

Positioning Pensions for the Twenty-First Century

Edited by Michael S. Gordon,
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Chapter 5

Investment of Assets in Self-Directed Retirement Plans

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There is a growing concern among some retirement policy analysts and employer-sponsors of retirement programs that the shift toward participant-directed investment of defined contribution plan assets in recent years is resulting in overly conservative investment of these assets. The real concern is that we are not realizing the economic horsepower from our defined contribution assets that we could realize and that, in the long term, the retirement security of many workers participating in self-directed plans will suffer accordingly. One recent survey suggests that nearly two-thirds of plan sponsors are concerned about the asset allocation decisions that their employees are making with their employer-sponsored retirement plan assets (Institute of Management and Administration 1995).

Recently there have been a number of articles in newspapers, general news magazines, and trade publications raising the consciousness of the general public about the concerns related to participant-directed investment of retirement plan assets. In some of the articles the focus is on the relative capabilities of professional asset managers who are generally involved in the asset placement decisions of defined benefit assets and those of individual plan participants in typical defined contribution plans. In other cases the focus is on the relative risk that large sponsoring organizations can assume in investing retirement assets in comparison to individual investors.¹

Despite the growing concerns about participant-directed investment of retirement assets, there has been remarkably little research into the actual investment decisions made by the participants in these plans. To date, what limited research has been done mostly has focused on the

comparative aggregate distribution of retirement assets in defined benefit and defined contribution plans. The conclusion from this research is quite straightforward—DC plan participants tend to invest more of their assets in fixed-income type assets and less in equities than do the investors of DB plan assets. By itself, this conclusion may be interesting but is not necessarily informative.

The reason that the conclusions drawn from prior research on the differences in the investment in DB and DC assets is not informative is that it generally fails to account for the underlying variation in investment behavior that is behind the conclusion. Much of the prior research also fails to consider the reasons for the variations between the investment styles of different types of plans and their legitimacy. In this chapter we attempt to expand on the prior research. First, we investigate the gradual shift from the organized management and investment of retirement assets to the current environment where the investment of these assets is increasingly being directed by the plan participants. Second, we take a brief look at the differences in the aggregate investment of defined benefit and defined contribution assets. Third, we analyze the investment of assets in a number of defined contribution plans across a range of worker characteristics based on actual investment records from a sample of defined contribution plans. In the final section of the chapter, we draw some conclusions based on the earlier sections of the chapter.

Background

Since the passage of the Employee Retirement Income Security Act (ERISA) in 1974, we have seen defined contribution plans assume an increasingly important role in the elements of the retirement security system sponsored by employers. In 1975 there were slightly more than 103,000 private defined benefit plans in operation in the United States. The number of defined benefit plans grew steadily until 1983, when there were just over 175,000 plans in operation. Since then we have seen a fairly steady decline in the number of plans, with just under 102,000 plans in existence in 1991, the last year for which we have published disclosure data. Over this same period the number of defined contribution plans grew steadily from slightly under 208,000 plans to nearly 600,000 plans (USDOL 1995:60).

The pattern of participation in defined benefit plans directly followed the pattern of plan growth between 1975 and the early 1980s as participation grew from 33 million workers in the prior year to about 41 million by 1984. Although there was a decline of nearly 42 percent in the number of private defined benefit plans in operation between the early 1980s

and 1990s, participation in the plans only declined by about 2.5 percent from the peak and stood at 39 million workers in 1991. At the end of the 16-year period, participation was 18 percent higher in defined benefit plans than it had been at the beginning. In the case of defined contribution plans, the growth in participation was nearly as steady as the growth in the number of plans. In 1975, there were 11.5 million participants in plans, growing to nearly 35 million by 1985. Beyond 1985, the growth in defined contribution plan participants slowed somewhat. By 1991, participation in defined contribution plans had grown to 38.6 million workers, representing a 335 percent growth over the level in 1975 but only a 10 percent growth over the level in 1985 (USDOL 1995).

Participation in defined contribution plans grew rapidly immediately after the passage of ERISA because the benefit limits under section 415 of ERISA allowed greater tax-qualified retirement contributions in cases where employers were sponsoring both types of plans than in cases where they had only one or the other. This encouraged many employers that had traditionally offered only a defined benefit plan to introduce supplemental defined contribution programs. The growth in participation further accelerated during the early 1980s because of introduction of section 401(k) plans. Under these plans workers could voluntarily defer compensation on a pre-tax basis. Most employers that had sponsored profit-sharing or thrift-savings plans prior to the publication of section 401(k) regulations introduced 401(k) features into their defined contribution plans. Many employers that had not offered such plans in the past provided employees with a section 401(k) plan soon after the release of the regulations.

Through the end of the 1970s and into the early 1980s, the assets in defined contribution plans typically were held in a pooled trust, and each participant in the plan was credited with his or her vested pro rata share of the pool. The vesting periods during this era could range up to 10 years, although they tended to be somewhat shorter than that. Because of the vesting periods, however, significant amounts of the money in the plans at any point in time were not yet the property right of the individuals to whom they had been credited. With the establishment of 401(k) plans, however, workers were now contributing their "own" money to the plans to a much greater extent than they had before, and there was immediate vesting in their balances. The new realities of defined contribution plan structure changed perceptions about whose money was in the plans and how that money should be managed. With the evolution of 401(k) plans during the 1980s, sponsors of defined contribution plans increasingly offered participants the opportunity to direct the investment of their retirement accounts.

ERISA generally provides that a fiduciary of a benefit plan must dis-

charge his or her investment responsibilities prudently, including diversifying plan investments to minimize the risk of large losses. To the extent these duties are breached, the fiduciary is liable to the plan for any losses. ERISA, however, includes an exception to this provision in section 404(c) where it provides that in cases where the participants can direct their own investments, the plan fiduciaries are not liable for any loss or breach that results from the participant's exercise of control. In the late summer of 1987, the Department of Labor released preliminary regulations under section 404(c) beginning to detail the rules under which employers could hand off some of the fiduciary obligations that they held when they controlled their defined contribution assets.

The precipitous decline in stock prices during October 1987 raised a number of fiduciary issues for plan sponsors still managing their defined contribution plan portfolios. For example, many plans at that time calculated the value of distributions on the basis of the last valuation date of assets in the plan prior to a worker's termination. Many valuations were done on a quarterly basis. Plans whose valuation dates coincided with the end of a calendar quarter were in the position of paying individuals who terminated prior to the end of 1987 considerably more than the value of their respective accounts at the date of termination. Paying someone terminating on October 31, 1987 the value of his or her account on the basis of a September 30, 1987 valuation would further drain the value of the remaining portfolio for those workers who remained in the plan. Thus, in addition to the restructuring of retirement plans and the changing perception about ownership of plan assets, there were practical developments that encouraged plan sponsors to allow participants to direct their own investments.

During September 1992 the Department of Labor finalized the section 404(c) regulations, which were somewhat less onerous than the initial proposed regulations had been. In order for a plan to meet the 404(c) requirements a plan must allow each participant to "exercise independent control" over the assets in his or her individual account. This means that the participant must be able to give investment instructions to a plan fiduciary, who must generally comply with such instructions. In addition, the regulations require that sufficient information to make informed investment decisions must be made available to participants in these plans. The regulations allow plans to restrict the frequency with which investment changes may be made, but require that participants be able to give investment instructions with a frequency which is appropriate for the expected market volatility of the investment. The regulations state general rules requiring that the available investment alternatives must be sufficient to give the participant a reasonable opportunity to affect materially both the potential return on assets in his or her account and the

degree of risk to which the assets are subject. The regulations require that the participants be able to choose from at least three investment alternatives, each of which is diversified (thus an employer's securities cannot be one of the three), each of which has to have materially different risk and return characteristics, which allow the participant to achieve a diversified portfolio with desired risk and return characteristics, and so minimize overall risk. In return for setting up the 404(c) plan, the sponsor is not liable to participants for any loss or breach of fiduciary responsibility that may result from the participant's exercise of control.

The combination of factors that have evolved over the last 10 to 15 years means that most defined contribution plans today offer participants control over at least some part of their retirement accumulations. As we have made the transition from professionally managed pension portfolios to an increasing dependence on individual investment decisions, the relative level of assets in defined contribution plans has been increasing in comparison to defined benefit plans. In 1980, private defined benefit plans held slightly more than US \$400 billion in assets. The balances had grown to US \$1.1 trillion by 1991, reflecting an annual compound growth rate of 9.6 percent. By comparison, defined contribution assets grew from US \$162 billion in 1980 to US \$834 billion in 1991, with an underlying growth rate of 16.1 percent per year (USDOL 1995:70).²

Variations in the Investment of Retirement Plan Assets

A simple algebraic equation which captures the operations of both defined benefit and defined contribution plans is

$$\text{Benefits} = \text{Contributions} + \text{Asset Yield}$$

The relative interest of plan sponsors in the specific variables in this equation, however, are or should be vastly different between defined benefit and defined contribution plans. In a defined benefit plan the sponsor is responsible for delivering a set of benefits laid out in the benefit formula that defines the essence of the plan. In this case there is a direct inverse relationship between the yield on assets and the amount of contributions or cost of the plan to the sponsor. In a defined contribution plan the sponsor is responsible for delivering a set of contributions in accordance with the plan documents. In this case there is a direct positive relationship between the yield on assets and the benefits delivered to the participant.

Historically, one of the motivations for setting up defined contribution plans instead of defined benefit plans is that the plan sponsor can be freed of the investment risk faced when making the defined benefit

promise. For example, one can argue that if private academic institutions, which now largely depend on defined contribution plans, were to shift to defined benefit plans they would face the prospect of required increases in retirement plan funding during down cycles in the investment markets which would coincide with the deterioration of the value of their endowments, which are generally invested in financial assets and on which they are dependent for operating income. In other words, if private academic institutions that rely heavily on endowment income were to shift to defined benefit plans, they would be hit with their heaviest benefit funding requirements at exactly the times they were least able to meet them. Thus, because of this timing problem, defined contribution plans may best meet the needs of private universities from the perspective of their larger financing considerations and the financial risk they face over the investment cycle.³

Employers' movement to 404(c) plans allowing the plan participants to direct the investment of their own accounts is a further effort to pass on the risk of negative market performance to the plan participants. The 404(c) regulations are quite specific: if the plan sponsor offers a diversified set of investment options, the participants are given the opportunity to move money among investment options with some frequency and are provided information on the investment options. The participants, not the plan sponsors, are at risk from negative investment outcomes. Presumably, sponsors of retirement programs have been aware that they are passing risk to the participants in their retirement programs as they have moved away from defined benefit plans and into 404(c) defined contribution plans.

Once risk is passed from the sponsor of a retirement program to the participants in the program, it should not be surprising that the risk that is assumed in the investment of the plan assets changes. One of the reasons that individuals have different investment preferences than plan sponsors relates to their respective time horizons. Especially for older workers, the time horizon over which they are considering the investment of their retirement assets may be extremely short. For a plan sponsor which is an ongoing entity, on the other hand, the time horizon might be almost infinite. The implications of the time horizon can be seen by considering the case of a worker who has US \$100,000 to invest with the choice of investing it in a riskless asset with an annual rate of return of 3 percent or in a S&P 500 index fund with an expected return of 10 percent with a 15 percent standard deviation (Kritzman 1994). Table 1 shows the range of possible outcomes that the investor faces.

After one year the value of the fixed-income asset is US \$103,000. The risky asset's value, on the other hand, will be between US \$81,980 and US \$147,596 95 percent of the time. There certainly is some upside po-

TABLE 1 Terminal Wealth from a Risky Versus Riskless Investment

	<i>S&P 500 95% Confidence Interval</i>		<i>Fixed-Income Asset</i>
	<i>Lower Boundary</i>	<i>Upper Boundary</i>	<i>Terminal Wealth</i>
1 Year	\$ 81,980	\$ 147,596	\$103,000
5 Years	83,456	310,792	115,927
10 Years	102,367	657,196	134,392
15 Years	133,776	1,304,376	155,797
20 years	180,651	2,565,345	180,611

Source: Kritman (1994:15).

tential from investing in the risky asset, but there is also considerable downside risk. By comparison, after 20 years, the low-risk asset's value accumulates to US \$180,611 while the 95 percent confidence interval range of values for the risky asset is from US \$180,651 to US \$2,565,345. This example seems to suggest that, over a longer time horizon, an investor's aversion to risk should be ameliorated.

Nevertheless Kritzman (1994) argues that some investors who prefer a low-risk asset to a risky one over a three-month time horizon would also prefer a riskless asset over a ten- or twenty-year horizon if three conditions are met: first, the investor's risk aversion is invariant to changes in wealth; second, the investor believes that risky returns are random; and third, the investor's future wealth depends only on investment income. The underlying logic in Kritzman's analysis is that risk aversion implies the standard economic model of declining marginal utility related to increases in wealth. Specifically, an investor is assumed to realize a greater increase in satisfaction as wealth increases from US \$100,000 to US \$150,000 than from a similar increase from US \$150,000 to US \$200,000. The problem with risky investments for some investors is that the slope of their utility curves is such that the potential disutility from losing even a small amount of value in their assets outweighs the added potential utility from substantially larger gains. While Table 1 suggests that a longer time horizon would make the more risky investment option the desirable one for our hypothetical investor, the table does not show the 99 percent confidence interval values of the risky investment outcomes. For some investors, the potential disutility of a loss in wealth is so large that, even considering its extremely small probability of occurring, it still is not worth the relatively smaller increases in satisfaction from large potential gains at a much higher probability of occurrence.

One of the conditions specified in the Kritzman analysis is that the investor must believe that risky returns are random. A recent Oppen-

heimer-Money Magazine poll indicated that nearly one-half of respondents believe that people who invest in the stock market get wiped out at least once during their investment careers (Oppenheimer Funds 1994). The conclusion that stock investors get wiped out periodically suggests that people believe the returns in the market are random, otherwise they would think investors would be able to anticipate downturns and get out of the market before being wiped out. On the other hand, most managers of pension assets believe that investing in a diversified equity portfolio pays a risk "premium" to the investor. Indeed, some prognosticators believe that all pension assets managed on a pooled basis might be fully invested in equities if it were not for liquidity needs to manage plan operations over the short term, and because of funding considerations over variations in the investment cycle—that is, the plan sponsor wants to avoid being thrown into an underfunding situation by a decline in equity values in the portfolio during the down portion of the investment cycle (Markland 1994).

Information on exactly where different types of investors put their retirement money varies somewhat from study to study. An Employee Benefit Research Institute analysis of 1989 Form 5500 filings suggested that defined benefit plans compared to 401(k) plans held nearly two-thirds more of their investment portfolio in stocks (Wyatt Company 1994). Greenwich Associates has estimated that participants in 401(k) plans invest only 39 percent of their assets in equities and the remainder in fixed-income investment options. They estimate that defined benefit plans, on the other hand, have just exactly the opposite mix of equities and fixed-income assets (Smith 1993).

Where Plan Participants Put Their Retirement Money

Today there is a growing sense that we need to change the investment allocation of the assets that are accumulating in defined contribution plans or, more specifically, 401(k) plans. The news media frequently runs stories about the need to invest retirement assets more wisely. There is a growing public policy awareness that there is a potential problem here, and we are even beginning to see calls for employers to take back the responsibility of investing and managing the assets in 401(k) plans (Rohrer 1994). In light of this, some employers have begun undertaking major education programs to change the investment behavior of plan participants. Yet remarkably little is known about how individual investors allocate their retirement resources and what we must do if we want to encourage alternative behavior.

In order to help explain the investment behavior of participants in

self-directed retirement plans, we have pooled administrative records on slightly more than 36,000 participants drawn from 24 defined contribution plans holding nearly US \$1.4 billion in total assets. The total number of participants in these plans ranged from around 150 to 6,000. We had some larger plan data that we chose not to include here because there were strong financial incentives encouraging investment in company stock which resulted in disproportionately heavy investment in that asset option. Table 2 shows a distribution of the total assets in the plans that are included in this analysis. We did not include approximately US \$50 million in rollover money in these plans because such accounts were reported in only about 5 percent of the cases and because some plans may have more restrictive investment options for such money compared to money accumulated under their own programs.

Table 2 shows both the distribution of participants investing in various asset types and the total assets invested in each asset class. The fixed-income funds include bond, GIC, and money market funds and would generally be the classes of assets which have raised the concerns about where self-directed retirement money is being invested. The balanced fund class of investments are funds that hold a mixed portfolio of stocks and bonds. Company stock is the stock of the sponsor of the plan in which the individual participates. The domestic equity funds invest in a portfolio of stocks of companies issuing such stocks in the United States. The international equity funds invest in stocks of companies outside the United States.

The distribution of assets in the table suggests that between 35 and 40 percent of the total assets being analyzed here are in equity funds, which is comparable to other estimates of the aggregate allocation of self-directed retirement assets. Interestingly, consistently a larger share of the participants invest in each of the equity funds than the share of assets that are allocated to each of them. One of the things that is clear from Table 2 is that substantial numbers of investors are investing at least some of their assets in equity funds.

Self-Directed Investment of Retirement Assets and Age of Participants

The earlier discussion suggested that, for at least some participants in plans, the time horizon over which they are investing might be important in determining their investment allocations. While a longer time horizon might be insufficient to encourage some investors with a strong aversion to risk to move any of their assets into equities, for some, the prospect of moderate risk of loss over a longer time frame and the possibility of

TABLE 2 Assets Held in Defined Contribution Accounts by Type of Investment

<i>Type of Asset</i>	<i>Participants with This Asset Type</i>	<i>Percent with This Asset Type</i>	<i>Total Assets (US \$)</i>	<i>Percent of Total Assets</i>	<i>Average Asset Balance of Asset Holders (US \$)</i>
Fixed-Income Funds	24,825	68.9%	\$ 799,457,499	58.1%	\$32,204
Balanced Funds	7,647	21.2	107,432,387	7.8	14,049
Company Stock Funds	6,827	19.0	83,307,341	6.1	12,203
Domestic Equity Funds	24,801	68.9	348,221,176	25.3	14,041
International Equity Funds	3,730	10.4	38,464,729	2.8	10,312
Total	36,244		\$1,376,883,132	100.0%	\$38,234

Source: Authors' calculations.

TABLE 3 Percent of DC Participants Invested in Specific Types of Investment by Participant Age

<i>Type of Investment</i>	<i>Age of Plan Participant</i>					
	<i>Under 21</i>	<i>21 to 30</i>	<i>31 to 40</i>	<i>41 to 50</i>	<i>51 to 60</i>	<i>61+</i>
Fixed-Income Funds	65.1%	63.8%	67.3%	69.9%	73.8%	81.8%
Balanced Funds	27.4	21.4	22.8	20.8	19.9	21.2
Company Stock Funds	13.2	17.9	19.4	18.6	20.4	19.0
Domestic Equity Funds	59.4	70.8	73.0	69.5	61.2	68.9
International Equity Funds	0.0	8.6	11.2	11.2	9.8	10.4

Source: Authors' calculations.

substantial gain from a more aggressive investment posture suggest that young people would likely put more of their money into riskier assets than older workers.

Table 3 shows the percentage of workers by their ages who invest in each of the money classes being considered. The patterns there are consistent with what is expected. At each succeeding age in the table, increasing percentages of plan participants put money into the fixed-income option from youngest to oldest participants. We also see lower utilization of the various equity funds at older ages.

The allocation of assets in the plans by the age of participants is even more pronounced than the distribution of individual investors in each of the asset classes. Table 4 shows the relative allocation of assets into each of the fund options by the age of the participants. At the younger ages, under 40, the allocation of assets is probably fairly close to the 60 percent equity, 40 percent fixed-income combination that some analysts think is relevant for retirement assets. At the older ages, though, there is a marked shift away from the riskier asset options which many retirement planners would advocate. Within the context of the age distribution shown here, the investment of assets does not appear as unsophisticated as the aggregate data suggest.

While Table 4 suggests that the investment behavior of individuals is more reasonable than we often conclude by looking at the aggregate results, it also holds at least part of the key for explaining why the aggregate distribution of self-directed investment behavior looks so conservative. Table 5 holds the remaining part of the explanation. Table 5 shows the average balances of the participants holding various kinds of assets by the age of the participants. It is not too surprising that the balances at the older ages are significantly higher than they are at younger ages. The higher balances among the older participants in combination with their natural inclinations to invest more conservatively result in the overall conservative nature of the investment of self-directed accounts.

The data presented thus far suggest that there is considerable diversification in the selection of assets from the options available to plan participants. Another way to look more specifically at the diversification in the portfolios is to consider the concentration of investments in individual investment options. Table 6 shows the investment concentration for three elements of the investment portfolios offered to the plan participants: fixed-income, domestic equity, and international equity funds. The second column in the table shows the number of potential investors in each of the funds by the participant's age. The number of potential investors can vary from fund type to fund type because not every fund type is offered by each plan sponsor, although all offer fixed-income and domestic equity funds. The next column in the table shows the percent

TABLE 4 Percent of DC Assets Invested in Specific Types of Investment by Participant Age

<i>Type of Investment</i>	<i>Age of Plan Participant</i>					
	<i>Under 21</i>	<i>21 to 30</i>	<i>31 to 40</i>	<i>41 to 50</i>	<i>51 to 60</i>	<i>61+</i>
Fixed-Income Funds	52.6%	41.4%	43.4%	49.4%	61.5%	85.2%
Balanced Funds	8.4	5.7	8.2	11.0	8.3	1.3
Company Stock Funds	4.2	11.0	8.9	6.1	5.8	2.7
Domestic Equity Funds	34.8	39.1	36.4	29.7	22.0	9.5
International Equity Funds	—	2.8	3.1	3.8	2.5	1.2

Source: Authors' calculations.

Note: Some columns may not sum to 100 percent due to rounding error.

TABLE 5 Average DC Investment Balance (US \$) in Specific Types of Investment for Those Holding the Investment by Participant Age

<i>Type of Investment</i>	<i>Age of Plan Participant</i>					
	<i>Under 21</i>	<i>21 to 30</i>	<i>31 to 40</i>	<i>41 to 50</i>	<i>51 to 60</i>	<i>61+</i>
Fixed-Income Funds	\$400	\$3,786	\$12,974	\$29,265	\$65,131	\$187,542
Balanced Funds	152	1,553	7,217	21,938	32,443	17,761
Company Stock Funds	156	3,584	9,238	13,517	22,068	29,246
Domestic Equity Funds	290	3,223	10,064	17,684	28,043	35,995
International Equity Funds	—	1,881	5,608	13,968	20,123	31,627
Total	\$494	\$5,836	\$20,150	\$41,387	\$78,133	\$179,955

Source: Authors' calculations.

TABLE 6 Concentration of DC Assets in Selected Investment Options by Participant Age

<i>Age of Workers</i>	<i>No. Potential Investors</i>	<i>Percent of Potential Investors with x Percent of Total Assets in This Investment</i>					
		<i>Zero</i>	<i>0.01 to 20.0</i>	<i>20.1 to 40.0</i>	<i>40.1 to 60.0</i>	<i>60.1 to 80.0</i>	<i>80.1 to 100.0</i>
<i>Fixed-Income Funds</i>							
Under 21	106	34.9%	6.6%	8.5%	10.4%	5.7%	34.0%
21 to 30	6,267	36.7	9.4	12.5	12.3	6.3	22.9
31 to 40	12,836	33.7	10.4	13.1	12.2	7.0	23.6
41 to 50	10,001	30.8	9.2	13.0	12.2	7.1	27.8
51 to 60	5,464	26.7	7.4	11.0	12.2	7.5	35.2
61 or over	1,338	18.7	5.7	8.1	9.6	9.4	48.5
<i>Domestic Equity Funds</i>							
Under 21	106	40.6%	6.6%	10.4%	15.1%	7.5%	19.8%
21 to 30	6,267	29.2	7.3	10.9	15.9	12.2	24.5
31 to 40	12,836	27.1	9.7	12.7	16.7	12.3	21.6
41 to 50	10,001	30.6	9.5	12.2	16.9	11.2	19.5
51 to 60	5,464	38.9	11.3	12.0	13.7	8.7	15.5
61 or over	1,338	52.3	9.6	9.0	10.2	5.2	13.6
<i>International Equity Funds</i>							
Under 21	14	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%
21 to 30	2,277	76.3	11.3	7.7	2.5	0.9	1.3
31 to 40	5,742	74.9	11.9	8.1	3.0	1.0	1.1
41 to 50	4,533	75.3	12.0	7.4	3.2	0.8	1.3
51 to 60	2,487	75.8	11.5	5.7	2.3	0.6	1.3
61 or over	807	88.5	5.9	2.9	1.6	0.2	0.9

Source: Authors' calculations.

of the potential investors who have zero percent of their portfolio invested in the particular fund type. The right hand column of the table shows the percent of potential investors who have more than 80 percent of their total plan assets in the designated fund type. The table suggests that, even at the youngest ages, there are substantial numbers of participants who are investing their assets quite conservatively. The fixed-income funds seem to be particularly attractive to significant numbers of investors for most or all of their retirement assets. This would not be an investment strategy that most financial counselors would recommend for many of the plan participants who are investing their assets in this fashion.

Table 7 shows the concentration of investment in the company stock and balanced fund investment classes. Company stock is relatively popular with many of the participants who have an option to purchase it. The problem with buying company stock for the retirement portfolio is that it accentuates the risk that the worker already faces from the possibility of reduced lifetime income if the employer sponsoring the plan should have economic problems. It was this concern that led policymakers to limit the amount of a plan sponsor's stock that can be held in the asset portfolio of a defined benefit plan. While many plan participants undoubtedly feel secure and will do well in investing in a company where they work and in which they trust, this again is not an investment option in which most financial counselors would advise workers to invest significant amounts of their retirement assets.

The balanced fund option might be thought of as a "lazy" investor's way naturally to diversify the retirement portfolio between equities and bonds without having to do any of the asset allocation personally. Despite being an easy way to diversify risk, these investment funds do not attract the high concentration of investment that fixed-income and the company stock funds attract. There certainly seem to be some opportunities here for improving the allocation of retirement funds directed by plan participants.

Self-Directed Investment of Retirement Assets and Wage Level of Participants

Another way to consider the variations in the self-directed investment of defined contribution assets is to look at how investment behavior varies across different wage levels of workers. Table 8 shows the percent of participants investing in various classes of assets in comparison to their annual wage levels. Here again, there are some very clear differences in the investment behavior of workers at different wage levels. Other than at the very lowest wage level, there is a clear declining pattern of investment

TABLE 7 Concentration of DC Assets in Company Stock and Balanced Funds by Age of Plan Participants

<i>Age of Workers</i>	<i>No. Potential Investors</i>	<i>Percent of Potential Investors with x Percent of Total Assets in This Investment</i>					
		<i>Zero</i>	<i>0.01 to 20.0</i>	<i>20.1 to 40.0</i>	<i>40.1 to 60.0</i>	<i>60.1 to 80.0</i>	<i>80.1 to 100.0</i>
<i>Company Stock</i>							
Under 21	16	12.5%	6.3%	25.0%	18.8%	6.3%	31.3%
21 to 30	1,799	37.8	13.5	18.9	12.5	4.7	12.6
31 to 40	3,928	36.5	16.9	19.7	11.4	6.1	9.4
41 to 50	3,164	41.2	15.9	19.7	9.9	5.0	8.2
51 to 60	2,198	49.4	12.9	15.2	8.1	5.6	8.8
61 or over	447	50.3	14.5	18.1	7.4	4.7	4.9
<i>Balanced Fund</i>							
Under 21	83	65.1%	13.3%	8.4%	9.6%	2.4%	1.2%
21 to 30	4,284	68.7	11.1	10.2	6.1	1.6	2.4
31 to 40	9,102	68.0	11.3	11.2	6.6	1.2	1.7
41 to 50	6,813	69.5	10.7	10.7	6.3	1.1	1.7
51 to 60	4,120	73.6	9.8	9.1	5.3	0.9	1.2
61 or over	1,046	82.9	6.5	5.7	3.2	0.7	1.1

Source: Authors' calculations.

TABLE 8 Percent of DC Participants Invested in Specific Types of Investment by Participant Earnings (US \$)

<i>Type of Investment</i>	<i>Participant Annual Earnings</i>							
	<i>Less than \$15,000</i>	<i>\$15,000 to \$24,999</i>	<i>\$25,000 to \$34,999</i>	<i>\$35,000 to \$44,999</i>	<i>\$45,000 to \$59,999</i>	<i>\$60,000 to \$74,999</i>	<i>\$75,000 to \$99,999</i>	<i>\$100,000 or More</i>
Fixed-Income Funds	63.5%	74.7%	72.4%	67.3%	61.5%	58.3%	56.0%	63.9%
Balanced Funds	31.8	19.6	19.7	22.4	21.3	19.8	17.9	18.1
Company Stock Funds	16.0	17.3	21.5	24.0	27.6	28.0	22.4	5.9
Domestic Equity Funds	68.5	59.0	65.7	74.5	81.5	84.2	86.7	86.4
International Equity	3.0	6.8	7.9	11.0	15.5	19.8	25.7	26.3

Source: Authors' calculations.

TABLE 9 Percent of DC Assets Invested in Specific Types of Investment by Participant Earnings (US \$)

<i>Type of Investment</i>	<i>Participant Annual Earnings</i>							
	<i>Less than \$15,000</i>	<i>\$15,000 to \$24,999</i>	<i>\$25,000 to \$34,999</i>	<i>\$35,000 to \$44,999</i>	<i>\$45,000 to \$59,999</i>	<i>\$60,000 to \$74,999</i>	<i>\$75,000 to \$99,999</i>	<i>\$100,000 or More</i>
Fixed-Income Funds	62.1%	63.0%	61.6%	66.7%	53.2%	32.2%	26.0%	27.2%
Balanced Funds	5.9	7.2	9.0	6.5	12.0	11.1	14.7	8.4
Company Stock Funds	6.5	7.6	8.2	6.6	7.6	10.6	7.9	2.3
Domestic Equity Funds	24.6	21.5	19.5	18.6	25.3	42.2	45.4	52.0
International Equity	0.6	0.8	1.7	1.6	2.0	3.9	6.1	10.2

Source: Authors' calculations.

Note: Some columns may not sum to 100 percent due to rounding error.

in fixed-income funds. At the higher wage levels there is generally a greater prevalence of investment in the equity funds. The other fund category is particularly popular at the upper wage levels.

Table 9 shows the distribution of assets in the various asset classes by the wage levels of the participants. While we noted above that the percent of participants investing in fixed-income funds declined at higher wage levels, we see an ever greater drop-off in the concentration of assets in these funds among higher-wage workers, especially at wage levels above US \$60,000 per year. Higher-wage workers appear to be pursuing higher rates of return and invest a greater percentage of their assets in equity funds than their lower-wage counterparts.

In the earlier discussion about aversion to risk, three conditions were posited as necessary for the short-term risk aversion carrying over into the longer term. One of these was that an investor's risk aversion was invariant to changes in wealth. Another was that future wealth depends only on investment results. The more aggressive investment pattern of the higher-wage workers suggests that these conditions may not apply evenly across the wage spectrum. Part of the reason might be because of the higher relative utility of accumulated wealth on the part of lower-wage workers than for those with higher wages.

Table 10 shows the average balances in each of the investment classes for the individuals with assets in the class. Interestingly, in each of the wage categories up to US \$60,000 per year or more, the average fixed-income fund balance for the investors with some fixed-income holdings significantly exceeds the average balances in the other investment categories. In other words, at lower wage levels those with the most money tend to invest in fixed-income options. Another interesting aspect of Table 10 is that in the pay ranges up to US \$35,000 per year, the participants in the plans appear to have accumulated an average balance that is roughly equivalent to a year's pay. Between US \$35,000 and US \$60,000 per year, they appear to have accumulated somewhat more than a year's pay on average. Above US \$60,000 per year the average accumulation is significantly less than one year's pay.

Earlier we looked at the concentration of investment in certain of the investment funds on the basis of the age of the participants. Table 11 shows the concentration of investment by the wage level of the participants in the plans for fixed-income funds, company stock, and the balanced fund investment options. In each case there tends to be a much greater concentration of investment in the specific funds at lower-wage levels than at higher ones. For example, within the wage band of US \$15,000 to US \$24,999, 37.5 percent of the participants eligible to invest in fixed-income funds put more than 80 percent of their total

TABLE 10 Average DC Assets Investment Balance in Specific Types of Investment Classes for Those Holding the Investment by Participant Earnings (US \$)

<i>Type of Investment</i>	<i>Participant Annual Earnings</i>							
	<i>Less than \$15,000</i>	<i>\$15,000 to \$24,999</i>	<i>\$25,000 to \$34,999</i>	<i>\$35,000 to \$44,999</i>	<i>\$45,000 to \$59,999</i>	<i>\$60,000 to \$74,999</i>	<i>\$75,000 to \$99,999</i>	<i>\$100,000 or More</i>
Fixed-Income Funds	\$13,827	\$13,173	\$24,002	\$52,605	\$54,681	\$28,608	\$32,314	\$31,943
Balanced Funds	2,615	5,753	12,901	15,382	35,517	28,890	57,133	35,023
Company Stock Funds	5,723	6,864	10,767	14,528	17,346	19,624	24,681	28,887
Domestic Equity Funds	5,082	5,685	8,394	13,281	19,592	25,952	36,472	45,158
International Equity	4,402	1,741	5,883	7,957	8,357	10,138	16,483	29,103
Total	14,147	15,624	28,220	53,105	63,252	51,738	69,673	75,104

Source: Authors' calculations.

TABLE 11 Concentration of DC Individual Asset Holdings in Selected Investment Funds by Participant Earnings (US \$)

<i>Participant Annual Earnings</i>	<i>No. Potential Investors</i>	<i>Percent of Potential Investors with x Percent of Total Assets in This Investment</i>					
		<i>Zero</i>	<i>0.01 to 20.0</i>	<i>20.1 to 40.0</i>	<i>40.1 to 60.0</i>	<i>60.1 to 80.0</i>	<i>80.1 to 100.0</i>
<i>Fixed-Income Funds</i>							
Under \$15,000	6,720	36.6%	7.0%	13.2%	14.2%	5.9%	23.2%
\$15,000 to 24,999	8,827	25.6	7.4	11.2	11.2	7.1	37.5
\$25,000 to 34,999	6,700	28.0	9.7	12.7	11.2	7.3	31.1
\$35,000 to 44,999	3,820	33.2	10.4	13.2	13.4	7.9	21.9
\$45,000 to 59,999	2,811	39.5	11.7	12.0	11.1	8.1	17.6
\$60,000 to 74,999	1,433	43.6	13.1	14.2	9.4	6.4	13.3
\$75,000 to 99,999	1,163	47.0	12.2	13.0	10.6	5.8	11.4
\$100,000 or more	2,152	39.7	14.6	13.8	11.6	6.9	13.4
<i>Company Stock</i>							
Under \$15,000	2,008	46.5%	9.0%	17.6%	10.4%	3.2%	13.3%
\$15,000 to 24,999	2,777	45.0	13.2	17.0	9.7	5.4	9.7
\$25,000 to 34,999	2,231	35.4	16.0	19.5	12.1	6.9	10.1
\$35,000 to 44,999	1,436	36.3	16.9	18.5	11.7	6.8	10.0
\$45,000 to 59,999	1,203	35.6	21.6	19.5	10.1	6.2	7.0
\$60,000 to 74,999	660	39.2	22.9	18.6	9.8	4.7	4.7
\$75,000 to 99,999	422	38.4	21.6	24.9	7.6	4.5	3.1
\$100,000 or more	225	44.0	16.9	28.4	5.3	2.7	2.7
<i>Balanced Fund</i>							
Under \$15,000	4,901	56.4%	11.5%	16.7%	10.5%	2.0%	2.9%
\$15,000 to 24,999	6,208	72.2	10.4	8.8	5.7	1.0	1.7
\$25,000 to 34,999	4,592	71.2	10.8	9.7	5.2	1.5	1.6
\$35,000 to 44,999	2,795	69.5	11.7	10.2	6.2	0.9	1.6
\$45,000 to 59,999	2,116	71.7	12.3	8.5	5.3	0.8	1.4
\$60,000 to 74,999	1,152	75.3	10.8	7.5	4.3	1.1	1.0
\$75,000 to 99,999	954	78.4	8.8	7.7	3.9	0.6	0.6
\$100,000 or more	225	79.3	9.4	8.4	2.0	0.2	0.6

Source: Authors' calculations.

retirement plan assets in those types of funds. By comparison, only about 10 to 15 percent of workers at higher wage levels do so.

Participants are much less likely to bet most or all of their retirement assets on the stock of the companies for which they work than they are to put it mostly in fixed-income options. Where company stock is available as an investment option, workers at the lowest wage levels are three to five times as likely to have 80 percent or more of their retirement plan savings in company stock than at the highest wage levels. It is somewhat ironic that the workers who generally have the least potential to control the operations of the employers for which they work are the most willing to fully commit their long-term retirement security to the successful performance of those organizations.

The concentration of assets in the balanced fund class of investments is interesting because of the relative lack of use of the accounts across the wage spectrum. At the bottom of the wage distribution, only about 45 percent of plan participants with a balanced fund option put any money into the funds. In the middle of the wage distribution, generally less than 30 percent use these fund options, and at the top of the wage distribution it falls to only about 20 percent. For those using these options, most are putting less than half their retirement assets in them. Never as many as 5 percent of those who have an option to use a balanced fund put more than 60 percent of their savings into these accounts. At the highest wage levels, not even 1 percent of the participants put more than 60 percent of their assets into them. Much of the recent commotion about repackaging balanced funds under the rubric of "life stages" funds may result in their greater utilization, but the data here suggest that they do not attract many retirement savers faced with a number of alternative investment options.

Self-Directed Investment of Retirement Assets and Plan Sponsor

Thus far we have focused on variations in investment patterns of participants in retirement savings plans on the basis of the age and wage levels of the participants. A completely different way to look at variations in participants' investment patterns is to consider how these patterns vary across the plans included in the analysis. For this segment of the analysis we are only looking at the concentration of assets invested in fixed-income funds. While this may provide a somewhat incomplete picture, it is instructive because it suggests that plan sponsors can affect the investment behavior of the participants in their plans.

Table 12 shows the percentage of investors with varying concentrations of their total retirement plan assets in the various fixed-income funds. The variation in the distributions is quite remarkable. The percentage of

TABLE 12 Concentration of DC Individual Asset Holdings in Fixed-Income Funds by Plan Sponsor

Plan Sponsor	<i>Percent of Potential Investors with x Percent of Total Assets in This Investment</i>					
	Zero	20.0 or Less	20.1 to 40.0	40.1 to 60.0	60.1 to 80.0	80.1 to 100
A	22.0%	8.0%	10.5%	15.4%	8.5%	35.7%
B	23.4	11.3	12.2	11.9	13.0	28.2
C	25.7	6.3	9.4	10.5	8.6	39.4
D	35.3	12.5	14.7	15.0	6.5	16.0
E	28.4	13.4	21.8	23.8	5.4	7.2
F	5.8	0.7	3.6	5.1	0.0	84.7
G	30.5	11.4	14.9	11.7	6.7	24.8
H	29.0	4.2	8.1	15.1	6.8	36.8
I	69.5	8.0	11.8	3.2	1.6	5.9
J	11.4	7.2	15.4	15.7	17.9	32.4
K	28.6	11.9	27.6	17.2	5.3	9.3
M	19.1	3.8	12.6	21.4	15.1	28.1
N	32.8	5.2	7.8	2.2	0.0	51.9
O	0.6	0.3	0.0	1.6	0.8	96.8
P	5.4	2.3	3.4	4.0	1.9	83.0
Q	42.4	4.7	13.2	15.2	6.7	17.8
R	49.2	6.0	15.8	14.4	3.1	11.5
S	30.7	5.5	14.8	17.5	8.4	23.2
T	35.9	12.3	16.3	11.5	6.9	17.2
U	49.2	7.3	15.2	12.8	3.6	11.9
V	44.5	19.3	13.1	7.3	4.8	11.1
W	8.8	2.4	2.3	5.9	3.7	76.9
X	45.4	18.4	11.5	9.8	2.9	11.9
Y	43.8	10.0	12.5	11.5	8.9	13.4

Source: Authors' calculations.

participants who have no fixed-income investments in their plans range from a low of 0.6 percent to a high of 49.2 percent. The percentage holding 80 to 100 percent of their assets in fixed-income funds ranges from 7.2 percent to 96.8 percent. In the latter case, the plan sponsor also offers the participants a domestic equity fund, an international equity fund, and a balanced fund. The participants in plans O and P are relatively old, which may account for the heavy concentration of investment in fixed-income funds. Plan W has only recently offered participants investment options other than a GIC, and it may simply take some time for participants to become familiar with their other opportunities to invest. Even taking these explanations for high concentration of assets in some of the fixed-income funds into account, the variations in the table suggest that there is something about the plans being offered by the sponsors, or in how they are being communicated, that is having a very

significant effect on the investment behavior of the participants. At this stage of the analysis we have not yet begun to understand more fully what may be causing the variations that we have found. That will be an issue to be pursued in further research.

Conclusions

The research presented here is merely a beginning assessment of the factors behind the investment behavior of retirement plan participants who manage the allocation of their own retirement plan assets. As the immediately preceding section suggests, there is a great deal of additional work to be done. Still there are several conclusions that we can draw from the current effort. First, we find a pattern of investments that suggests younger workers are generally more aggressive in their investment behavior than older workers. There are some clear exceptions to this general pattern, however, as even some of the youngest workers are totally invested in fixed-income investment options. Second, we find that higher-wage workers are somewhat more aggressive in their investment behavior than lower-wage workers. Again, there are clear exceptions to this conclusion. Some high-wage workers are very conservatively investing their retirement assets. Among lower-wage workers with an option to invest in the stock of their employers, we find that there is some substantial number who are investing virtually all of their retirement money there which is probably inappropriate, or even undesirable, in a diversification sense. We believe that better education programs may lead to somewhat different investment patterns than we now find in self-directed defined contribution plans. We do not believe, however, that any amount of education would result in self-directed defined contribution assets being invested in accordance with the investment style that prevails among defined benefit plans.

Putting these results into the framework of the larger discussion about self-directed retirement investment issues leads back to consideration of the motivations that employers have in setting up and administering their retirement savings programs. Traditionally, employers have thought about retirement programs as target savings vehicles that have certain human resource incentives built into them. In the context of the replacement rate model often utilized in designing or analyzing retirement programs, plans are designed so participants can accumulate retirement assets during their working careers sufficient to generate income during their retirement that allows them to maintain their pre-retirement disposable income levels.

More specifically, within the context of sponsoring a defined benefit plan, the replacement rate model has often been used to design plans

which deliver benefits in conjunction with Social Security and personal savings that allow retirees to maintain pre-retirement living standards. Once the defined benefit plan is specified, the sponsor is on the hook for delivering the benefits as stipulated. In this environment the plan sponsor is interested in pursuing investment policies which minimize contributions to the plan over time, or at least coordinate contributions with business operations, and over time periods that exceed the earning or accumulation periods of individual employees.

Within the context of sponsoring a defined contribution plan, sponsors are pushing investment risk onto plan participants. But for a variety of reasons discussed above, workers may have completely different risk preferences than their employers in investing retirement assets. It should not be a surprise to anyone that risk preferences or tolerances vary across individuals and for workers in comparison to their employers. Returning to the replacement rate model used in designing retirement programs, if self-directed defined contribution plans tend to generate lower rates of return, as we believe they generally will on average, then the overall saving in the defined contribution plans will have to be greater in order to generate the same replacement of pre-retirement income than if a defined benefit plan was being used. If employers' motivation in setting up retirement plans is to deliver a targeted level of retirement income at a minimum contribution cost, then self-directed defined contribution plans are not the optimal way to achieve their goal. If employers' motivations in setting up their defined contribution plans is to hand off investment risk, minimize the liability for bad investment outcomes, and give workers some flexibility in meeting their own retirement income needs, then self-directed defined contribution plans are probably the optimal way to achieve that goal. No matter which goal is pursued, there is a price to be paid in each case.

The authors' comments and opinions expressed in this paper are solely their own and do not necessarily represent the opinions of Watson Wyatt Worldwide or any of its associates.

Notes

1. The headlines and tone of the articles has become alarmist in some cases—such as a recent Panel Publishers piece “When Employees Choose, They Lose” (1995).

2. The asset amounts exclude funds held by life insurance companies under allocated group insurance contracts. These funds make up roughly 10 to 15 percent of total private pensions plan assets.

3. Of course there are other motivations for choosing a defined benefit or defined contribution plan than assumption or diversification of investment risk.

These include the ability to attract, retain, and motivate workers during their working years and to retire them on an orderly basis at the end of their useful careers. These considerations are not dealt with in the current context.

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