), profit
sharing, or money purchase feature. To the extent that such features impact the administrative costs of
the plan, this could result in differential performance by union status. Finally, union plans could take
on a very different risk profile than nonunion plans. It would be inappropriate to compare returns
across plans without adjusting for differential risk exposure in the plans.
To determine how unions affect risk-adjusted return performance, we use a version of the Fama-French (FF) model (Fama and French, 1993). We include four risk factors for stocks and two risk factors for bonds. This methodology is a common way to examine the risk and return features of a stock or mutual fund. The essence of the approach is described by the regression below where excess pension returns are regressed on a constant and six FF factors:

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(1) \quad r_{it} = \alpha_i + \beta_{1i} V\text{WRF}_t + \beta_{2i} S\text{MB}_t + \beta_{3i} H\text{ML}_t + \beta_{4i} M\text{OM}_t + \beta_{5i} D\text{EF}_t + \beta_{6i} T\text{ERM}_t + e_{it}
\]

where i indexes the pension plan and t indexes time. The dependent variable is the annual return on the pension portfolio (net of expenses, measured in percentage points) in excess of the “risk free rate” measured as the average of the corresponding annualized one-month U.S. Treasury bill rates. The control variables include six FF factors. The first four represent stock market risk factors: V\text{WRF} is the excess return on the overall stock market (relative to the annualized yield on one-month U.S. Treasury bills) as measured by the value-weighted returns on all stocks traded on the NYSE, AMEX, and NASDAQ; S\text{MB} (small minus big) is the difference in returns on small- versus large-cap portfolios; H\text{ML} (high minus low) is the difference in returns on value and growth portfolios; M\text{OM} (momentum) represents the difference in returns on portfolios formed on size categorized as “winners” and “losers” based on returns in the prior 2-12 months. The remaining two factors represent bond risk. T\text{ERM} is the difference in annual returns on 20 year government bonds and one month treasury bills. D\text{EF} is the difference between the annual returns on 20 year government bonds and a portfolio of

\footnote{For recent examples employing this methodology to mutual and pension funds, see Tonks (2005) and Cohen et al. (2008).}

\footnote{The construction of these variables and the data are available from Kenneth French’s website at \text{http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/Data_Library/f-f_factors.html}.}
20 year AAA and AA corporate bonds.\textsuperscript{22} Because the pension plan reporting year does not necessarily coincide with the calendar year, all risk factors are calculated to match the 12 month period corresponding to the plan’s Form 5500 filing.

In the FF model, the coefficients on the FF factors reflect the exposure to risk factors in the market. For example, if a pension is entirely invested in the overall market portfolio (as measured by VWRF), $\beta_1$ would equal one; and $\beta_2$ through $\beta_6$ would equal zero. If instead the portfolio was invested entirely in one month U.S. Treasury bills, $\beta_1$ through $\beta_6$ would equal zero. If there were no administrative, record keeping, or investment fees for managing the pension, $\alpha$ would equal zero in both cases. To the extent that there are such fees, $\alpha$ will be negative. Idiosyncratic risk is captured in the residual. In theory, idiosyncratic risk is not rewarded with higher expected returns.\textsuperscript{23} A plan’s risk adjusted net returns is measured by $\alpha$.

The FF regression is estimated separately for each pension plan and by union status using OLS. Because there are relatively few observations per plan (minimum of 10, maximum of 21), the coefficient estimates may be estimated imprecisely making it difficult to accurately test for differences in plan behavior by union status. The large number of plans, however, potentially mitigates this problem and as seen below, the vast majority of FF regressions have statistically significant explanatory power and we are able to find statistically significant differences in the parameters by union status.

The estimated FF coefficients are used to examine the impact of unions on pension performance. First, using a procedure similar to Carhart (1997) and Busse et al (forthcoming) analyzing the performance of mutual fund and institutional investment managers, the effect of

\textsuperscript{22} The data source for all bond returns is Morningstar (2010).
\textsuperscript{23} This approach to measuring risk-adjusted performance is very similar to that used by Dorsey and Turner (1990) for examining pension performance except that we use multiple risk factors reflecting different types of stock and bond market risk whereas they use a single factor based on a mixed stock and bond market index.
unionism on risk-adjusted performance is estimated by regressing each plan’s measure of risk adjusted performance including the year-specific residual from the FF equation \((a_i + e_{it})\) on a dummy variable indicating whether the plan is collectively bargained. Notice that our measure of performance varies across time for a given plan because the residual from the first stage equation is added to \(\alpha_i\). This allows us to estimate whether control variables that vary over time for a given plan (or across plans) systematically explain its variation in performance over time. The risk adjusted return regression corrects for clustering of residuals by plan and heteroskedastic errors. Because union status might be correlated with other variables that impact performance, we also add controls for other pension characteristics that might affect performance and year dummies that might account for changes in performance due to regulatory or technological changes that could affect administrative or asset management expenses.

### IV. Results

**Fama-French Regressions.**

A separate FF regression is estimated for each of the 38,895 pension plans in the panel data set. The means of the estimated coefficients are presented in table 2 along with the percentage of times that each coefficient is statistically different from zero at the .05 level.\(^{24}\) The number of regressions corresponds to the number of pension plans in the panel data set (38,895). The average of the regression R-squared values is .87. The excess return on the market equity index is the most FF factor that has the greatest explanatory power. The average coefficient is .52 and it is statistically different

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\(^{24}\) The t-statistics used to determine statistical significance for a given plan’s regression coefficients are compared to critical values from the t-distribution with \((n-7)\) degrees of freedom where \(n\) represents the number of observations for that plan and are calculated using robust standard errors.
from zero at the .05 level for over 93 percent of pension plans. The fact that the coefficient is substantially below one is consistent with figure 1 which shows that the return on the average pension plan tracks the market index but is less volatile. The other FF factors have smaller coefficients (in absolute value) and are statistically significant less frequently. A test of the joint hypothesis that all the coefficients on the six factors equal zero is rejected for 94 percent of pension plans. Overall, despite the relatively small sample sizes for each pension plan, the regressions generally have statistically significant explanatory power.

The results of the FF regressions suggest that union plans have slightly higher risk adjusted performance (.31 percentage points) than nonunion plans and slightly less exposure to stock market risk. For the average plan, a 10 percentage point increase in the excess return on the market portfolio increases pension returns by 5.4 percentage points for non-union plans and by 4.2 percentage points for union plans.

Figure 2 provides a histogram of the estimates of risk-adjusted net returns ($\alpha$) by union status and shows that the lower mean of risk adjusted returns for union plans is not the result of outliers in the data. The observed advantage in performance for union plans could, however, be due to factors correlated with unionism. Regression analysis is required to sort out the true effect of unionism.

*Regression analysis of excess returns.*

Table 3 presents several specifications analyzing the determinants of risk adjusted net pension returns ($\alpha$). With the exception of the single-employer and multi-employer union plan dummies, all variables are measured as deviations from means so that the intercept represents the mean value of $\alpha$ for the non-union sample holding other plan characteristics equal to the mean for all plans.

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25 The reported t-statistics are based upon robust standard errors corrected for clustering of residuals by pension.
Specification (1) contains only two dummy variables: one for single-employer union plans and another for multi-employer union plans. Compared to non-union plans, single employer union plans out-perform non-union plans by 30 basis points and the difference is statistically significant at the .01 level of significance. Multi-employer union plans underperform by 26 basis points. This simple specification, however, does not adjust for several factors that might affect the administrative and money management costs of union and non-union plans.

To control for plan differences that might influence performance, we first estimate separate regressions for DB and DC plans (specifications 2 and 3) without any controls for plan characteristics. Among DC plans, single employer union plans outperform the nonunion plans by 59 basis points; the multi-employer union plans underperform by 18 basis points. For DB plans, the single employer union plans underperform by 10 basis points (though the difference is insignificant at the .10 level), but the multi-employer plans underperform by 59 basis points.

These simple comparisons do not control for the fact that union and non-union plans differ in several ways that could account for the performance differentials. In specifications (4) and (5), we add controls for number of participants, assets per participant, the age of the plan, and whether the employer offers other plans. The estimated effects of these controls are generally consistent with expectations. For example, the positive effects of per capita assets and the positive but diminishing effects of the number of participants suggest scale economies in both dimensions. Also, the improved performance of older plans could reflect start-up costs and/or improved efficiencies from learning by doing.

As discussed previously, unions can exercise the greatest influence on investments in multi-employer plans and this is where we expect to find the largest union effect. In single employer plans,

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26 These regressions also include year and industry dummies to allow for the fact that risk-adjusted performance might differ systematically across years and the cost of administration could differ across industries because of different work force characteristics.
unions have limited ability to implement activist policies since the employer makes the investment decisions. The union could, however, have a positive effect on performance by improved monitoring of pension fund managers. We also predict that unions will be more willing to sacrifice performance to achieve union objectives when the reduced performance is at the employer’s expense (as with a DB plan) and not the employee’s (as with a DC plan).

The pattern of results in specifications (4) and (5) are consistent with our hypotheses. First, compared to single employer nonunion plans, multi-employer union plans underperform relative to nonunion plans and the difference is statistically significant at the .01 level. Moreover, the underperformance is worse among DB plans (76 basis points) than DC plans (36 basis points).

In contrast to the findings for multi-employer plans, we find no significant performance differential between nonunion plans and single employer union plans. Among DC plans, single employer union plans have a slight performance edge (14 basis points) over nonunion plans but the effect is statistically insignificant at the .05 level. Among DB plans, the single employer union plans slightly underperform (4 basis points), but this effect is not statistically significant at the .10 level either.

Overall, the empirical results imply that, among single employer plans, unions do not have a significant effect on risk adjusted performance. On the other hand, there is statistically significant underperformance for multi-employer union plans that is especially pronounced for DB plans.

There are two competing explanations for the underperformance of multi-employer plans: (1) multi-employer plans are more expensive to administer; or (2) multi-employer plans sacrifice returns by using pension assets to promote union goals. An inability to accurately measure administrative expenses with Form 5500 data makes it impossible for us to directly test whether higher administrative expenses are the source of underperformance. Administrative expenses are not accurately measured
because they are handled differently depending on how the assets are managed. For example, if a plan invests its funds with a mutual fund or insurance company, the administrative expenses for managing the underlying funds would simply be subtracted from the funds’ returns and will not appear as administrative or investment advisory expenses on the form 5500. On the other hand, if a pension fund hires an investment advisor to manage its funds, there can be explicit charges for the investment management services that would appear as an expense on the form 5500. Complicating matters even more is the fact that some employers may absorb part of the administrative costs associated with the pension plan by providing office space and their own staff to handle bookkeeping and other tasks in which case the expenses do not reduce net returns. A multi-employer plan is not affiliated with any single employer and less likely to have an employer absorb administrative costs.

An alternative explanation for underperformance of multi-employer union plans is that the unions take advantage of their greater control over pension investments to promote union goals and sacrifice returns in the process. To distinguish between the “expense” and “control” theories of underperformance, we consider another dimension of pension design -- participant direction.

*The Role of Participant Direction.*

In a trustee directed (TD) pension, all participants hold shares in a common pool of assets controlled by the pension manager. The pension manager frequently employs the services of investment advisors to assist with asset allocation decisions. In a participant directed (PD) plan, the plan sponsor chooses a list of investment options and each participant decides how to allocate his or her own assets. In most cases, PD plans consist of offerings from a registered investment company (mutual funds) or an insurance company.
If a pension switches from TD to PD, there are several ways that performance could be affected. First, expenses could increase because the asset manager must now manage a separate account for each participant in the pension plan instead of one common account that each participant shares in. Conditional on plan size, it is unlikely that the effect of PD on expenses would differ for union and nonunion plans. Second, PD could reduce the union’s ability to control assets since individual plan members decide how to invest their assets – not the union leadership. This shift in control over asset allocation decisions could increase or decrease performance, depending on whether the union is better at picking investments than the individual participants. If the union is willing to sacrifice returns to improve performance, PD should improve performance of union relative to nonunion plans.

To examine the effect of PD on risk adjusted returns, we restrict our sample to DC plans and estimate risk adjusted return regressions separately for PD and TD plans. Because data on asset allocations used in subsequent regressions is not available for 1988-89, the sample is restricted to plans from 1990 forward. In the first two specifications, the models control for all the plan characteristics used in table 3. Among PD plans, there is no significant difference in the risk adjusted performance of non-union and union plans. That is, PD completely eliminates the underperformance of multi-employer pension plans. Among trustee directed plans, there is no significant differences in risk adjusted net returns for non-union and single employer union plans, but multi-employer plans underperform by 50 basis points. Since differences in administrative expenses by plan type are unlikely to explain this pattern, we take this as strong evidence that the forfeiture of union control over investment decisions with a movement to PD eliminates any negative effects on performance.

One possible explanation for the impact of PD on performance is that there are significant differences in how the assets in PD and TD plans are managed. Lakonishok et al (1992) argue that the
mutual fund industry outperforms institutional pension fund managers because of agency problems in pension administration. With TD, pensions often employ a money manager to invest assets. The money manager may purchase stocks, bonds, real estate, and other financial instruments. With PD, the pension must give each participant a list of investment options and internal management becomes less viable. As a result, PD pensions usually employ a third party provider such as a registered investment or insurance company to provide access to mutual funds and handle the administration of individual accounts. Alternatively, the plan pools assets with other pension plans in a trust that could make mutual funds from a variety of fund families available to the participants. The average share of assets managed by trusts, registered investment or insurance companies is 56 percent for TD and 86 percent for PD plans. For multi-employer union pensions, the difference is more pronounced – 35 percent for TD and 84 percent for PD plans.

Given that PD is associated with a shift of asset management to third parties, the PD effect on the performance of multi-employer plans might be entirely due to a shift in the type of asset management. To test this, we add controls for the share of the fund’s assets managed by registered investment or insurance companies and the share of assets held in common/collective trusts, pooled separate accounts, master trusts, or 103-12 investment entities (“trusts”). The omitted asset category reflects assets managed directly by the pension fund. The results of this specification are in the last two columns of table 4.

Consistent with the finding in Lakonishok et al (1992) that pension fund managers underperform relative to the mutual fund industry, the share of assets managed externally has a positive effect on risk-adjusted returns for both PD and TD plans. A 10 percentage point increase in the share of assets managed by registered investment or insurance companies (offset by a decrease in share managed internally) increases performance by around 4 basis points; increasing the share in
trusts by 10 percentage points improves performance by 2-3 basis points. Nevertheless, controlling for share of assets managed externally does not eliminate the underperformance of multi-employer plans when they are trustee directed. This suggests that when the union still controls the asset allocation decisions through TD, the plan still underperforms even if third party money managers are used. This could be explained by the fact that even through the mutual fund industry, the union leadership could invest in funds sacrifice performance by investing in assets that promote union goals. As an example, it could offer the HIT and BIT funds described earlier that invest in union building projects, or mutual funds that invest in unionized companies.

Overall, the empirical evidence suggests that multi-employer union plans underperform relative to nonunion plans – regardless of whether the plan is a DB or a DC. For single employer plans, unions do not have a statistically significant effect on the performance of DB or DC plans. Finally, among DC plans, participant direction eliminates the under-performance of multi-employer union DC plans.

Are the Effects Large Enough to Matter?

While our empirical results suggest that unions have statistically significant effects on pension performance, the question remains whether the effects are large enough for union members or policy makers to be concerned with. To address this, we consider the implications of the effects of union status on retirement wealth among workers in DC plans.

To provide some sense of the magnitude of the effects, we estimate that in 2008, the average union member with a DC plan had annual contributions of $3,700. The average real rate of return
(net of expenses) on union DC plans over our entire sample period was 4.1%. If real contributions for the typical worker are held constant over a 30 year career and a 4.1% real rate of return is earned, the worker would accumulate real wealth of $211,015 by retirement.

Using the above as a benchmark, we estimate the effects of multi-employer union pensions on retirement wealth. For example, we estimate that multi-employer union plans underperform by 36 basis points relative to nonunion plans (table 3, specification 4). If the underperformance of multi-employer union plans was eliminated, workers could increase pension wealth at retirement by 6.2% without any increase in annual contributions.

As an alternative illustration, consider the consequences of switching a multi-employer union plan from trustee to participant direction. Our estimates (table 4) suggest that this would reduce the underperformance of the multi-employer plan by 33 basis points relative to nonunion plans. For the benchmark situation described above, this would result in 5.7% more wealth for workers at retirement. Moreover, PD gives workers the added advantage of allowing them to adjust their individual portfolios to reflect their own risk preferences, whereas the trustee-directed plans force all workers in the pension to hold the same portfolio at any given point in time.

V. Summary and Conclusions

Unions could help or harm pension performance. On the one hand, unions are well known for using assets in their pension plans to promote union goals. Such activities could harm pension performance. On the other hand, unions could improve performance by providing a means for workers to share in the cost of monitoring the pension fund manager.

We hypothesize that the effect of unions on pension performance could be altered by at least three factors. First, unions have greater influence in multi-employer plans than single-employer plans
because regulatory requirements give unions more control in multi-employer plans. Second, a change from a DB to a DC plan will shift the cost of underperformance from the employer to the union membership and potentially reduce employer resistance to activism that reduces performance. Finally, a shift from trustee to participant directed DC plans shifts the control over investment decisions from the union leadership to individual members and reduces the odds that investments are directed toward projects that result in reduced performance.

Our empirical results are generally in line with the predictions. Multi-employer plans have significant underperformance, and the underperformance is greater in DB than DC plans (76 versus 35 basis points). For DC plans, we estimate that this underperformance would result in about 6 percent less pension wealth at retirement after a 30 year career.

Among the increasingly popular DC plan, we find that the trustee-directed multi-employer plan where the union exercises the greatest control has the worst performance -- 36 basis points lower than nonunion plans. If the asset allocation decisions are turned over to union members by a switch to participant direction, the underperformance is virtually eliminated and we estimate that pension wealth at retirement would increase by about 6% for the typical union member over a 30 year career.

Our overall conclusion is that union influence in pension plans has negative or neutral effects on performance, depending on pension design. While unions have been slow to switch to participant directed DC plans, if the recent trend continues, any negative effect of the union on performance should gradually disappear.
References


Furchtgott-Roth, Diana. “Pension Plans: How Secure are Union Members’ Investments?” Report for Hudson Institute, Summer 2008.
GAO. “Changes Needed to Provided 401(k) Plan Participants and the Department of Labor Better Information on Fees.” November 2006.


Table 1. Sample Means for Form 5500 Pension Plan Data, 1988-2008.

<table>
<thead>
<tr>
<th></th>
<th>All</th>
<th>Nonunion</th>
<th>Union</th>
</tr>
</thead>
<tbody>
<tr>
<td>Union</td>
<td>17.3%</td>
<td>0%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Rate of Return (before expenses)</td>
<td>6.42%</td>
<td>6.18%</td>
<td>7.58%</td>
</tr>
<tr>
<td>Expense Ratio</td>
<td>0.46%</td>
<td>0.37%</td>
<td>0.88%</td>
</tr>
<tr>
<td>Return Net of Expenses</td>
<td>5.96%</td>
<td>5.81%</td>
<td>6.70%</td>
</tr>
<tr>
<td>Std. Deviation of Net Returns</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Within plans</td>
<td>11.6%</td>
<td>12.0%</td>
<td>9.7%</td>
</tr>
<tr>
<td>Between plans</td>
<td>3.1%</td>
<td>3.2%</td>
<td>2.8%</td>
</tr>
<tr>
<td>Participants</td>
<td>1,841</td>
<td>1,411</td>
<td>3,899</td>
</tr>
<tr>
<td>Per Capita Assets ($1000s)</td>
<td>27.1</td>
<td>27.0</td>
<td>27.5</td>
</tr>
<tr>
<td>Percent Assets Managed Externally</td>
<td>69.8%</td>
<td>72.2%</td>
<td>58.2%</td>
</tr>
<tr>
<td>Collectively bargained multi-employer plan</td>
<td>7.4%</td>
<td>0%</td>
<td>43.1%</td>
</tr>
<tr>
<td>Defined Benefit</td>
<td>30.0%</td>
<td>22.0%</td>
<td>68.2%</td>
</tr>
<tr>
<td>Defined Contribution Plan</td>
<td>70.0%</td>
<td>78.0%</td>
<td>31.8%</td>
</tr>
<tr>
<td>Participant Directed Defined Contribution Plan</td>
<td>49.5%</td>
<td>56.7%</td>
<td>15.3%</td>
</tr>
<tr>
<td>401k Plan</td>
<td>54.9%</td>
<td>63.3%</td>
<td>14.7%</td>
</tr>
<tr>
<td>Profit Sharing Plan</td>
<td>60.0%</td>
<td>69.2%</td>
<td>16.3%</td>
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<td>Money Purchase Plan</td>
<td>5.4%</td>
<td>4.1%</td>
<td>11.3%</td>
</tr>
<tr>
<td>Offer other DB plan</td>
<td>22.0%</td>
<td>18.9%</td>
<td>36.7%</td>
</tr>
<tr>
<td>Offer other DC plan</td>
<td>31.9%</td>
<td>30.0%</td>
<td>41.1%</td>
</tr>
<tr>
<td>Number of Plans</td>
<td>38,895</td>
<td>32,461</td>
<td>6,434</td>
</tr>
<tr>
<td>Number of Plan Year Observations</td>
<td>538,563</td>
<td>445,263</td>
<td>93,300</td>
</tr>
<tr>
<td>Number of Observations Per Plan</td>
<td>14.03</td>
<td>13.72</td>
<td>14.50</td>
</tr>
</tbody>
</table>

Note: The sample is based on IRS Form 5500 data for private sector plans, with 100 or more participants, between 1988 and 2008. The sample excludes any plan-year observations with missing data on union status and Employee Stock Ownership plans.
Table 2. Summary Statistics from Fama-French Regressions, 1988-2008.

Explanation. The numbers presented below represent the average of the estimated Fama-French coefficients across the pension plans. The dependent variable is excess pension return net of expenses measured in percentage points. In parentheses are the percentage of plans for which the corresponding coefficients are statistically different from zero at the .05 level. The statistical significance is based upon robust standard errors corrected for clustering of residuals by plan and the t-distribution.

<table>
<thead>
<tr>
<th></th>
<th>All Plans</th>
<th>Non-Union Plans</th>
<th>Union Plans</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alpha (in percentage points)</td>
<td>-1.28</td>
<td>-1.34</td>
<td>-1.03</td>
</tr>
<tr>
<td></td>
<td>(23.6%)</td>
<td>(23.9%)</td>
<td>(22.4%)</td>
</tr>
<tr>
<td>Coefficients on Fama-French Factors</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Market – Risk Free</td>
<td>.52</td>
<td>.54</td>
<td>.42</td>
</tr>
<tr>
<td></td>
<td>(93.2%)</td>
<td>(94.1%)</td>
<td>(89.6%)</td>
</tr>
<tr>
<td>Small – Large Cap</td>
<td>-.010</td>
<td>-.011</td>
<td>-.009</td>
</tr>
<tr>
<td></td>
<td>(20.8%)</td>
<td>(20.6%)</td>
<td>(22.3%)</td>
</tr>
<tr>
<td>High – Low (Value – Growth)</td>
<td>-.091</td>
<td>-.093</td>
<td>-.082</td>
</tr>
<tr>
<td></td>
<td>(32.3%)</td>
<td>(32.7%)</td>
<td>(30.5%)</td>
</tr>
<tr>
<td>Momentum</td>
<td>.048</td>
<td>.052</td>
<td>.027</td>
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<tr>
<td></td>
<td>(21.9%)</td>
<td>(22.7%)</td>
<td>(18.3%)</td>
</tr>
<tr>
<td>Term</td>
<td>-.13</td>
<td>-.15</td>
<td>-.01</td>
</tr>
<tr>
<td></td>
<td>(29.8%)</td>
<td>(31.0%)</td>
<td>(23.8%)</td>
</tr>
<tr>
<td>Default</td>
<td>-.12</td>
<td>-.14</td>
<td>.01</td>
</tr>
<tr>
<td></td>
<td>(23.4%)</td>
<td>(23.2%)</td>
<td>(24.4%)</td>
</tr>
<tr>
<td>% of regressions with coefficients on Fama-French factors jointly significant at .05 level</td>
<td>94.2</td>
<td>94.4</td>
<td>93.3</td>
</tr>
<tr>
<td>Average of Regression R-squared</td>
<td>.87</td>
<td>.87</td>
<td>.86</td>
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<td>Number of Pension Plans</td>
<td>38,895</td>
<td>32,461</td>
<td>6,434</td>
</tr>
<tr>
<td>Number of Observations</td>
<td>538,563</td>
<td>445,263</td>
<td>93,300</td>
</tr>
<tr>
<td>Observations per Pension Plan</td>
<td>14.03</td>
<td>13.72</td>
<td>14.50</td>
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</table>

Explanation. The coefficients are from a regression of the estimated alpha plus the residual from the Fama-French equations as the dependent variable. The t-statistics in parentheses are based upon robust standard errors corrected for clustering of residuals by plan.

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)*</th>
<th>(5)</th>
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<tbody>
<tr>
<td>Constant</td>
<td>-0.442</td>
<td>-0.532</td>
<td>-0.119</td>
<td>-0.508</td>
<td>-0.108</td>
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<tr>
<td></td>
<td>(-25.94)</td>
<td>(-27.83)</td>
<td>(-3.228)</td>
<td>(-27.02)</td>
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<td>Union Single Employer</td>
<td>0.302</td>
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<td>(1.520)</td>
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<td>-0.182</td>
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<td>-0.357</td>
<td>-0.757</td>
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<tr>
<td></td>
<td>(-5.725)</td>
<td>(-2.601)</td>
<td>(-8.886)</td>
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<td>Plan Assets Per Capita in $10,000</td>
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<td>0.00084</td>
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<td></td>
</tr>
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<td></td>
<td>(2.648)</td>
<td>(0.196)</td>
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<td></td>
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<tr>
<td>Participants in 10,000s</td>
<td>0.0405</td>
<td>0.00285</td>
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</tr>
<tr>
<td></td>
<td>(6.610)</td>
<td>(1.062)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Participants in 10,000s²</td>
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<td>-1.08e-06</td>
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<tr>
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<td>(-5.859)</td>
<td>(-0.114)</td>
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<td></td>
<td>(21.47)</td>
<td>(6.976)</td>
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<tr>
<td>Employer Offers Other Defined Benefit</td>
<td>0.562</td>
<td>-0.112</td>
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<tr>
<td></td>
<td>(12.33)</td>
<td>(-1.647)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Employer Offers Other Defined Contribution</td>
<td>0.338</td>
<td>0.00186</td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(8.239)</td>
<td>(0.0311)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year Dummies Included</td>
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<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Industry Dummies Included</td>
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<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Observations</td>
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<td>377,136</td>
<td>161,427</td>
<td>377,136</td>
<td>161,427</td>
</tr>
</tbody>
</table>

p-values for hypothesis tests:
- equal coefficients on union single & union multiemployer: 0.000 0.000 0.000 0.000 0.000
- equal coefficients on union single-employer in DB and DC: -- 0.000 0.003
- equal coefficients on union multi-employer in DB and DC: -- 0.000 0.137
- R-squared: 0.00 0.00 0.00 0.09 0.06

* Column (4) also includes controls for 401(k) plan, profit sharing plan, and other money purchase plan.
Table 4. Determinants of Risk-Adjusted Returns, by Participant Direction Status, for DC Plans, 1990-2008

Explanation. Coefficients are from a regression of the estimated alpha plus the residual from the Fama-French equations as the dependent variable. T-statistics are in parentheses and are based upon robust standard errors corrected for clustering of residuals by plan.a

<table>
<thead>
<tr>
<th></th>
<th>Participant Directed</th>
<th>Trustee Directed</th>
<th>Participant Directed</th>
<th>Trustee Directed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-0.480 (-20.88)</td>
<td>-0.347 (-8.838)</td>
<td>-0.506 (-20.82)</td>
<td>-0.303 (-7.821)</td>
</tr>
<tr>
<td>Union Single Employer</td>
<td>0.109 (1.062)</td>
<td>0.128 (0.821)</td>
<td>0.115 (1.124)</td>
<td>0.116 (0.746)</td>
</tr>
<tr>
<td>Union Multiemployer</td>
<td>-0.118 (-0.891)</td>
<td>-0.504 (-4.029)</td>
<td>-0.107 (-0.808)</td>
<td>-0.443 (-3.506)</td>
</tr>
<tr>
<td>Share of Assets Invested with registered investment or insurance companies</td>
<td>0.453 (5.921)</td>
<td>0.424 (5.704)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Share of Assets Invested in Trusts</td>
<td>0.282 (3.580)</td>
<td>0.220 (2.738)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sample Size</td>
<td>262,729 95,209</td>
<td>262,729 95,209</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R-Squared</td>
<td>0.101 0.076</td>
<td>0.101 0.077</td>
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</tbody>
</table>

a The sample period is 1990-2008. Share of Assets Invested in Trusts is defined as the sum of assets in common/collective trusts, pooled separate accounts, master trusts, and 103-12 investment entities divided by total assets. Models also include controls for industry, year, plan assets per capita in 10,000s, participants (in10,000s) and its square, plan age, whether employer offers other defined contribution plan, whether the employer offers other defined benefit plan, 401(k) plan, profit sharing plan, and other money purchase plan.
Returns on union and non-union pension plans are calculated from IRS Form 5500 filings with 100 or more participants. The return for the market index is based on a value-weighted index of all NYSE, AMEX, and NASDAQ stocks.
Figure 2
Alpha Coefficients for Union and Nonunion Plans

Note: Alpha represents risk-adjusted performance (in percentage points) from a six-factor Fama-French model. The sample includes 6,434 union plans and 32,461 nonunion plans.