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INVESTMENT RETURNS: DEFINED BENEFIT VS. DEFINED CONTRIBUTION PLANS

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Introduction

Pension coverage in the private sector has shifted from defined benefit plans, where professionals make investment decisions, to 401(k) plans, where participants are responsible for their own investment strategy. The supposition is that individuals are not very good at investing their own money and face high fees. The question is whether this supposition is borne out by the facts. That is, are returns on defined contribution plans markedly lower than those on traditional defined benefit plans?

This *brief* first discusses alternative ways to measure the rate of return. The second section reports, under a variety of definitions, returns on defined benefit and defined contribution plans for 1990-2012 from the Department of Labor's Form 5500. The third section explores the asset allocation of defined benefit and defined contribution plans and its potential impact on returns. The fourth section presents regression results of the relationship between returns and plan type (defined benefit or defined contribution), controlling for plan size and asset allocation. The fifth section discusses the extent to which fees may explain the lower return in defined contribution plans. The final section reports on Individual Retirement Accounts (IRAs) – the assets in these accounts now exceed holdings in either defined benefit or defined contribution plans, largely due to rollovers from employer-sponsored plans.

The bottom line is that, during 1990-2012, defined benefit plans outperformed defined contribution plans by 0.7 percent. Since this differential remains even after controlling for size and asset allocation, the likely explanation is higher fees in defined contribution accounts. The available data suggest that IRAs produce even lower returns than defined contribution plans, which implies trouble ahead given the massive amount of money that is being rolled over into IRAs.

Defining Rate of Return

The first step in assessing investment performance is simply to compare average annual rates of return over the period 1990-2012 for defined benefit and defined contribution plans. The formula for calculating returns is one commonly used by actuaries and relates the change in assets, netting out the impact of cash flows, to the beginning assets plus half of cash flows:[1]

$$\textit{Rate of return} = \frac{\textit{Ending assets} - \textit{Beginning assets} - \textit{Cash flows}}{\textit{Beginning assets} + \frac{1}{2}(\textit{Cash flows})}$$

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Because plans sometimes borrow funds in order to purchase assets, the rate of return is based on the change in *net* assets (financial assets less financial liabilities). Cash flows include total contributions, benefit payments, and transfers to and from the plan.[2] The data come from the U.S. Department of Labor's (DOL) Form 5500. The analysis focuses on the period 1990-2012 because the DOL has cleaned the data for these years and they are consistent with totals published in the *Private Pension Plan Bulletin*.[3]

Aggregate returns can be calculated in a number of ways. One approach is simply to average the rate of return calculated for each plan. In terms of the example shown in Table 1, the average return would be 7 percent. But note that 70 percent of the total assets are in Plan A, which earns 10 percent. So, an alternative measure would weight returns by plan assets and then identify the average. Such an approach would yield a return of 9 percent in this example.

Table 1. Example: Un-weighted versus Weighted

Plan	Assets	Rate of return
Plan A	$70	10%
Plan B	15	8
Plan C	10	6
Plan D	5	4

Source: Authors' example.

Whether the two approaches to calculating returns yield different results depends on the size distribution of plans and the relationship between size and returns. Table 2 (at the bottom of the page) shows that a high percentage of plans and participants generally fall into the "<$100 million" category, while the bulk of assets tend to rest in the larger plans.

Table 3 shows the relationship between asset holdings and the rate of return for both defined benefit and defined contribution plans. In the case of defined benefit plans, returns increase with the size of the plan.

Table 3. Geometric Rates of Return by Plan Size, 1990-2012

Plan size (assets)	Defined benefit	Defined contribution	Difference
< $100m	6.5%	5.9%	0.6%
$100-$500m	7.5	7.2	0.3
$500m-$1b	7.8	7.6	0.2
$1-$5b	8.0	7.4	0.6
>$5b	8.3	6.9	1.4

Source: Authors' calculations based on Form 5500 (1990-2012).

The pattern is somewhat different for defined contribution plans, where returns increase until plans reach $1 billion and then decline thereafter.[4] In both cases, excluding plans with "less than $100 million" will produce higher returns. Weighting by assets will also produce higher returns for both types of plans because it will de-emphasize the low returns earned by small plans.

Table 2. Distribution of Plans, Participants, and Assets by Plan Size, 2012

Plan size (assets)	Plans		Participants		Assets	
	DB	DC	DB	DC	DB	DC
< $100m	74.4%	93.8%	12.6%	43.0%	7.1%	23.2%
$100-$500m	17.2	4.8	19.1	21.7	14.1	20.5
$500m-$1b	3.2	0.7	9.7	8.4	8.6	10.0
$1-$5b	3.9	0.6	32.5	16.7	31.4	26.5
>$5b	0.8	0.1	26.1	10.2	38.8	19.8
Total percent	100.0	100.0	100.0	100.0	100.0	100.0
Total number	9,203	63,762	40.9m	76.9m	$2.4tril	$3.1tril

Source: Authors' calculations based on U.S. Department of Labor (DOL), Form 5500 (2012). The numbers do not match values from DOL's *Private Pension Plan Bulletin* because our sample is restricted to plans with at least 100 participants, as the DOL does not maintain complete data for small plans.

Returns in DB and DC Plans, 1990-2012

The following tables report more comprehensive data on returns from Form 5500 for 1990-2012.[5] While the level of returns varies by unweighted versus weighted and whether the focus is the whole universe or just large plans, defined benefit plans consistently report higher returns than defined contribution plans (see Table 4).[6] This result is not surprising given that, for every asset size, the average return for defined benefit plans exceeds that of defined contribution plans.

Table 4. Geometric Rates of Return, 1990-2012

Plan	Defined benefit	Defined contribution	Difference
All plans			
Unweighted	6.6%	5.9%	0.7%
Weighted	7.9	7.0	0.9
Plans > $100 million			
Unweighted	7.8	7.3	0.5
Weighted	8.2	7.3	0.8

Source: Authors' calculations based on Form 5500 (1990-2012).

Some researchers have suggested that the differential between defined benefit and defined contribution plan returns has declined over time,[7] but the data show that the differential is generally larger after 2002 (see Table 5).

Table 5. Geometric Rates of Return, DB Less DC Plans, 1990-2012 and Sub-periods

Plan	1990-2012	1990-2002	2003-2012
All plans			
Unweighted	0.7%	1.1%	0.3%
Weighted	0.9	0.6	1.3
Plans > $100 million			
Unweighted	0.5	0.4	0.6
Weighted	0.8	0.3	1.5

Source: Authors' calculations based on Form 5500 (1990-2012).

Asset Allocation

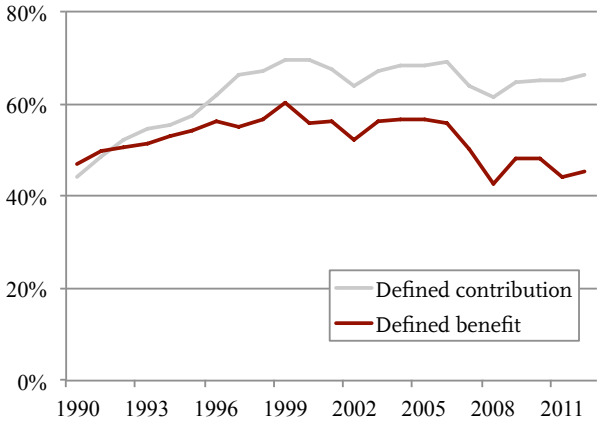
The preceding comparison does not address portfolio differences between defined benefit and defined contribution plans. One might expect that, over the long term, plans invested more in risky assets would produce higher returns. In this case, differences in returns could simply reflect a differential ability to accept risk between the two types of plans, not a failure of defined contribution plans to produce a competitive return.

In the Form 5500, plans must report the total assets held in common stock, preferred stock, corporate bonds, government securities, and real estate, as well as other well-recognized asset classes. In addition to these categories, plans must report assets held in mutual funds and investment trusts.[8] As it turns out, a significant portion of plan assets reported in the Form 5500 is held in mutual funds and trusts, and the challenge is to allocate the balances to conventional asset classes.[9] For the allocation of mutual fund holdings, we use the aggregate asset allocation of mutual funds reported in the Federal Reserve's *Flow of Funds,* which shows about 80 percent allocated to equities. We then confirmed that the aggregate returns were representative by comparing the 2012 aggregate data to mutual fund data from the Center for Research in Security Prices, which covers 3,000 mutual funds.[10]

For trusts, the 5500 provides some information – such as the name of the trust, the employer identification number of the trust, and how much of the plan's money the trust holds. Many of the trusts are dedicated to one asset class, which can be deciphered by the trust's name (e.g., "T. Rowe Price Bond Index Trust").[11] For the remaining unidentifiable trusts, we assume that their annual asset allocation is equal to the aggregate asset allocation of all identified trusts in the given year. Although the process sounds simple, it is extremely time consuming.

Figure 1 (on the next page) shows the percentage of defined benefit and defined contribution plan portfolios held in equities during 1990-2012. Defined benefit plans appear to have rebalanced during the run-up in equities during the bull market of the 1990s and, since the turn of the century, have reduced equity

Figure 1. Equities as a Percentage of Total Portfolio, 1990-2012



Source: Authors' calculations based on Form 5500 (1990-2012).

holdings to match liabilities as companies have frozen their plans.[12] In contrast, in defined contribution plans, the share of assets in equities increased sharply during the 1990s and has more or less stayed at that level since then.[13]

Although the asset allocation of the two types of plans differed significantly over the period 1990-2012, asset allocation would be expected to have only a modest effect on returns. The reason is that the long-run (1926-2014) pattern, where risky equities significantly out-performed less risky long-term corporate bonds, has not held over the past two decades (see Table 6).

Table 6. Geometric Annual Average Returns on Equities and Bonds, Various Periods

Financial investment	1926-2014	1990-2012	1990-2002	2003-2012
Equities	10.1%	8.6%	9.7%	7.1%
Long-term corporate bonds	6.1	8.7	9.5	7.8
Differential	4.0	-0.2	0.2	-0.7

Source: Ibbotson Associates (2015).

Regression Analysis

To account for the differences in allocations to broad asset classes, it is necessary to estimate regression equations in which the dependent variable is the annual return and the explanatory variables include a flag set equal to 1 for a defined benefit plan; a control for the size of the plan (assets and assets^2); the percentage held in equities; and a variable for each year to account for overall fluctuations in the market.

$$Annual\ return = a + b*DB + c*assets + d*assets^2 + e*\%\ equities + year$$

The results (see Appendix Table A5) show that both fund size and equity share are associated with higher returns, but – after controlling for these factors – defined benefit plans still earned returns at least 0.7 percent higher than defined contribution plans. And these results hold whether returns are weighted by assets or whether plans with less than $100 million are included or excluded (see Table 7). Equations were also estimated for the sub-periods 1990-2002 and 2003-2012, and the coefficient of the defined benefit variable ranged from 0.3 percent to 1.5 percent (see Appendix Tables A6 and A7).

Table 7. Regression Results: Differential between DB and DC Annual Returns, 1990-2012 and Sub-periods

Plan	1990-2012	1990-2002	2003-2012
All plans			
Unweighted	0.7%	0.8%	0.3%
Weighted	1.2	0.9	1.4
Plans > $100 million			
Unweighted	0.7	0.5	0.9
Weighted	1.1	0.7	1.5

Source: Authors' calculations.

Overall, the coefficients of the defined benefit flag in the regression equation were very close to those calculated directly from the Form 5500 data.[14] Thus, neither size nor asset allocation is driving the differences in returns, which must be due to either differences in the performance of specific investments within the broader asset classes or, more likely, to investment fees.

The Role of Fees

Investment fees, which typically account for 80-90 percent of total expenses, are the most likely reason that defined contribution plans earn lower returns than defined benefit plans.[15] The reason for the higher fees is that defined contribution plans invest through mutual funds, while defined benefit plans do not. Mutual funds charge fees for selecting the stocks and undertaking the research that leads to buy and sell decisions. These fees are usually assessed as a percentage of invested assets and are paid by the account holder through lower investment returns.

As shown in Table 8, fees vary significantly not only across fund types – 0.44 percent for the median return in an index equity fund versus 1.18 percent in an equity value fund – but also within fund types – bond funds range from 0.48 percent to 1.65 percent.

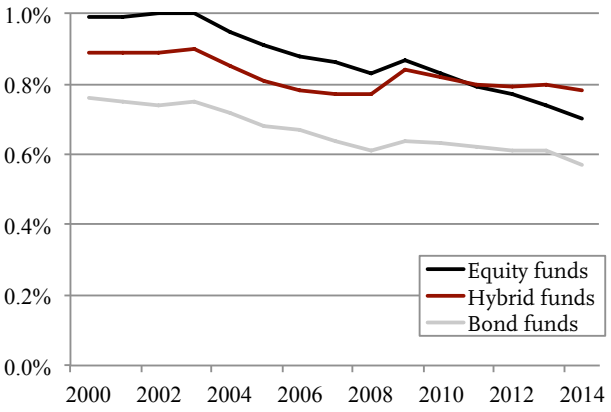
Table 8. Mutual Fund Fees as a Percentage of Assets, 2014

Category	Expense		
	10th percentile	Median	90th percentile
Hybrid fund	0.70 %	1.24 %	2.05 %
Equity value fund	0.73	1.18	1.96
Global fund	0.88	1.39	2.20
Bond fund	0.48	0.86	1.65
Index equity fund	0.08	0.44	1.56
Institutional money market fund	0.06	0.10	0.21

Source: Investment Company Institute (2015a).

While reported fees are interesting, the impact on returns depends on how the money is actually invested. When weighted by assets, fees for equity funds, bond funds, and hybrid funds, while declining over time, accounted for about 0.80 percent of assets under management between 2000 and 2014 (see Figure 2) and were probably substantially higher before that time. Of course, defined benefit plans also have some investment fees, but these are small compared to those associated with defined contribution plans.[16]

Figure 2. Expenses Incurred by Mutual Fund Investors as a Percentage of Assets, 2000-2014

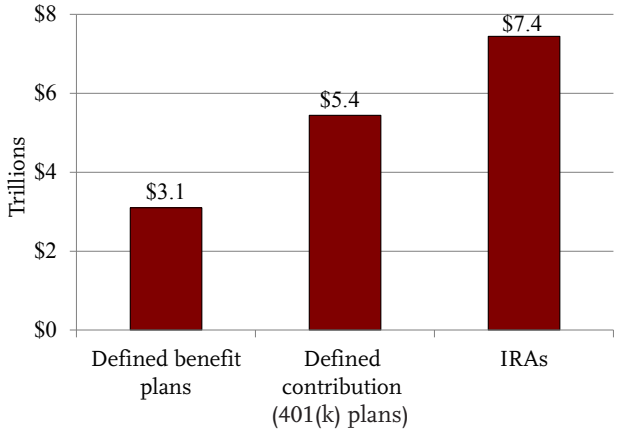


Source: Investment Company Institute (2015a).

IRAs – A Major Component of Retirement Income

IRAs now hold more money than either defined benefit or defined contribution plans (see Figure 3). Even though most IRAs are not sponsored by employers, most of the money in IRAs has been rolled over from employer plans.[17] And the return that IRA holders earn on their assets will have a substantial impact on their retirement security.

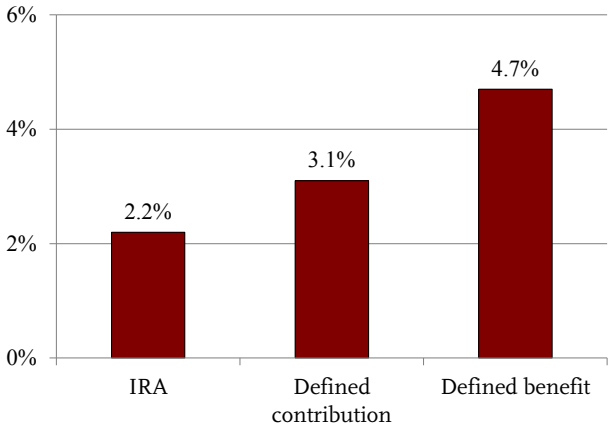
Figure 3. Private Retirement Assets, Trillions of Dollars, 2014 Q4



Source: U.S. Board of Governors of the Federal Reserve System, *Flow of Funds Accounts of the United States*, 2014.

While individuals holding IRAs do not have to fill out a Form 5500, the Investment Company Institute provides data on beginning-year assets, year-end assets, contributions, rollovers, and withdrawals for IRAs that make it possible to calculate the aggregate average return for 2000-2012. Over that period, the results show that IRAs produced substantially lower returns than defined contribution or defined benefit plans (see Figure 4). These lower returns mean that those who rely on IRAs will have substantially lower balances in retirement.

Figure 4. Geometric Rates of Return by Plan Type, 2000-2012



Source: Authors' calculations based on Investment Company Institute (2015b) data and Form 5500 (2000-2012).

The low returns on IRAs may be due to two factors – asset allocation and fees. Indeed, the data suggest that 11 percent of assets in traditional IRAs are invested in money market funds compared to 4 percent for defined contribution plans.[18] Since money market accounts produce safe but low returns, this difference in allocation can be part of the explanation for the low return on IRAs. The rest of the explanation must be that owners of IRAs are being sold many of the high-fee products shown in Table 8.

Conclusion

Three main conclusions emerge from this analysis. First, the Form 5500 shows that defined benefit plans out-performed 401(k) plans over the period 1990-2012 by 0.7 percent. Second, holding size and asset allocation constant, the regression analysis shows a differential between defined benefit and defined contribution plans only slightly larger than that seen in the Form 5500 data, which is likely due – at least in part – to investment fees. Finally, data from the Investment Company Institute show that returns for IRAs, which now hold the bulk of the money, are about 1 percent less than in defined contribution plans. Forgoing returns over long time periods means that assets at retirement will be sharply reduced. Saving is too hard to have fees eat up such a large portion of investment earnings.

Endnotes

1 Including one half of the cash flows assumes that flows occur at an even rate over the year so that, on average, half of the flows are available for investment.

2 Other studies have defined cash flows as only contributions and benefits. Including transfers in the cash flow measure impacts both defined benefit and defined contribution plans similarly and thus does not greatly impact the comparison of returns.

3 U.S. Department of Labor (2015).

4 Other analysts have also noted that small defined contribution plans out-perform larger ones; see Judy Diamond Associates (2014).

5 Note that the unweighted returns look very much like the returns for plans with less than $100 million in assets, because, as shown in Table 2, 74 percent of defined benefit plans and 94 percent of defined contribution plans fall into the smallest asset category.

6 For data on annual returns, see Appendix Tables A1 and A2. Plans with an annual return above 75 percent or below -75 percent were excluded from the analyses of returns. These plans make up less than 0.5 percent of the plans and assets in any given year.

7 See McGee (2015).

8 Investment trusts are separated into 4 groups: common/collective trusts, pooled separate accounts, master trust investment accounts, and 103-12 investment entities.

9 For defined benefit plans, nearly 60 percent of assets are held in trusts (although only about 5 percent in mutual funds). For defined contribution plans, 35 percent of assets are in trusts and 40 percent in mutual funds.

10 Because the 5500 data provide no details on the mutual funds in which a plan invests, there is no way to link the CRSP mutual fund data to the 5500 data.

11 We first allocate the trust into the following 16 asset categories based on their names: Equities, Corporate Bonds, Government Bonds, Mutual Funds, Cash, Income, Short-Term, Money Market, Real Estate, Hedge Funds, Foreign, Emerging Markets, Stable Value, Life Cycle Funds, Receivables, and Other.

12 For a discussion of plan freezes, see Munnell et al. (2006a).

13 For more on the effect of asset allocation on returns in the 1990s, see Munnell et al. (2006b).

14 The coefficient shows the return differential for defined benefit plans if they had the same assets and the same percentage in equities as defined contribution plans. In fact, defined benefit plans hold less in equities, which should reduce the actual return reported in the Form 5500, and are larger, which should increase it. Since the coefficient is one- or two-tenths greater than the Form 5500 data, the asset allocation effects appear to dominate the size effect as one moves from the coefficient to actual data.

15 Deloitte Consulting LLP and Investment Company Institute (2011).

16 Council of Institutional Investors (2005).

17 Investment Company Institute (2015b) reports that for the period 1996-2012, 95 percent of the inflows in traditional IRAs were rolled over from employer-sponsored plans.

18 Investment Company Institute (2015c) and authors' calculations from Form 5500 (1990-2012).

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APPENDIX

Table A1. Annual Rates of Return for Defined Benefit and Defined Contribution Plans, 1990-2012

Year	All plans							
	Defined benefit				Defined contribution			
	Unweighted		Weighted		Unweighted		Weighted	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median
1990	5.3%	4.8%	3.6%	1.4%	5.3%	6.0%	4.7%	5.4%
1991	14.7	13.7	18.5	19.7	12.3	11.3	15.0	13.0
1992	7.4	7.0	7.9	6.9	7.5	7.0	9.6	8.4
1993	7.3	7.4	10.2	11.2	7.3	7.0	9.7	8.7
1994	3.2	0.3	2.4	0.0	3.3	1.8	4.2	2.6
1995	17.9	18.7	21.5	22.3	16.1	16.3	19.6	18.3
1996	12.6	12.4	14.4	14.5	12.5	12.2	15.0	13.7
1997	15.4	16.2	17.0	18.5	15.3	15.8	19.5	18.2
1998	11.9	11.7	13.9	14.0	13.0	13.1	15.4	14.3
1999	10.9	10.2	14.8	15.2	16.5	16.1	11.5	13.2
2000	-0.3	0.0	-0.6	0.2	-6.2	-5.7	-3.5	-3.3
2001	-3.2	-3.6	-4.4	-5.0	-7.4	-8.0	-6.1	-6.3
2002	-7.9	-8.5	-8.7	-9.2	-12.3	-13.1	-11.8	-11.7
2003	13.4	15.5	18.3	20.8	17.3	19.0	17.9	19.1
2004	9.4	9.1	11.6	11.4	9.5	9.3	10.2	9.6
2005	6.0	5.7	8.5	8.0	6.5	6.3	6.5	6.5
2006	9.9	10.3	12.6	12.7	10.7	10.9	12.3	11.7
2007	7.8	7.1	9.7	8.9	7.0	6.8	7.6	7.3
2008	-18.0	-21.4	-19.9	-23.2	-25.6	-28.1	-24.6	-26.1
2009	11.2	16.8	12.2	15.8	18.8	21.3	17.9	20.0
2010	11.7	11.4	12.9	12.9	11.4	11.3	12.1	11.7
2011	3.9	1.4	5.2	4.3	-0.2	-1.4	0.6	-0.3
2012	9.4	10.6	11.2	12.1	10.3	11.1	11.0	11.3

Source: Authors' calculations from Form 5500 (1990-2012).

Table A2. Annual Rates of Return for Defined Benefit and Defined Contribution Plans > $100 Million in Assets, 1990-2012

Year	Plans > $100 million in assets							
	Defined benefit				Defined contribution			
	Unweighted		Weighted		Unweighted		Weighted	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median
1990	3.6%	1.8%	3.2%	0.8%	3.9%	5.1%	4.5%	5.0%
1991	18.8	19.6	19.0	19.8	16.3	14.2	15.6	13.4
1992	8.2	7.6	7.9	6.9	9.8	8.5	10.3	8.9
1993	9.8	10.8	10.7	11.7	9.5	8.8	10.4	9.2
1994	2.7	-0.1	2.2	0.0	3.5	2.7	4.6	2.8
1995	21.5	22.4	21.8	22.5	20.8	18.9	20.6	18.6
1996	14.5	14.2	14.5	14.7	14.6	13.3	15.8	14.7
1997	17.6	18.2	17.1	18.6	19.3	18.0	20.8	19.0
1998	13.2	13.3	14.1	14.2	14.2	14.3	16.3	14.6
1999	13.2	12.9	15.2	15.2	12.4	13.7	10.2	12.3
2000	-0.3	0.0	-0.7	0.2	-2.2	-3.0	-3.0	-2.9
2001	-3.7	-3.8	-4.5	-5.2	-5.5	-6.0	-5.9	-5.9
2002	-8.6	-8.9	-8.8	-9.2	-10.7	-11.1	-11.9	-11.3
2003	16.4	18.9	18.8	21.0	18.4	19.2	18.1	19.2
2004	10.9	10.5	11.8	11.6	10.7	9.8	10.2	9.7
2005	7.3	7.0	8.7	8.3	6.9	6.6	6.3	6.4
2006	11.6	11.8	12.8	12.9	11.8	11.5	12.7	12.0
2007	8.5	7.8	9.8	9.0	7.9	7.5	7.6	7.3
2008	-19.6	-22.9	-20.0	-23.4	-24.3	-26.4	-24.5	-25.7
2009	17.4	18.0	15.9	16.1	21.1	21.4	20.1	20.2
2010	12.4	12.1	13.0	12.9	12.2	11.8	12.2	11.7
2011	4.6	2.4	5.3	4.4	0.5	-0.5	0.8	-0.1
2012	10.5	11.5	11.3	12.2	11.2	11.5	11.0	11.3

Source: Authors' calculations from Form 5500 (1990-2012).

Table A3. Summary Statistics of Factors Affecting Rates of Return for All Plans, 1990-2012

	Mean	Standard deviation	Minimum	Maximum
CRR return	6.09	13.18	-74.98	74.97
Defined Benefit	0.20	0.40	0	1
Assets (billions)	$0.05	$0.54	$0	$71.02
Assets squared (billions)	$2.89E+08	$1.81E+10	$0	$5.04E+12
Percent equity	55.09	27.48	0	100
Number of observations	1,470,948			

Note: Assets are reported in billions.
Source: Authors' calculations from Form 5500 (1990-2012).

Table A4. Summary Statistics of Factors Affecting Rates of Return for Plans > $100 Million Assets, 1990-2012

	Mean	Standard deviation	Minimum	Maximum
CRR return	7.12	13.14	-71.39	74.84
Defined benefit	0.45	0.50	0	1
Assets (billions)	$0.71	$2.10	$0.10	$71.02
Assets squared (billions)	$4.90E+09	$7.44E+10	$1.00E+07	$5.04E+12
Percent equity	61.45	18.76	0	100
Number of observations	86,830			

Note: Assets are reported in billions.
Source: Authors' calculations from Form 5500 (1990-2012).

Table A5. Regression Results: Marginal Effect on Rates of Return, 1990-2012

	All plans		Plans > $100 million	
	Unweighted	Weighted	Unweighted	Weighted
Defined benefit flag	0.66***	1.18***	0.71***	1.11***
	(0.02)	(0.01)	(0.05)	(0.05)
Assets	0.46***	0.01***	0.09***	-0.01**
	(0.02)	(0.00)	(0.02)	(0.01)
Assets squared	-9.33E-12***	2.15E-13***	-1.53E-12**	5.68E-13***
	(0.00)	(0.00)	(0.00)	(0.00)
Percent equity	0.02***	0.01***	0.02***	0.00**
	(0.00)	(0.00)	(0.00)	(0.00)
R^2	0.67	0.69	0.66	0.69
Number of observations	1,470,948	1,470,948	86,830	86,830

Note: Statistically significant at 5-percent (**) or 1-percent level (***). Standard errors are in parentheses. The model includes year fixed effects. Assets are reported in billions.
Source: Authors' calculations from Form 5500 (1990-2012).

Table A6. Regression Results: Marginal Effect on Rates of Return, 1990-2002

	All plans		Plans > $100 million	
	Unweighted	Weighted	Unweighted	Weighted
Defined benefit flag	0.84***	0.85***	0.54***	0.67***
	(0.02)	(0.02)	(0.10)	(0.1)
Assets	0.68***	0.08***	0.10**	0.04***
	(0.04)	(0.00)	(0.05)	(0.01)
Assets squared	-1.88E-11***	-2.60E-12***	-3.41E-12**	-1.98E-12***
	(0.00)	(0.00)	(0.00)	(0.00)
Percent equity	0.03***	0.01***	0.02***	0.00
	(0.00)	(0.00)	(0.00)	(0.00)
R^2	0.57	0.57	0.53	0.57
Number of observations	729,116	729,116	36,671	36,671

Note: Statistically significant at 5-percent (**) or 1-percent (***) level. Standard errors are in parentheses. The model includes year fixed effects. Assets are reported in billions.
Source: Authors' calculations from Form 5500 (1990-2012).

Table A7. Regression Results: Marginal Effect on Rates of Return, 2003-2012

	All plans		Plans > $100 million	
	Unweighted	Weighted	Unweighted	Weighted
Defined benefit flag	0.34***	1.42***	0.86***	1.45***
	(0.02)	(0.02)	(0.06)	(0.06)
Assets	0.39***	0.01***	0.11***	0.00
	(0.02)	(0.00)	(0.02)	(0.01)
Assets squared	-6.91E-12***	3.72E-13***	-1.40E-12**	6.15E-13***
	(0.00)	(0.00)	(0.00)	(0.00)
Percent equity	0.02***	0.01***	0.03***	0.01***
	(0.00)	(0.00)	(0.00)	(0.00)
R^2	0.75	0.77	0.75	0.77
Number of observations	741,832	741,832	50,159	50,159

Note: Statistically significant at 5-percent (**) or 1-percent (***) level. Standard errors are in parentheses. The model includes year fixed effects. Assets are reported in billions.
Source: Authors' calculations from Form 5500 (2003-2012).

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