Defined Benefit & Defined Contribution Pension Plans

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Regents Distinguished Professor of Public Finance
Basics of Pension Management

Accumulation Phase

- Contributions
  - "Account"
    - Investment Returns
    - Fees

Withdrawal Phase

- Withdrawals
  - "Account"
    - Investment Returns
    - Fees
Definitions – Defined Benefit Plans

• First, what is a defined benefit (DB) plan?
  – Mandated contributions
  – Third-party control over investments
  – Formula based benefit withdrawals

• Third-party control
  – Board of trustees, investment committee, CIO, consultants, fund managers

• Benefit rules
  – Attainment rules
    • Vesting requirement
    • Minimum age
    • Formula
  – Payout rules
    • Percentage of salary
Definitions – Defined Contribution Plans

• First, what is a defined contribution (DC) plan?
  – Contributions either optional or mandatory, employer match
  – At least some control over investments
  – Withdrawals determined by beneficiary

• Investment options
  – Menu chosen by plan sponsor and maybe a consultant, choice by worker

• Benefit rules
  – Attainment rules
    • Vesting of matching contributions
    • Separation
  – Payout
    • Determined by beneficiary
Issues with Defined Benefit Plans

• Underfunding
  – Causes?
• Risk transfer
• Incomplete portability
Issues with Defined Contribution Plans

• Number and type of investment choices
  – Too few, possibly skewed
  – Too many investment choices
  – Asset allocation choices

• Education issues

• Reporting/monitoring issues
DB Plan Funding Trends

Funding Ratios, KPERS & Peers, 2001 - 2013

- Arkansas FR
- Colorado FR
- Iowa FR
- Kansas FR
- Missouri FR
- Nebraska FR
- Oklahoma FR
Normal Cost Trends
Investment Returns
Contribution Trends
Other Issues with DB Plans

• Risk transfer
  – When funding deficiencies are covered from taxes/general fund transfers, risk is transferred to taxpayers and beneficiaries of public programs

• Incomplete portability
  – Can take individual contributions (if vested)
  – May end up with several “stranded” assets
Solutions for DB Plans

• Increased contributions
• Return chasing
  – Increasing risk in the portfolio
  – “Alternative assets”
• Reduction in benefit formulas, attainment rules, vesting rules
• Pension obligation bonds
• Fundamental reform
  – Tiered system
  – DC plan, Cash Balance plan
Plan Enrollment

• Not enough people participate, and at levels that are too low to ensure a sound retirement
• Participants may have to “opt-in”
• Participants given little time to consider carefully the options
• Participants either given small amount of investment options or far too many options
• Unclear or arcane language regarding options
  – People use heuristics to set contribution rates
    • Rule of 5
    • Maximum savings rate
    • Minimum required to get maximum match
Who Decides the Mix of Investments?

- Choice of consultant may affect default choice

<table>
<thead>
<tr>
<th>Plan administrator</th>
<th>Target date fund</th>
<th>Money market fund</th>
<th>Stable value fund</th>
<th>Bond fund</th>
<th>Guaranteed investment/annuity</th>
<th>Not sure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single city official</td>
<td>2</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Board/commission</td>
<td>4</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>External—investment</td>
<td>1</td>
<td>1</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>External—insurance company</td>
<td>1</td>
<td>1</td>
<td></td>
<td>2</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>External—consultant</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Chen, Ebdon, Kriz and Masondieu-Laforge (2014)
Asset Allocation

• People use naïve diversification rules
• “Lifestyle” funds may be less helpful than thought
• “Return chasing”
• Infrequent reallocation/rebalancing
• Reliance on peers for advice
Diversification Rules of Thumb

• $1/n$
• Conditional $1/n$ (if divisible evenly say by 2 or 4, then allocate evenly, if not, use some other heuristic)
• Menu following (if 5 equity funds and 1 bond fund are offered, invest more in equity funds)
• Based on the number of lines on election form
• Overload default (if too many choices offered, default to money market/bond)
Lifestyle Funds and Core Funds in a Large Plan

**Table 1**
Allocation of Contributions for a Plan Offering a Mix of Lifestyle Funds and Core Funds

<table>
<thead>
<tr>
<th></th>
<th>Participants in the Conservative Lifestyle Fund</th>
<th>Participants in the Moderate Lifestyle Fund</th>
<th>Participants in the Aggressive Lifestyle Fund</th>
<th>Participants NOT in any lifestyle fund</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core funds</td>
<td>66%</td>
<td>55%</td>
<td>54%</td>
<td>100%</td>
</tr>
<tr>
<td>Conservative Lifestyle Fund</td>
<td>31</td>
<td>1</td>
<td>0</td>
<td>N.A.</td>
</tr>
<tr>
<td>Moderate Lifestyle Fund</td>
<td>3</td>
<td>42</td>
<td>4</td>
<td>N.A.</td>
</tr>
<tr>
<td>Aggressive Lifestyle Fund</td>
<td>0</td>
<td>2</td>
<td>42</td>
<td>N.A.</td>
</tr>
<tr>
<td>Total equity exposure (%)</td>
<td>77</td>
<td>80</td>
<td>89</td>
<td>78</td>
</tr>
</tbody>
</table>

Source: Benartzi and Thaler (2007)
Market Timing: Buy High, Sell Low

Figure 2
Choices of Equities by New Plan Participants

Panel A: The Equity Allocation of New versus All Plan Participants

% of new contributions in equities

<table>
<thead>
<tr>
<th>Year</th>
<th>New participants (%)</th>
<th>All participants (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1992</td>
<td>58%</td>
<td>52%</td>
</tr>
<tr>
<td>1993</td>
<td>61%</td>
<td>53%</td>
</tr>
<tr>
<td>1994</td>
<td>59%</td>
<td>55%</td>
</tr>
<tr>
<td>1995</td>
<td>69%</td>
<td>57%</td>
</tr>
<tr>
<td>1996</td>
<td>74%</td>
<td>58%</td>
</tr>
<tr>
<td>1997</td>
<td>74%</td>
<td>59%</td>
</tr>
<tr>
<td>1998</td>
<td>71%</td>
<td>63%</td>
</tr>
<tr>
<td>1999</td>
<td>72%</td>
<td>65%</td>
</tr>
<tr>
<td>2000</td>
<td>74%</td>
<td>67%</td>
</tr>
<tr>
<td>2001</td>
<td>70%</td>
<td>65%</td>
</tr>
<tr>
<td>2002</td>
<td>64%</td>
<td>54%</td>
</tr>
</tbody>
</table>

Source: Benartzi and Thaler (2007)
Reporting/Monitoring Issues

• Reporting and monitoring spotty and inconsistent

<table>
<thead>
<tr>
<th>Interview sites</th>
<th>Role of the government</th>
<th>Number of options</th>
<th>Monitoring service providers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site 3</td>
<td>Fully involved and play central role</td>
<td>20</td>
<td>Monthly review reports, analyze performance, and push for changes</td>
</tr>
<tr>
<td>Site 5</td>
<td>Design the framework and oversee the process</td>
<td>30–40</td>
<td>Regularly look at the report and review major changes</td>
</tr>
<tr>
<td>Sites 1, 2, 4, 6</td>
<td>Limited role</td>
<td>50–100</td>
<td>Yearly or less, non-regular</td>
</tr>
</tbody>
</table>

Source: Chen, Ebdon, Kriz and Masondieu-Laforge (2014)
Solutions for DC Plans

• Enrollment and contribution decisions
  – Automatic enrollment (negative election)
  – Active decision making (check yes or no)
  – Simplifying decision making process (combine enrollment, saving rate, asset allocation)
  – Providing relatively few options
  – Change contribution formulas to lower match rate but higher threshold
  – Make contribution thresholds a multiple of 5
Solutions for DC Plans

• Asset allocation decisions
  – Default portfolios of either “lifestyle” funds or “target date” funds
    • Labels for lifestyle funds matter a lot
    • Have to screen funds for appropriateness
  – “Impartial” educational materials (maybe)
    • Universities, “Financial Engines”
  – Reminders for rebalancing/reallocation
  – Combination of risk profiling and “target risk” portfolios
    • Index Funds Advisors
  – Present as much historical data as possible
The Role of Education

• Mixed results
• On one hand...
  – Holland, Goodman and Stich (2008): Financial training positively affect the financial well-being of employees; employees are less stressed about the current situation and more confident about the financial emergencies
  – Muller (2003): Retirement education substantially increases the percentage invested in equities for individuals with a high level of risk aversion.
  – Bayer and Bernheim (2008): Retirement seminars are generally associated with significantly higher rates of participation and contributions
The Role of Education

• On the other hand...
  – Benartzi and Thaler (2007): Financial literacy test score increased by 1 point out of 100 after educational program
  – Choi, et.al. (2002): 100% of those attending a savings plan seminar expressed interest in saving more, only 14% joined the plan (versus normal rate of 7%)
Education May Not Be Neutral

### TABLE 4
Asset Allocation (Valid Responses: 34 Plans, 42 Percent of the Total Respondents)

<table>
<thead>
<tr>
<th>Plan administrator</th>
<th>U.S. large cap equities (%)</th>
<th>U.S. small cap equities (%)</th>
<th>International equities (%)</th>
<th>U.S. Government bonds (%)</th>
<th>U.S. Corporate bonds (%)</th>
<th>Money market securities (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single city official</td>
<td>38.26</td>
<td>33.50</td>
<td>2.25</td>
<td>0.00</td>
<td>16.69</td>
<td>0.17</td>
</tr>
<tr>
<td>Board/commission</td>
<td>33.42</td>
<td>20.50</td>
<td>14.17</td>
<td>1.38</td>
<td>10.30</td>
<td>1.22</td>
</tr>
<tr>
<td>External—consultant</td>
<td>50.88</td>
<td>20.57</td>
<td>5.91</td>
<td>0.00</td>
<td>0.75</td>
<td>2.27</td>
</tr>
<tr>
<td>External—insurance</td>
<td>18.76</td>
<td>10.90</td>
<td>5.59</td>
<td>0.00</td>
<td>3.20</td>
<td>0.03</td>
</tr>
<tr>
<td>External—investment</td>
<td>41.00</td>
<td>13.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>No response</td>
<td>25.38</td>
<td>17.76</td>
<td>15.99</td>
<td>0.26</td>
<td>5.06</td>
<td>6.10</td>
</tr>
<tr>
<td>Overall average</td>
<td>34.62</td>
<td>19.37</td>
<td>7.32</td>
<td>0.27</td>
<td>6.00</td>
<td>1.63</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Plan administrator</th>
<th>Real estate (%)</th>
<th>Target date funds (%)</th>
<th>Balanced funds (%)</th>
<th>Stable value funds (%)</th>
<th>Guaranteed investment contracts (%)</th>
<th>Specialty funds (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single city official</td>
<td>0.89</td>
<td>0.00</td>
<td>11.04</td>
<td>0.00</td>
<td>2.82</td>
<td>0.00</td>
</tr>
<tr>
<td>Board/commission</td>
<td>4.38</td>
<td>26.64</td>
<td>2.00</td>
<td>0.00</td>
<td>3.29</td>
<td>4.35</td>
</tr>
<tr>
<td>External—consultant</td>
<td>0.14</td>
<td>1.29</td>
<td>7.48</td>
<td>23.61</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>External—insurance</td>
<td>2.47</td>
<td>20.68</td>
<td>3.78</td>
<td>33.44</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>External—investment</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>No response</td>
<td>1.92</td>
<td>18.50</td>
<td>2.77</td>
<td>17.13</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Overall average</td>
<td>1.63</td>
<td>11.18</td>
<td>4.51</td>
<td>12.36</td>
<td>1.02</td>
<td>0.73</td>
</tr>
</tbody>
</table>

*Note:* The following asset classes had zero or negligible asset allocations: international bonds, mortgage-backed securities, bank savings/CDs, annuities, commodities, venture capital/private equity, infrastructure funds, raw land/timber, and target risk funds.
INVESTMENT CONSIDERATIONS
Investment Considerations in Making a Decision

• Investment Discipline
  – Initial Investment
  – Rebalancing
  – Glide Path

• Understanding Risk
  – Annual v. Holding Period
  – Funding Risk

• Investment Options Available
Initial Investment Decisions
Elements of a Good Investment Decision

• Understanding your own risk tolerance
• Understanding the options available to you
• Understanding your goals
Risk Tolerance

“For clients with an extremely low risk tolerance, I recommend they talk to someone with a ground-floor office.”
Understanding Your Risk Tolerance

• Survey instruments ask you questions on willingness to take risks, then assess your answers
• Example: http://njaes.rutgers.edu:8080/money/riskquiz
Understanding Your Goals

• Income Replacement?
• Minimum Income?
• Years of Retirement?
• Bequest?
• Uncertainty?
Result of Initial Investment Decisions: Asset Allocation

DATA AS OF 05/09/2010

**Asset Classes**
Your current balance broken down by asset class is shown below.

<table>
<thead>
<tr>
<th>Current Balance (%)</th>
<th>Allocation</th>
<th>Asset Classes</th>
</tr>
</thead>
<tbody>
<tr>
<td>74.96%</td>
<td>Domestic Stock</td>
<td></td>
</tr>
<tr>
<td>12.43%</td>
<td>Bonds</td>
<td></td>
</tr>
<tr>
<td>7.19%</td>
<td>Foreign Stock</td>
<td></td>
</tr>
<tr>
<td>4.63%</td>
<td>Short Term</td>
<td></td>
</tr>
<tr>
<td>0.78%</td>
<td>Other</td>
<td></td>
</tr>
</tbody>
</table>
Rebalancing
Rebalancing

• Process of keeping your asset allocation in line with your desired targets
• Adjusting for age (glide path)
• Recommended periodicity is every one to two years

• Fundamental questions
  – Do you have time?
  – Can you bear to sell winners and buy losers?

• Evidence: No
Glide Path

Target Date Index Portfolio Glide Path Quick Guide
For Target Date Index Portfolios Started Between 1/1/2014 to 12/31/2014

Glide Path = Reduce One Portfolio Number For Each Passing Year
Assume: Retirement at age 65

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Understanding Risk I: Annual Risk

Time Diversification of IFA Index Portfolios
88 Years, 4 Months (1/1/1928 - 4/30/2016)

IFA Index Portfolios

Holding Period

1 YR

Median of Annualized Return (50th %ile) (%)

Return Range (High minus Low) (%)

Years: 88+ 50+

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Sources, Updates and Disclosures: ifabt.com - Created: 3/9/16
Understandin Risk II: Holding Period Risk

Time Diversification of IFA Index Portfolios
88 Years, 4 Months (1/1/1928 - 4/30/2016)

IFA Index
Holdin Period
Portfolios
5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100
15 YR 14 YR 13 YR 12 YR 11 YR 10 YR 9 YR 8 YR 7 YR 6 YR 5 YR 4 YR 3 YR 2 YR 1 YR

Median of Annualized Return (50th percentile) (%)

<table>
<thead>
<tr>
<th>$</th>
<th>2</th>
<th>4</th>
<th>6</th>
<th>8</th>
<th>10</th>
<th>12</th>
<th>14</th>
<th>16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Years:</td>
<td>88+</td>
<td>50+</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Return Range (High minus Low) (%)
Understanding Risk III: Holding Period Risk Revisited

IFA Index Portfolios: IFA Index Portfolio 0 vs. IFA Index Portfolio 100
88 Years, 4 Months (1/1/1928 - 4/30/2016)

% of Periods where Returns are Highest

| IFA Index Portfolios | 0  | 5  | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | S&P |
|----------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| % of Periods where Returns are Highest | 60.75% | 67.11% | 79.02% | 86.21% | 95.75% | 97.62% | 100% |

% of Periods (Monthly)  
1060 1-mo. Holding Periods  
1049 12-mo. Holding Periods (1 Year)  
1025 36-mo. Holding Periods (3 Years)  
1001 60-mo. Holding Periods (5 Years)  
941 120-mo. Holding Periods (10 Years)  
881 180-mo. Holding Periods (15 Years)  
821 240-mo. Holding Periods (20 Years)
Understanding Risk IV: Funding

Risk – Aggressive Investment Portfolio

50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87

$2,000 $1,500 $1,000 $500 $0 $-500 $-1,000

Savings Disbursements  Cone of Uncertainty  Savings Balance - Retirement  Savings Balance - Working Years
Understanding Risk V: Funding Risk – Balanced Investment Portfolio
Understanding Investment Risk VI: Funding Risk – Conservative Investment Portfolio
Investment Options

• Broad Asset Class Funds
• “Factor” Funds
• “Sector” Funds
• Multi-Asset Class Funds
• Specialty Funds
  – Specialty Assets
  – Specialty Strategy
  – Target Date
  – Target Risk
• Annuities/Stable Value Funds
Broad Asset Class Funds

• Example: CREF Bond Market Account, Fidelity Magellan Fund
• Very broad investment universe
• Difficult for fund managers to outperform benchmark indices
• Tend to be low fees
“Factor” Funds

• Examples: AB Small Cap Growth Portfolio I, Fidelity Blue Chip Growth Fund

• Smaller investment universe, focused on one sector (typically) and one aspect of returns (e.g., growth versus value)

• Easier to achieve excess return, but risk comes not only from overall market but from the factor

• Slightly higher fees
Multi-Asset Class Funds

• Example: Fidelity Balanced Fund
• Can combine investments from many different types of assets so extremely large universe
• Can be “strategic” or “tactical”
• Strategic funds tend to have lower fees, tactical fund fees can be relatively high
• Very difficult to benchmark
Specialty Asset Funds

• Example: Fidelity Real Estate Investment Portfolio
• Concentrated investment in one asset class
• Large range of returns, risks in many different dimensions
• Difficult to benchmark
Specialty Strategy Funds

- Example: CREF Social Choice Account
- Single or multi-asset funds with focus on one particular type of investment (e.g., “green”)
- Similar to factor funds in risk/return dynamics
- Fees have been an issue
Target Date Funds

• Example: Fidelity Freedom Fund 2035
• Multi-Asset class fund type that seeks to provide optimal asset allocation for an individual that will need money at a specific time
• Provides built in “glide path”, however it may not be appropriate for higher risk tolerance investors
• Tends to be heavily indexed so very small excess returns
• Fees are the big issue
Target Risk Funds

• Example: TIAA-CREF Lifestyle Conservative Fund
• Multi-Asset class fund type that seeks to provide optimal asset allocation for an individual with a specified risk tolerance level
• Provides built-in rebalancing to maintain risk exposure at a certain level
• Investors need to rebalance across risk levels to provide glide path or adjust for changes in risk tolerance or goals
• Benchmarks are very difficult to find for some funds
• Fees can be high depending on provider