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ABSTRACT

This paper questions recent conclusions that the trend towards defined contribution plans and away from defined benefit plans is due to increased pension regulation and/or a changing economic environment. Using data from IRS 5500 filings by pension administrators, we find that at least half of the trend is due to a shifting employment mix toward firms with industry, size, and union status characteristics which have historically been associated with lower defined benefit plan rates. Not more than half of the trend can be attributed to a "stampede" by firms with given industry, size, and union status characteristics toward defined contribution pension coverage.

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I. Introduction

There are two basic types of pension plans, defined benefit plans and defined contribution plans. According to McGill (1984), a defined benefit plan is "one in which the benefits are established in advance by a formula and employer contributions are treated as the variable factor." From the same source, a defined contribution plan is "a plan that provides an individual account for each participant and bases his benefits solely upon the amount contributed to the participant's account and any expense, investment return, and forfeitures allocated to such participant's account."

For most employees, their primary pension is a defined benefit plan. However, recent evidence suggests that there may be an increasing tendency, especially in the 1980's, for the primary plan to be a defined contribution rather than a defined benefit plan (Ippolito, 1986; Clark, Gohmann and McDermed, 1988; Turner and Beller, 1988). For example, data from IRS filings indicate that among those employed in firms with more than 100 employees, the probability that a worker's primary plan was defined benefit fell slightly between 1977 and 1981 and more precipitously between 1981 and 1985, from 0.880 to 0.793. Moreover, plans formed in earlier years are more likely to be defined benefit plans than are plans formed in later years (Clark, Gohmann and McDermed, 1988).

Some of this apparent trend may be attributed to increasing regulation. The trend was preceded by important changes in pension regulations, beginning with ERISA and continuing through tax and pension regulations passed in the middle 1980's. Since many changes in pension regulation increase the relative cost of defined benefit plans and limit their effectiveness as devices for influencing retirement and productivity, it has been argued that the trend toward defined benefit plans reflects the effects of changing regulation (e.g., Clark, Gohmann and McDermed, 1988).

Another factor in the trend may have been the changing economic environment. In earlier times, inflation was relatively low and stable. Under such circumstances, defined benefit plans relieve the worker of risks associated with asset performance. In more recent years, inflation has moved to higher levels and has also become more erratic. Since many of the incentives from defined benefit pensions are sensitive to the growth rate of wages and prices, the changed inflationary environment has had the effect of making defined benefit plans more risky to workers relative to defined contribution plans. This in turn reduces the incentive to choose defined benefit plans.

The overall trend toward defined contribution plans may also reflect the changing composition of industry and the work force. It is well known that defined benefit plans are more likely to be found in union firms, in large firms, and in certain industries such as manufacturing (e.g., Kotlikoff and Smith, 1983). Moreover, these key correlates of plan type have been subject to strong trends. The decline of unionization and the trend away from manufacturing and toward services are highly visible and well known phenomena which have also been of concern because of implications for productivity, the distribution of income, and related social policy issues. To some extent, the trend toward defined contribution plans may simply reflect changes in the mix of jobs.

The main purpose of this note is to assess the importance of this last phenomenon. In general terms, we find that about half of the overall trend towards defined contribution plans is attributable simply to a shift in employment mix toward firms whose size, industry, and union status have always been associated with an increased likelihood of defined contribution plans. The remaining trend may be due to changes in regulation, changes in the economic environment, or other factors, but we do not here attempt to assess the relative importance of the various potential explanations.

The analysis separates out the effects of changing mix of employment by industry, firm size and union status from any trend within each category. The data for the analysis are IRS 5500 forms, which pension administrators are required to file each year. The next section discusses some issues associated with using the IRS data, and the following section decomposes the trend toward primary defined contribution plans into the portion due to the changing mix of employment by union status, industry, and firm size and the portion due to the remaining trend, holding employment mix constant. A final section briefly summarizes the conclusions.

II. Data Issues.

IRS 5500 forms are filed annually by administrators of pension plans with 100 or more participants. The analysis uses information from the years 1977, 1981 and 1985, which span the years for which the forms have been encoded in machine readable form. Plans of government employers are excluded. In classifying the plans, those with both defined benefit and defined contribution elements are treated as primarily defined benefit plans. A few plans with less than one hundred employees appear in the sample.

One problem with the IRS data is that individuals may be covered by a primary and one or more secondary plans, with no indication of which plan is primary. This problem is addressed by an algorithm written by Daniel Beller of the Department of Labor. Essentially, for each year the algorithm first groups plans which have the same employer identification number (EIN). If there is only one plan for an EIN, it is labeled as primary. Otherwise, the algorithm groups plans within an EIN according to geographic location. For each location, the algorithm considers any plans with clear defined benefit elements to be primary. If there are no defined benefit plans at a location, the largest defined contribution plan is considered to be primary. The results presented in the next section pertain only to primary plans.

A second problem is that the 5500 forms contain no systematic information on collective bargaining status. To obtain this information, the 1977 Employee Benefit Survey (EBS)is used to obtain the union status for each EIN and plan number in that survey. The EIN's and plan numbers are then matched to the corresponding information in the IRS data to yield the collective bargaining status of the plans. The match is made separately for each year of cross-section data. For the later years, this procedure fails to impute collective bargaining status for plans formed since the the EBS was done in 1977. This means that the number of missing observations on collective bargaining status increases steadily over time.

Although the study considers three years of data, we should be explicit that we do <u>not</u> attempt to follow individual firms or plans over time. The problem is that the EIN's, which would have to form the basis for the matching across years, appear to be quite noisy. As an indication of the degree of the problem, it may be noted that about one fourth of the IRS 5500 forms in 1977 cannot be matched to the EBS data using EIN's, despite the fact that the EBS data are for the same year. These errors in the EIN's may also create discrepancies among the measured pension-union relations found in the three cross-section samples of EIN forms.

III. Trends in Plan Type.

The principal findings of the empirical analysis are presented in Tables 1 and 2. Table 1 indicates, for each year and for a variety of categories of firms, the percentage of employees whose pension plans are primarily of the defined benefit type. To get the percentage of employees, each plan is weighted by the number of active participants, meaning current employees who are fully or partially vested or who are earning creditable years towards vesting. Table 2 reports the distributions of employees in the various categories. The bottom part of this table also reports on the number of plans which are included in the data and the total number of employees those plans covered.

The top row of Table 1 relates to the overall percentage of employees covered by defined benefit plans in the three years. The percentage declined slightly, from 89.7% to 88.0%, between 1977 and 1981, and more precipitously, to 79.3%, by 1985. Thus, there is a clear indication of a decline of over 10 percentage points in defined benefit plans over the eight year period, with the largest part of the decline occurring in the last four years.

Once the plans are classified by union status, the drops in percentages over time are less noticeable. For employees with pensions covered by a collective bargaining agreement, the percentage covered by defined benefit plans changed only from 97.2% to 96.0%, a drop of only a little over one percentage point. Even for employees with pensions not covered by a collective bargaining agreement, and for whom employers presumably had more leeway in changing pension plans, the drop in defined benefit plans was from 82.9% to 76.8%, or about 6 percentage points. Given the fact that union plans are substantially more likely to be of the defined benefit variety, the well-documented shift in employment and pension coverage toward nonunion workers accounts for a substantial part of the remaining decline in the overall percentages.

For 1977, collective bargaining status cannot be determined for 26.2% of the plans, largely because of match failures between the IRS 5500 forms and the EBS data. In later years, the fraction of plans for which collective bargaining status cannot be determined rises, reflecting new plans which are not in the EBS data. Given the lack of union organizing success in the late 1970's and early 1980's, it seems likely that many if not most of these new plans were nonunion. Hence, the mix of firms in this category has probably become increasingly nonunion over time. This would, in turn, help to account for the sharply declining percentage of defined benefit plans in this group, although the figure for 1985 indicates that the percentage of defined benefit plans among the firms offering new plans is even lower than among nonunion firms with more established plans.

The next group of figures reports percentages by firm size. The last row of this group refers to plans for which the firm size is not available. Many if not most of these plans are multiemployer plans. Since it is the plan administrator who is required to file the 5500 form for multiemployer plans, and not the employers, the size of the firms covered by such plans is not collected. The data by firm size show that the decline in defined benefit plans cuts broadly across all sizes of firms, although the steepest declines appear to have been at smaller firms.

In each of the years examined, large firms are more likely to have defined benefit plans than are small firms. There are at least a couple of reasons why this might be so. A defined benefit plan may involve larger fixed expenses, such as for actuaries, than defined contribution plans. Perhaps more importantly, particularly for closely held smaller companies, smaller firms may be less willing to bear the risk of fluctuations in pension asset values than are larger firms, which are able to diversify this risk among numerous shareholders. With regard to the greater decline in defined benefit plans among smaller companies, one factor may be the increasing availability in recent years of quite flexible defined contribution plans by groups of mutual funds. These funds take care of the paper work and allow switching among numerous types of assets, and they may be particularly attractive to small firms which are already predisposed toward defined contribution plans for the reasons discussed above. Reasons such as these must be distinguished from the effects of regulation such as increased complexity of reporting requirements.

With regard to industry, within manufacturing the percentage of defined benefit plans dropped about 6 percentage points, from 92 percent to 86 percent. The overall drop in defined benefit plans was larger both because the population of pension covered workers shifted to other industries with lower percentages of defined benefit plans and because the drop in the percentages of defined benefit plans was larger in those industries. For example, the percentage of pension covered employees in the services industry almost doubled, from 6.5 percent to 12.2 percent, while the percentage of service pension plans which were defined benefit dropped from about 88 percent to 70 percent. Similar results, though with less dramatic gains in pension covered employment, occurred in several other industries as well.

In 1985, the typical pension covered worker was more likely to be nonunion and less likely to work in manufacturing than was the case in 1977. A natural question to ask at this point is to what degree the overall drop in defined benefit pensions can be attributed to the fact that the mix of firms changed between 1977 and 1985, and to what degree the drop is due to the reduced tendency of firms with given union status, size and industry characteristics to offer defined benefit plans. A rough answer to this question is given in the final three rows of Table 1.

To construct these rows, the three union status categories, six firm size categories, and 74 two-digit industry categories are combined to yield a total of 1332 groupings. For each grouping, the percentage of covered employees who had defined benefit plans is calculated for each year. The 1332 percentages are then weighted and combined to yield an overall percentage. In the first row, the weights are proportional to the number of covered employees in 1977. The 85.7% figure in the final column of this row can be interpreted as meaning that if the number of employees in each grouping were held at the 1977 level, the percentage of defined benefit plans would have fallen to 85.7% due to the declining percentages of defined benefit plans within each group. The remainder of the actual decline in the overall percentage may then be attributed to shifts among the groups between the two years. The figures in the other two rows are constructed similarly.

These figures suggest that of the more than 10 percentage point drop in defined benefit plans generally, probably not more than half can be attributed to the declining propensity of firms with given union status, size and industry to offer defined benefit plans. The precise figure depends upon which year's weights are used. Using the 1977 weights, only 4 of the 10 percentage point decline can be attributed to declines within the union status, firm size and industry groupings, while using the 1985 weights as much as 6 of the 10 percentage point decline can be attributed to within-group declines. Even these figures probably overstate the magnitude attributable to within-group declines, since for at least some groups there may have been significant changes over time of the types of firms within the group. As a result, some of the within-group declines may really reflect changes in the composition of the group rather than true declines in the propensity of firms with given union status, size and industry to offer defined benefit plans.

IV. Conclusions.

With regard to the question posed in the title of this note, the "stampede" appears to be not more than half fact and not less than half fiction. Although the percentage of pension covered workers with defined benefit plans has fallen by more than 10 percentage points between 1977 and 1985, this does not mean that individual firms employing one out of 10 pension covered workers have shifted from primary defined benefit to defined contribution plans. Rather, at least five percentage points of the shift appears to be the result of employment shifts towards firms with characteristics which have always been associated with a lower probability of offering defined benefit plans. The shift toward defined contribution plans by firms within specific industry, size, and union status cells appears to be at most around 5 percentage points, a figure which might well have been lower if additional criteria had been used to construct the cells. In turn, this means that regulatory changes and/or changes in the economic environment have not had nearly as great an effect on plan type as the overall trend toward defined contribution plans might suggest.

Table 1
Percentages of Employees in Primary Defined Benefit Plans

	Year 1977	1981	1985
Total Plans:	89.7%	88.0%	79.3%
By Union Status:			
Union	97.2	97.6	96.0
Nonunion	82.9	83.7	76.8
Status Not Available	86.3	83.2	70.7
By Firm Size			
< 100 Employees*	84.2	68.6	60.6
100-249 Employees	63.8	56.5	45.3
250-499 Employees	69.3	63.2	50.9
500-999 Employees	77.3	72.4	60.7
1000+ Employees	90.2	90.8	82.2
Firm Size Not Available	95.4	91.4	86.6
By Industry			
Agriculture, Forestry & Fishing	88.0	82.3	65.2
Mining	86.5	86.2	76.3
Construction	91.2	81.3	70.8
Manufacturing	92.2	91.9	86.0
Transportation & Communication	92.0	95.8	85.8
Wholesale Trade	79.2	72.4	65.1
Retail Trade	83.0	78.5	68.3
Finance, Insurance & Real Estate	85.2	83.1	78.5
Services	87.7	81.0	69.9
Tax-Exempt Organizations	90.4	88.4	85.8
Industry Not Available	81.4	87.3	78.9
Using Constant Weights			
1977 Weights	89.7	90.0	85.7
1981 Weights	88.3	88.0	84.0
1985 Weights	85.5	85.3	79.3

* No more than two tenths of one percent of participants were covered by plans which reported less than 100 employees.

Table 2
Distributions of Covered Employees

	1977	Year 1981	1985
By Union Status:			
Union	41.5%	32.5%	25.8%
Nonunion	32.3	32.7	33.2
Status Not Available	26.2	34.8	41.0
By Firm Size			
< 100 Employees	0.1	0.1	0.2
100-249 Employees	2.4	2.7	3.3
250-499 Employees	3.7	4.0	4.4
500-999 Employees	4.8	4.8	5.5
1000+ Employees	59.3	64.1	66.5
Firm Size Not Available	29.7	24.3	20.1
By Industry			
Agriculture, Forestry & Fishing	0.3	0.4	0.5
Mining	1.0	1.5	1.5
Construction	6.6	6.6	7.1
Manufacturing	46.3	43.9	40.2
Transportation & Communication	12.8	11.8	11.3
Wholesale Trade	2.4	2.2	2.5
Retail Trade	7.1	7.9	10.4
Finance, Insurance & Real Estate	7.1	7.9	9.1
Services	6.5	8.9	12.2
Tax-Exempt Organizations	5.7	6.2	0.0
Industry Not Available	4.1	2.5	5.1
Total Number of Plans (in thousands)	23.2	32.2	35.9
Total Covered Employees (in millions)	25.0	31.5	33.2

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