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# The Tracker Plan: A Controlled Risk Defined Contribution Retirement Program, 46 J. Marshall L. Rev. 681 (2013)

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# THE TRACKER PLAN: A CONTROLLED RISK DEFINED CONTRIBUTION RETIREMENT PROGRAM

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## I. INTRODUCTION

The United States retirement system is in the early stages of a slow motion crisis. Numerous articles and books have portrayed the dismal details, but the conclusion is always the same: most of today's workers are headed for an insecure retirement. If not corrected, the current retirement system will lead to some combination of the following:

- Dramatic reductions in the living standards for many senior citizens; and/or,
- Significant increases in the public support provided to senior citizens (in effect, another deferred obligation which will be passed on to future generations of workers and taxpayers, albeit a largely hidden obligation).

The current retirement system can be characterized as a relatively modest pay-as-you-go defined benefit Social Security program. The system is supplemented by a highly fragmented collection of voluntary savings and benefit arrangements. Due to the voluntary nature of this system, employers provide no coverage at all for nearly half of the workforce. Others that may be covered face the risk of sudden sharp reductions in coverage and benefits when plans are closed or frozen. At the individual level, workers are often being asked to make a wide variety of complex financial decisions for which they are poorly prepared.

Furthermore, these arrangements are clustered at the two extremes of the risk-sharing spectrum. At one end are the so-

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called "traditional" pension plans, where a fixed benefit is determined at retirement based on a specific formula, and that benefit is payable for life. The financial obligation, and risks, of meeting that promise falls to the sponsor. (If the arrangement is voluntary the worker is actually exposed to a significant amount of risk. If the sponsor decides to close the plan, the worker in mid-career absorbs a major financial shock. This hidden risk factor for voluntary pension plans has become apparent in recent years when sponsors have abandoned their pension arrangements.) At the other end of the spectrum are the "traditional" defined contribution plans. These include plans such as 401(k) arrangements, where the sponsor merely matches some portion of employee contributions. The individual decides how much to save and how to invest the funds. The uncertain outcome of these decisions leaves the worker at significant risk. This framework has not worked. Nobel laureate Robert Merton summarized the situation well in a recent address:

> The essence of the current challenge is thus: Defined benefit is expensive to the sponsor, but its beneficiaries very much like the simplicity and security of the payout pattern it offers as base coverage. Defined contribution is a lot less expensive and well defined in terms of risk exposure for the sponsor but is too complex and too risky for the end user.[1]

A new framework is needed—one that significantly increases our aggregate savings, spreads it among all workers, and shares risk in a manageable way for all parties. And this new framework is needed soon. Although the crisis unfolds in slow motion, and thus is not very prominent on the public's radar, retirement savings are a long-term endeavor. As such, delays make the problems much larger and more difficult to solve. Lost savings opportunities cannot be back-filled, especially in the challenging economic environment we now face.

Most benefit professionals believe that the best retirement structures for the future are risk-sharing arrangements that combine many of the best elements from the current traditional plans. This Article presents the Tracker Plan, which is just such a risk-sharing arrangement, and describes how it could fit into a restructured retirement system. The Article will proceed as follows. Section 2 describes the overall framework for thinking about retirement systems, showing where the Tracker Plan fits and the role it is designed to fill. Section 3 provides details on how the Tracker Plan is structured. Section 4 shows the results of back testing the Tracker Plan using historical experience, and measures

1. Robert C. Merton, Ph.D., Keynote Address at the 2005 NCREIF/PREA Conference (Oct. 21, 2005).

the effectiveness of the plan through a Monte Carlo simulation model. Section 5 describes the major choices available to policy makers, and offers some suggestions and rationale for these suggestions. Separate subsections will look at coverage provisions, uniformity, the size of benefits and employer cost, the operational framework, the investment framework, and supplemental plan arrangements. Section 6 compares the Tracker Plan with a closely comparable defined benefit arrangement. Section 7 introduces a way to quantify results in a simple manner, so that different design options can be easily compared.

## II. RETIREMENT SYSTEM FRAMEWORK

The most comprehensive framework for describing retirement systems is one used by the World Bank in its *Pension Reform Primer*.[2] This framework describes five separate components, or pillars:

- *Zero Pillar* – non-contributory basic benefit financed by the government.
- *First Pillar* – mandatory pay-as-you-go government plan with contributions linked to earnings and objective of partial income replacement.
- *Second Pillar* – mandatory defined contribution plan with independent investment management.
- *Third Pillar* – voluntary pension and retirement savings plans, both employer sponsored and individual.
- *Fourth Pillar* – informal support (e.g. family), other formal social programs (e.g. health care, housing), and other individual assets (e.g. home ownership).

The United States does not have a broad-based Zero Pillar program that is specifically designed for senior citizens, and Social Security provides the First Pillar benefits. There are also no mandatory Second Pillar programs, and all the various plans that comprise our private retirement system fall into the Third Pillar.

In this Article I assume that the Social Security system remains largely in its current form. This means that all workers must participate and contribute, and benefits will be based on a formula that creates a progressive structure of partial income replacement at projected levels based on indexed career earnings. (Specifically, my retirement accumulation targets are based on

2. Robert Holzmann, Richard P. Hinz, & Mark Dorfman, *Pension Systems and Reform Conceptual Framework*, SOCIAL PROTECTION AND LABOR, THE WORLD BANK (June 2008), http://siteresources.worldbank.org/SOCIALPROTECTION/Resources/SP-Discussion-papers/Pensions-DP/0824.pdf.

projected Social Security benefits in 2049, at which time benefits for an average worker will be about 20% less than for currently retiring workers.) The Tracker Plan fits into the Second Pillar, although there is a policy choice of a completely mandatory program or one based on auto-enrollment with an opt-out provision. I also assume that a strong set of options will be available in the Third Pillar to provide supplemental benefits on a voluntary basis. The Third Pillar might function much like today's system, but with benefits resized and redesigned to reflect the new Tracker Plan benefits from the Second Pillar.

Here is my rationale for this choice of overall structure. The current system of voluntary Third Pillar plans is failing—with very weak coverage and with inadequate benefits for many of those that are covered. The United States government is not in a position now, or anytime soon, to offer more tax incentives to broaden coverage—but failing to expand coverage and savings is just another form of deferred obligation for future generations. The only viable solution is to create a universal program that is mandatory, or at least a nearly universal program through a combination of mandates and automatic default provisions. Any such program must be fully funded and, because of the need for some level of mandates, it cannot impose significant financial risks or administrative burdens on employers.

Accomplishing everything through a single program is unrealistic. Therefore, the Tracker Plan should be limited in scope, and a robust set of Third Pillar arrangements would complete the overall system. The goal for the Tracker Plan is to provide a structure where workers can easily meet their basic retirement needs, without the need for complex decisions or choices. This indicates that a highly standardized set of provisions emphasizing risk control is needed, where the primary decision is to be in the plan (the default option) or to be out of the plan. Supplemental Third Pillar plans can offer the flexibility and choice that some workers desire, and because of the controlled level of risk in the base Tracker Plan benefits, these supplemental plans can offer opportunities for enhanced returns which would entail more risk and uncertainty.

## III. THE TRACKER PLAN

This section describes the specific operation of the Tracker Plan: the particulars of how money flows into the plan, how money is invested, and what happens at retirement. Where choices are available for certain plan parameters, I indicate the selections I am using to present the analysis in this Article and the rationale for these selections. Section 5 provides more discussion of policy choices that are required before implementation. However the

program is implemented, the parameters for the program must be uniform, or very nearly uniform, across the full United States workforce. Without this uniformity the Tracker Plan concept loses a great deal of its strength.

### *A. Overview*

At the participant level, Tracker Plan's major goals are to:

- Provide an automatic path for participants to follow in accumulating the assets required to meet their retirement income needs.
- Control the risk of adverse outcomes, where assets are insufficient to meet needs.
- Provide full portability throughout a career with multiple employers.

At the macro program level, the major goals are to:

- Have universal coverage.
- Operate the plan(s) and manage the investments efficiently, professionally, and at a low cost to the participants.
- Keep employer obligations, both financial and administrative, at reasonable and manageable levels, with a known upper limit on annual cost under worst-case conditions.
- Never have unfunded obligations.

Traditional defined contribution arrangements have two common criticisms: (1) they are too risky for participants, and (2) participants lack the skills and training needed to make the critical financial and investment choices required for successful outcomes. The Tracker Plan meets these problems by primarily emphasizing risk control and simplicity:

- For each participant there is a single investment vehicle that gradually decreases risk over the course of a career (i.e. the target date fund concept is utilized—but at a lower level of risk than is common in today's funds).
- There is a standard contribution pattern to follow throughout the participant's career, designed to accumulate to the required target amount at retirement.
- Progress towards the target is monitored, and adjustments are made according to a fixed set of operational rules based on tracking error:
    - If performance is adverse and the fund is tracking below the desired target path, then additional contributions may be triggered, up to a fixed maximum add-on.
    - If performance is favorable and the fund is tracking above the desired target path, then the investment risk may be

reduced to preserve the cushion.

Risk control is a critical objective. Specific measures and standards are needed to determine whether the amount of risk is contained within reasonable levels. My selected standards are: (A) the participant will meet or exceed the desired target asset accumulation with about 90% confidence, and (B) for those cases where the target is not met, the shortfall can be managed with relatively painless steps, which would include working no longer than one year beyond the regular retirement date. These specific standards became the benchmark test for each design option analyzed with the Monte Carlo simulator. Through an iterative process I refined each of the design parameters to optimize the risk control results. The remaining subsections describe the specific Tracker Plan model that resulted from this process. There are subjective calls made along the way, but mostly these were to maintain simplicity of design unless there were noticeable improvements in the risk control outcomes.

### *B. Scope of Coverage*

The Tracker Plan is designed as a Pillar 2 program to ensure that workers can maintain a reasonable standard of living in their retirement years. I would characterize the Tracker Plan as a core benefit, to work in combination with Social Security. To maintain emphasis on core benefits and to control employer costs for this Pillar 2 program, I suggest that an earnings cap apply when contributions are determined. A cap that would not restrict contribution levels for media-income workers seems reasonable. The level of the cap should then be tied to the median level of earnings for workers in the latter portion of their careers, when merit and seniority effects are embedded in their pay levels. Based on the 2008 Current Population Survey from the Census Bureau, the median earnings for workers age 55 to 64 years old is $50,000. For administrative simplicity, the cap could be tied to some other average wage figure already in use by the government for other purposes, such as the Average Wage Index (AWI), which is used in the calculation of Social Security benefits. In 2008, Social Security benefits were calculated on the basis of earnings indexed up to the 2006 AWI of $38,651, so the earnings cap could be pegged, hypothetically, at around 130% of the AWI from two years prior.

For workers with pay that exceeds the cap, supplemental plans may be offered by employers to provide a more complete retirement savings package. Possible supplemental arrangements are discussed in Section 5.

Broad participation is a critical goal, so auto-enrollment procedures should be used. A mandatory participation framework could also be considered, but that may be a difficult political

choice. Employers would be required to enroll workers automatically at hire. Also, there should be a schedule of later auto-enrollment events for those not participating, perhaps at age 35 and again at age 40. These scheduled events would also provide focal points for communication with all workers about the need for adequate retirement savings.

### *C. Retirement Income Target*

The first parameter choice is to select a target level for retirement income. I choose a target 75% income replacement ratio at age 65, inclusive of Social Security, for a worker with median career earnings. This means that at age 65 the total income available from Social Security benefits plus the Tracker Plan benefits will be equal to 75% of the worker's gross income at the time of retirement. The Tracker Plan's benefits are based on annuitizing the accumulated funds at age 65, with an assumed post-retirement increase factor of 2.5% per year. The Social Security benefit used is based on retirement at age 65 in 2049, and this produces a 32% replacement ratio for Social Security alone. To meet the 75% overall target the Tracker Plan benefit should replace 43% of pre-retirement income.

More specifically, recognizing the risk control objectives stated in the previous section, the Tracker Plan benefit should equal or exceed 43% of final pay with a probability of about 90%, and should almost never fall much below 38% of final pay (a 5-6% shortfall is about what a worker can expect to recover by working to age 66 instead of age 65).

The 75% income replacement target is well supported by various researchers as one that will generally allow medium-level earners to maintain their standard of living after retirement. This reflects the changes that occur in medium-level earners tax and savings situation. In particular, the long-running Georgia State University/Aon Insurance project on replacement rates shows that medium earners need 78% of their pre-retirement income in order to maintain the same standard of living after retirement.[3] However, some experts note that a higher income replacement target is required when medical costs after retirement are more carefully recognized with respect to the future rate of medical cost inflation, and potential reforms that might shift more of the cost to retirees.

Forty years into the future, the retirement age for full Social Security benefits will be age 67. I choose age 65 as my target

3. Dr. Bruce Palmer, *2008 Replacement Ratio Study*™, AON CONSULTING (2008), http://www.aon.com/about-aon/intellectual-capital/attachments/human-capital-consulting/RRStudy070308.pdf.

retirement age to reflect that many workers retire before the age where they can receive full Social Security benefits, and also because delayed retirement becomes the ultimate tool available for participants to deal with adverse investment experience in any defined contribution arrangement. Choosing a target retirement age later than age 65 would effectively remove, or at least diminish, this important risk management option for workers when they must bear the residual risk from a defined contribution program.

### *D. Fund Investments*

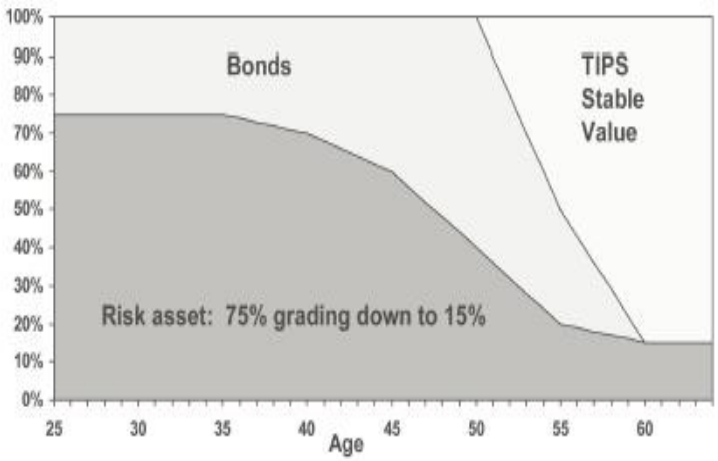
Accumulated contributions to the Tracker Plan for each participant will be invested in a single tracker fund, which has a declining allocation to equity assets as the worker moves toward retirement age. This is the well-accepted idea behind target date funds that is based on the life cycle financial framework (recognizing both financial assets and the human capital provided by future income-earning years). However, within the Tracker Plan framework, the risk control objectives play a very important role in determining the proper level of investment risk. To keep the retirement benefit risk within the desired constraints, the overall investment risk should be significantly lower than what is commonly embedded in many of the target date funds in use today.

The fund allocations will be among three separate investment pools: (1) a risk asset portfolio, which would be a diversified portfolio of equities and other assets that has the objective of earning the best long-term risk premium possible; (2) a fixed income portfolio, which would include core bond holdings similar to the Barclay's Aggregate Bond Index; and (3) a stable value fund invested in TIPS, which has the objective of earning a stable real return. For a core benefit arrangement like the Tracker Plan, the investment process must meet two critical standards:

- *Controlled Risk* – Risk cannot be avoided, but the fund investment decisions must always focus on the long-term goal of accumulating toward a fixed target amount with a very limited risk of shortfall at retirement age.
- *Low Expenses* – A low expense ratio is extremely important for the fund, which can be accomplished if the funds are large in scale (discussed more fully as part of the organizational structure of the plan) and likely use of passive investment funds for a substantial portion of the assets.

After testing a wide range of alternatives with the Monte Carlo simulation model, Chart 1 shows the allocation pattern, or glide path, that maximizes the return while keeping downside risk within the required range.

**Chart 1**




The fund starts with a 75% allocation to the risk asset portfolio and a 25% allocation to the fixed income portfolio. The equity allocation begins to decline at age 35, and the decline becomes more pronounced at age 45. By age 60 the equity allocation reaches 15% and remains at that level until retirement (subject to a possible dynamic adjustment discussed in the section on the tracker adjustment process). Between ages 50 and 60 there is also a shift from the fixed income portfolio to the stable value fund. This is to provide protection against unexpected inflation in the years just prior to retirement, which can cause major investment losses in a standard fixed income portfolio at the worst possible portion of the asset accumulation process.

In theory, there would be a separate tracker fund for each age cohort, but since the allocation remains steady until age 35, the worker would enter his or her specific tracker fund at that age. Prior to age 35, however, everyone will be in a common 75/25 fund. Furthermore, the Tracker Plan concept should work well even if three-year age groups are consolidated into a single tracker fund. Eventually there would then be 10 separate tracker funds maintained at any one time for workers between ages 35 and 65. Each worker would own the appropriate number of units in each of the three portfolios to maintain his or her allocation target.

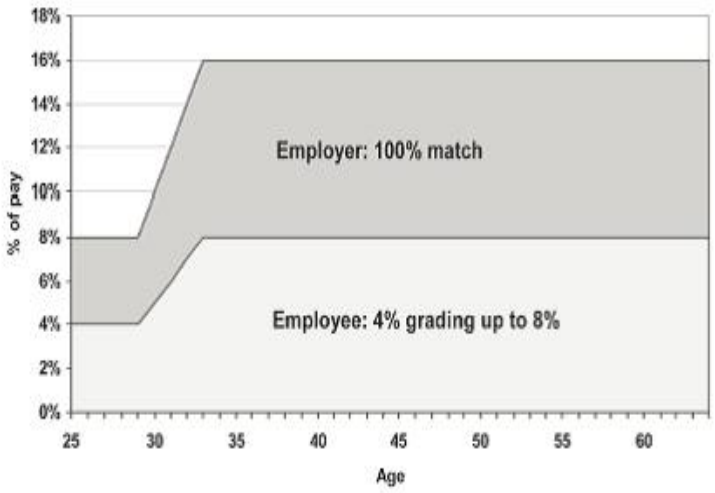
### *E. Contribution Schedule*

To provide a lifetime income equal to 43% of final pay requires a total fund accumulation equal to 7.5 times final pay at age 65, assuming a 2.5% annual increase in the benefit after retirement and using a real yield rate of 2% and projected future

mortality rates to price an annuity factor. However, the pre-retirement investment and inflation risk factors mean that any future accumulation amount can only be described by a distribution of possible amounts, and the goal of the Tracker Plan is to create a distribution where about 90% of the possible outcomes would equal or exceed the required 7.5 multiple. The 7.5 multiple is really something of a "soft floor" value, and the actual working target amount will need to be larger. With any set of economic assumptions the range of the distribution is a function of the investment risk. Since a specific investment process was defined in the previous section, the Monte Carlo simulation model can be used to determine what the median accumulation target is for a distribution that meets the 90% confidence objective. The process actually involves an iterative test of multiple variables, but in the illustrations used for this Article, I derived a target accumulation at age 65 equal to 8.85 times final pay.

With a working target amount at age 65, plus a specific investment process, there are various contribution schedules that will meet the target under a set of economic assumptions. Chart 2 shows the contribution schedule that I am using for this Article.

**Chart 2**




Total contributions starting at age 25 are equal to 8% of pay. The contributions then increase in 2% steps for each year between ages 30 and 33, reaching an ultimate level of 16% of pay from age 33 through retirement. The way that the contributions are split between employee and employer is a political choice parameter discussed later, but for the illustrations in this Article, I have assumed that contributions are split evenly.

The graded pattern of contributions seems preferable to a flat schedule, as it reflects the kind of choices typically made by participants in 401(k) programs. These observed patterns presumably reveal the desired preferences of workers, and reflect the fact that younger workers put less value on retirement savings, as compared with other financial needs.

For many people, these contribution rates may seem surprisingly high, but they reflect what is really needed to meet the required target with about a 90% level of confidence. The rates really reflect the trade off between risk and reward—an arrangement with low risk will require larger inputs to meet the required target. Many employers in the U.S. have walked away from defined benefit programs because they do not like the financial risk exposure. Workers should reasonably expect that their risk in a defined contribution arrangement would be restricted to a manageable level. There is a cost for this protection, but I believe it is an essential part of any Pillar 2 core benefit arrangement. These issues are discussed more in Section 5.3.

### *F. Automatic Tracking Adjustments*

The truly unique feature of the Tracker Plan is a set of automatic adjustments that will help keep accumulations on the desired path toward the required target. These adjustment provisions are a key part of the risk control process, and they facilitate a sharing of risk between workers and employers. There are two types of adjustments:

1. If performance is adverse and the fund is tracking below the desired target path, then additional contributions may be triggered, up to a fixed maximum add-on.

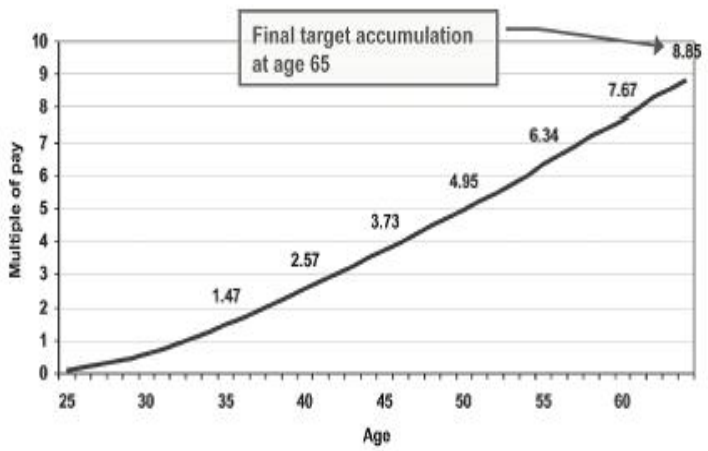
2. If performance is favorable and the fund is tracking above the desired target path, then the investment risk may be reduced to preserve the cushion.

The tracking process does not need to be done at the individual participant level, as long as all plan features remain standardized. A hypothetical account can be tracked for each of the tracker funds, based on the assumption of a median-income worker making the scheduled contributions, and earning the investment returns actually realized by that tracker fund. The tracking error for this hypothetical account will be monitored, and on an annual basis the level of the tracking error will be used to trigger any needed automatic adjustments for all of the workers in that tracker fund. As such, within each tracker fund, workers will all be treated in exactly the same way.

First we need to develop the accumulation path that will serve as the tracking benchmark. Making assumptions about

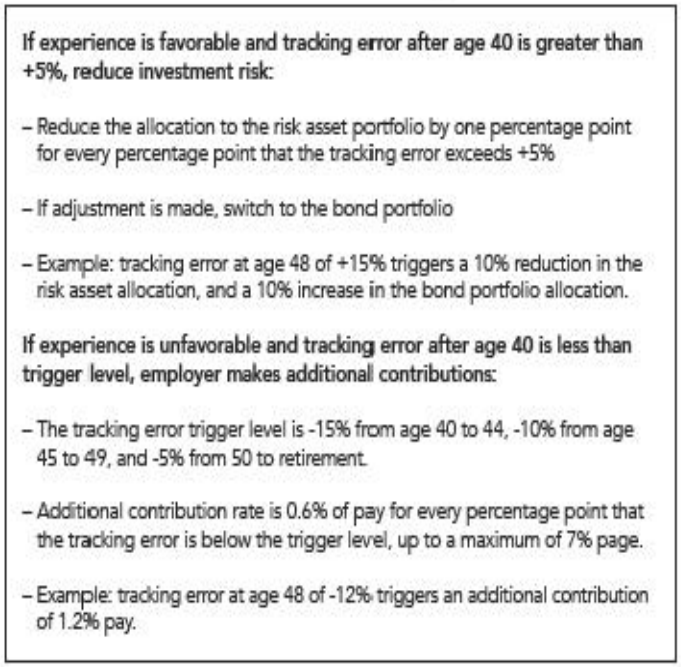
expected returns and inflation (and reflecting the uncertainty of these by using the Monte Carlo simulation model) we can input the year-by-year contribution rates from the schedule described in Section 3.4 and accumulate these fund returns based on the tracker fund allocations described in Section 3.3. The resulting accumulation values at each age can be expressed as a percent of pay, and the result is a range of pay multiples at each age that might be expected. The median value from this simulation range can then be used as our tracking benchmark. Tracking error will be measured against this benchmark, and the tracking error will determine what kind of automatic adjustment, if any, needs to be made for all the participants in that tracker fund. Chart 3 shows the benchmark pay multiples that I am using for this Article (note that the ending value at age 65 is the 8.85 value mentioned in the previous section).

**Chart 3**




The schedule of adjustments based on tracking error was developed using the Monte Carlo simulation model to iteratively test and then refine various choices for these adjustment factors, until the level of risk control could not be further improved without adding significant complexity. The resulting adjustment factors used for this Article are shown in Chart 4. I have chosen to begin the adjustment process at age 40, which is around the latest age where the process could control downside risk to the needed degree.

**Chart 4**




An issue that could arise is whether any additional adjustment contributions should be shared between the worker and the employer. This is certainly possible, but in my illustrations I assume that all additional contributions are from the employer. This is the preferred approach since the worker ends up taking on any residual risk under any defined contribution plan, including the Tracker Plan. Thus, the additional contributions are the primary way for the employer to share in the overall risk of the program.

Another issue is whether a claw-back arrangement can be used when the employer makes additional contributions, which later became unnecessary because strong investment performance creates a significantly positive tracking error. Again, this is possible and would lower the expected cost somewhat, but this analysis assumes that the additional complexity does not warrant such a feature.

The need for additional contributions is fairly obvious when a significant negative tracking error develops, but the adjustment to a lower risk investment policy in response to a positive tracking error may be less intuitive. The idea is that if a sufficiently large safety cushion has developed, relative to the 75% total income replacement target, then downside risk can be further controlled by effectively locking in the safety margin. The amount of

incremental risk control is actually fairly modest in the Monte Carlo simulation, but we will see later how effective this feature would have been for workers retiring in 2009—essentially dodging the 2008 market turbulence. Because of this I believe the feature is worthwhile.

### *G. Participant Communication and Retirement Planning*

The Tracker Plan provides an extremely useful frame of reference for communication with participants. They should all get regular communication materials on how well their tracker fund is progressing toward the desired target—for the hypothetical worker that serves as the benchmark for his or her age cohort they will see what the current accumulation is as a multiple of pay, and how this compares with the target multiple at that age. If they have contributed fully since at least age 25, then they will also know how well they are progressing, as their own accumulation should closely track that of the benchmark. Accumulated funds as a multiple of current pay becomes a very powerful and intuitive metric when there is a benchmark multiple to compare with. A worker who has not made full contributions, or whose pay has exceeded the cap, can quickly see how much less her own pay multiple is compared with the current multiple achieved by her tracker fund. Also, the worker can compare her pay multiple with the target pay multiple for her age. Convenient online tools could be utilized to demonstrate how additional supplemental savings could close any pay multiple gap. Also, the Tracker Plan has some natural points during the career when retirement planning communication efforts could be more concentrated and focused—such as age 35 when they first enter their tracker fund, and again at age 40 when the first automatic adjustments may be made.

### *H. Portability and Plan Distributions*

Portability is a measure of how well benefits are preserved when a career is broken into many segments with different employers. Full portability is when a worker receives exactly the same benefit whether or not the worker has worked for a single employer during his or her entire career, or if they worked for fifteen or twenty different employers. For a core Pillar 2 benefit arrangement, full portability is very important. All defined contribution plans start from a position of strength because the benefits are embedded in an actual account balance. For the Tracker Plan, all that is needed for full portability is (1) immediate 100% vesting, (2) preservation of the current tracker fund account until the worker is re-employed, and (3) the transference of the account to an equivalent tracker fund at re-employment. The Tracker Plan allows this because provisions and tracker funds are

standardized and employers are mandated to enroll new workers in a plan. The worker would resume participation under the same conditions with the new employer (contribution schedule, investment risk, and adjustment process), and stay on the same path toward his or her target.

In-service hardship withdrawals and loans could probably be allowed, but the conditions and administration of these provisions should be such that retirement savings objectives are not compromised. Only restricted amounts should be made available for such distributions.

Finally, the form of distribution at retirement should focus on preserving the standard of living through the worker's remaining lifetime. This is an area of constant development, and, ideally, the Tracker Plan would remain flexible enough to benefit from these new developments. However, it is important that the plan include at least some level of mandated "long-life" protection so that old age poverty is prevented for almost all workers.

One possible way to accomplish this may be through a late-age deferred annuity (e.g. with benefits commencing at age 80 or 85) where the benefit payable would be based on some reasonable multiple of the poverty level, less available Social Security benefits, indexed at a fixed percentage such as 2% or 2.5% per year. This annuity insurance could be distributed through private insurers or through a cooperative beneficial fund maintained (with some governmental back up) for a large pool of retired workers. The cost of this annuity protection at retirement could be based on an assumed 2% real return to avoid fluctuating annuity buy-in prices, with some form of participating adjustment made when payments commence, in order to reflect actual investment experience and mortality patterns that have emerged over the deferral period. If the initial pricing was conservative enough, then the participation effects would typically create a positive adjustment.

For remaining funds after the purchase of the late-age deferred annuity, I suggest a default into a conservatively invested fund, with a type of structured payout pattern. If lump sum distributions are allowed, they might be restricted in size to a fraction of final pay, and there might be some modest tax penalties imposed to discourage lump sum payouts. A range of other lifetime annuity options should also be made available.

## IV. TESTS OF EFFECTIVENESS

This section explores how well the Tracker Plan concept works. Section 4.1 illustrates how the Tracker Plan would have operated through two specific periods that replicate historical periods. Section 4.2 summarizes the key outcomes across a

complete range of periods that replicate all historical experience since 1926. Finally, Section 4.3 shows the distributions of results under the Monte Carlo simulation model.

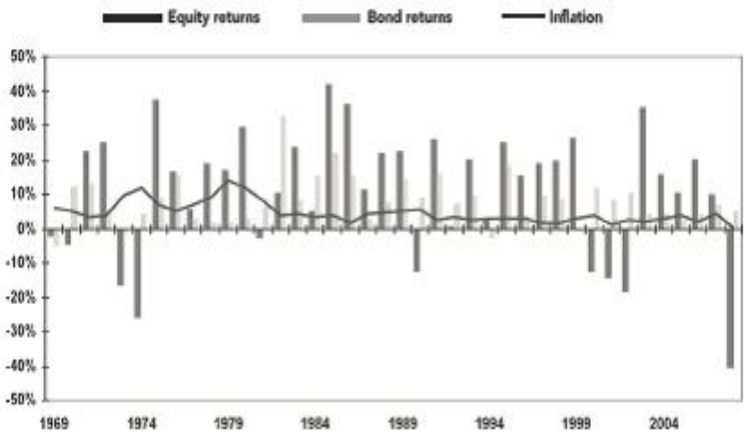
### *A. Two Illustrations*

This section shows how the tracking process works over two specific illustrative periods, reflecting the actual historical experience for inflation, wage inflation, and investment returns. Specifically, the following information has been used to illustrate how the accumulation and tracking adjustments would operate:

- *Risk asset portfolio:* For these returns I have used a portfolio of 60% U.S. equities (total stock market) and 40% non-U.S. equities (developed markets, plus emerging markets since 1988).
- *Bond portfolio:* For these returns I have used the Barclays Capital Aggregate Index since 1976, and long-term government bonds prior to that.
- *Real stable value portfolio:* For these returns I have used inflation plus 2%.

The first illustrative period covers the forty years from 1969 through 2008. This period is of special interest because it is the most recent, and ended with the turbulent market results of 2008, which created significant trauma for many individuals who will soon be reaching retirement age. Chart 5 shows the year-by-year investment returns for the risk portfolio, the bond portfolio, and the CPI results. It also illustrates the average compound results over the full period and also over the last fifteen years. In a defined contribution plan the last fifteen years are especially important because that is when account balances are large and returns carry more weight on the ultimate outcome.

**Chart 5**




| | | –Avg. Real Returns– | |
|---|---|---|---|
| | Avg. Inflation | Equity | Bond |
| 1989 to 2008 | 2.82% | 3.68% | 4.48% |
| 1942 to 1981 | 4.55% | 4.54% | 3.20% |

This time period reflects the following characteristics:

- High inflation early on, during the seventies and early eighties, followed by relatively low and stable inflation.
- Very good equity returns prior to 2008; and even with 2008 the average real returns on equities is reasonable, although below the long-term average real return of 6.0% for 1926 through 2008.
- Weak bond returns early on as a result of the unexpected inflation during the seventies and early eighties, followed by very strong bond returns thereafter. The 4.5% real bond return during the last fifteen years is well above the long-term average real return of 2.1% for 1926 through 2008.

The Tracker Plan would have performed very well under these historical conditions:

- The final total replacement ratio (including the same 32.0% Social Security benefit mentioned earlier for a 2049 retirement at age 65) is 93.8% or 18.8 percentage points higher than the 75% minimum target.
- No additional contributions were triggered during this forty-year period.
- Because of strong tracker fund returns, a significantly positive tracking error developed. This led to reductions in the risk asset allocation starting at age 42, and the fund had no risk asset

exposure after age 60. Because of these adjustments the large negative equity returns for 2008 had no impact at all on the final outcome.

Chart 6 shows the accumulation pattern, relative to the target path. Chart 7 shows the way that the asset allocation was adjusted.

**Chart 6**

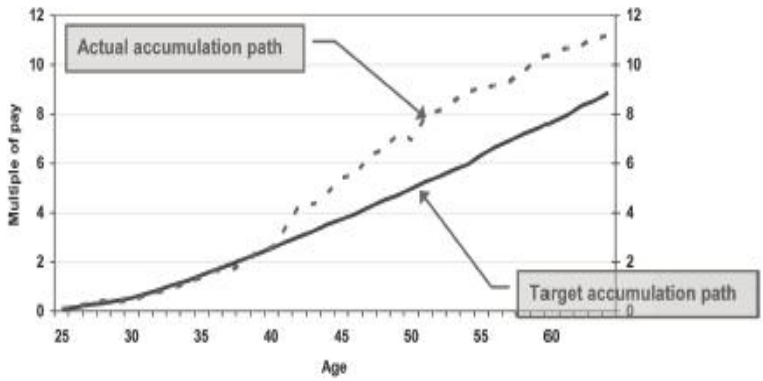
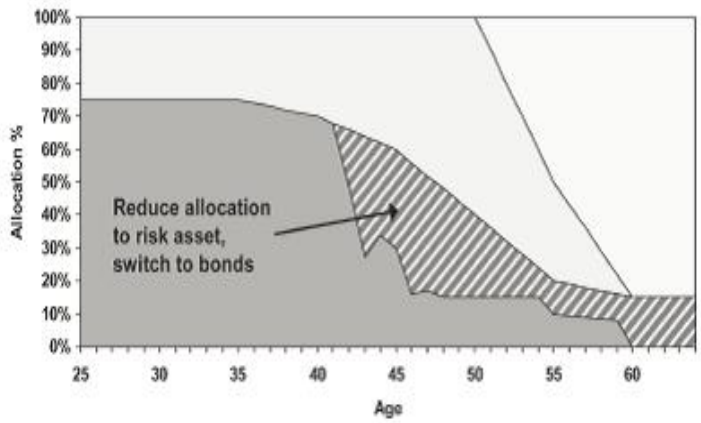


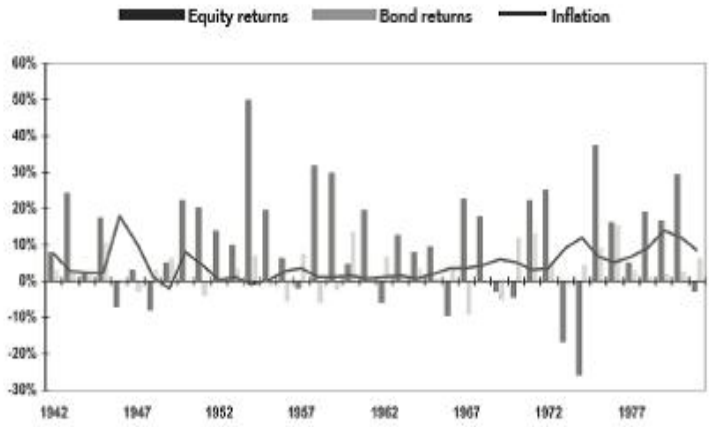

**Chart 7**




The second illustrative period covers the forty years from 1942 through 1981. This period is of special interest because it is one of the most difficult periods overall for long-term retirement savings during the last eighty plus years. Chart 8 shows the year-by-year investment returns for the risk portfolio, the bond portfolio, and the CPI results during that period. It also shows

average compound results over the full period, and also over the last fifteen years.

**Chart 8**




| | | –Avg. Real Returns– | |
|---|---|---|---|
| | Avg. Inflation | Equity | Bond |
| 1962 to 1981 | 5.89% | 1.53% | -2.14% |
| 1942 to 1981 | 4.58% | 5.30% | -1.73% |

This time period reflects the following characteristics:

- Periods of high inflation early on during the post World War II period, and then again during the seventies and early eighties, the period just before retirement. High and unexpected inflation just before retirement is one of the major risk factors for retirement savings. Income needs become quickly inflated, and this is accompanied by sharply negative bond returns and also usually by poor equity returns, with no time to recover losses before retirement. For this period the average price inflation over the last fifteen years is almost 6%.
- Over the whole period the average real return on equities was 5.3%, fairly close to the long-term average of 6.0%. However, over the critical final fifteen-year period the average real return was only 1.5%.
- Real bond returns were extremely poor, with an average of -1.7% for the full period and -2.1% during the final fifteen-year period. This is the reason that a real stable value fund using TIPS investments can be an important risk control tool for the years just before retirement.

Despite this very difficult economic environment, the Tracker Plan would have performed reasonably well with this experience:

- The final total replacement ratio (including the same 32.0% Social Security benefit mentioned earlier for a 2049 retirement at age 65) is 79.5% or 4.5 percentage points higher than the 75% minimum target.
- The key reason for the favorable outcome was that the automatic tracking and adjustment process triggered additional contributions during twelve of the final fourteen years. During these twelve years the average additional contribution was 3.9% of pay.
- Because of strong tracker fund returns in the early years, the automatic adjustment process led to some reductions in the risk asset allocation between ages 40 and 50, but by age 50 the normal allocations had been restored.

Chart 9 compares the accumulation pattern with the target path. Chart 10 shows the pattern of additional contributions, and Chart 11 shows the way that the asset allocation was adjusted.

**Chart 9**

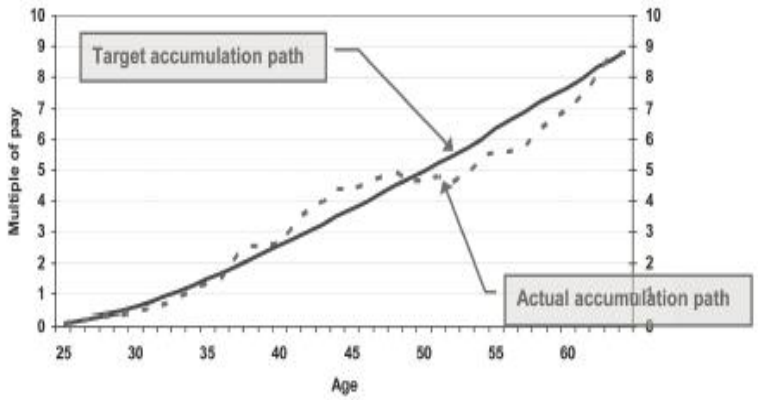


**Chart 10**

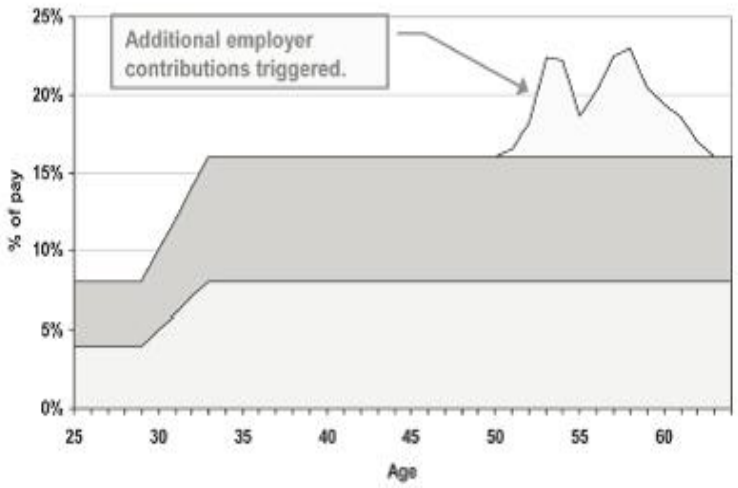
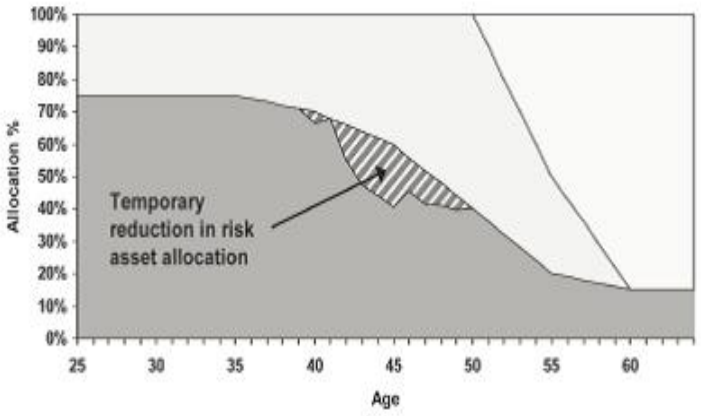



**Chart 11**




### *B. Complete Historical Replication*

This section extends the same type of analysis used in the preceding section and shows how the Tracker Plan would have performed over all rolling forty-year time periods between 1926 and 2008. Chart 12 shows the total replacement ratio outcomes for all of these periods, or cohorts, representing what individuals retiring in each year from 1966 through 2009 would have received from the Tracker Plan plus Social Security (always using the same 32.0% Social Security benefit from 2049). As a benchmark for

comparison, I have also plotted the replacement ratios that would have been achieved by a typical 401(k) participant under the same economic conditions. For a typical 401(k) plan, I have assumed the following:

- Full participation from age twenty-five through age sixty-five retirement, with employee contributions of 6% of pay each year.
- Employer contributions each year equal to 3% of pay, based on a 50% match.
- Investment in a target date fund typical of those currently used by 401(k) plans, with an initial allocation to equities of 90%, starting to grade down at age 35 to an ultimate level of 50% at age 65.
- Note that the results do not reflect a typical participant—they reflect a (rare) participant who continuously maximizes participation from age 25 up to age 65 in a typical plan.

**Chart 12**

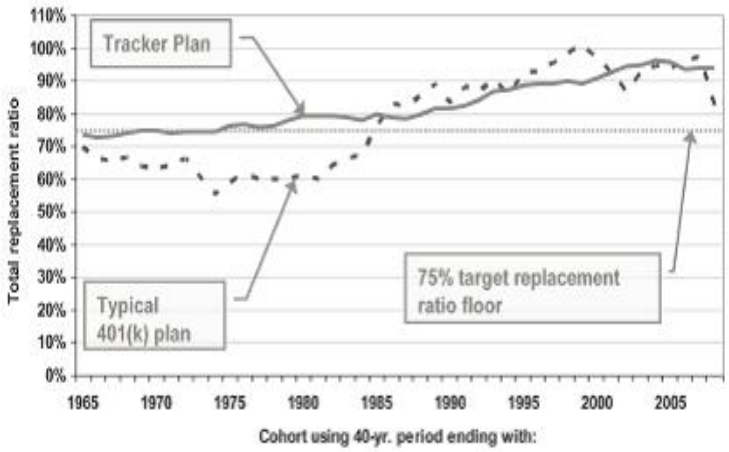



Chart 12 shows that the Tracker Plan total replacement rates are almost always above the 75% floor target. Only for the first ten cohorts (reflecting retirements from 1966 through 1975) are there shortfalls. These shortfalls are usually less than 1.0 percentage point and never more than 2.5 percentage points. After this point all of the cohorts are above the 75% floor target, usually by very substantial margins for the later cohorts. On the other hand, the 401(k) benefits are much more volatile, with the first 20 cohorts experiencing replacement ratios below the critical level of 70% ("critical" because it is very hard for a median-income worker to handle that level of shortfall). Six of these 401(k) cohorts

experience replacement ratios at or below the 60% level, which is characterized as an extreme shortfall for a core retirement benefit. Across all forty-four cohorts the average replacement ratios are 82.6% for the Tracker Plan and 77.8% for the typical 401(k) plan. The Tracker Plan contributions are significantly higher than the 401(k) plan, but the key result is the stability of results and the downside risk protection—driven by a less risky investment profile and by the automatic adjustment process.

Chart 13 shows the average contribution rates made for each of the forty-four cohorts in this analysis, including the regular employee contributions and the 100% matching employer contributions, plus any additional contributions triggered for that cohort by the automatic adjustment process. For this purpose I have assumed that individuals in the cohort are at or below the pay cap for their entire career, and all rates are averaged over the forty-year career.

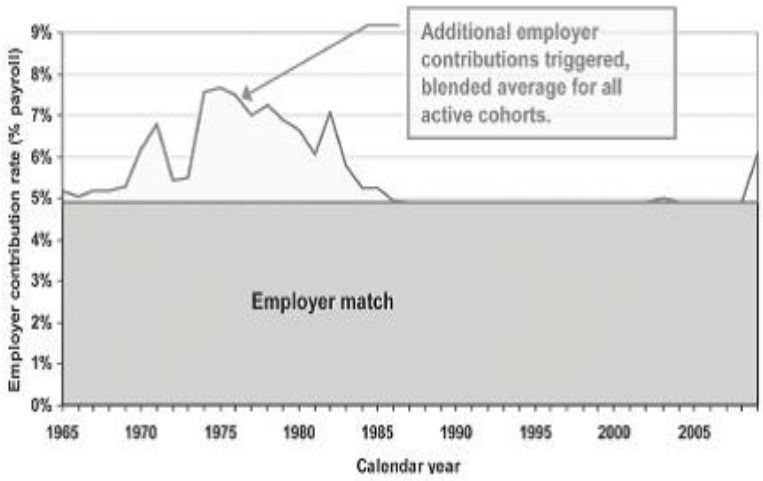
**Chart 13**


Some additional contributions were triggered for almost all of the cohorts, with the exception of the last three. The average additional rate across all forty-four cohorts is 1.3% of pay. The highest value is 3.3% for the very first cohort (reflecting an individual retiring in 1966, who started contributing in 1926). After the 1972 cohort the additional contributions never exceed 2% of career pay.

Of course the way employers would actually experience additional contributions for any year is a blended average of the twenty-five cohorts between ages forty and sixty-four, since these are the only ages where additional contributions would be

triggered. It is possible that some of these cohorts may have additional contributions triggered because of poor tracker fund results, while others may have no additional contributions. Chart 14 shows the blended average employer contribution rates (the regular 100% match, plus any additional contributions for all cohorts) expressed as a percentage of total payroll. The total payroll used reflects a distribution of individuals at different ages and at different pay levels, based on U.S. Census Bureau data from the 2008 Current Population Survey for individuals who worked full time on a year-round basis. This includes individuals below age twenty-five, for whom it is assumed that no contributions were made, and individuals with pay above the $50,000 pay cap, where it reflects only contributions made on pay up to the cap. Above age twenty-five 100% participation is assumed in the Tracker Plan, up to the pay cap.

**Chart 14**




The chart shows that the regular 100% matching contribution on pay up to a $50,000 cap works out to just less than 5% of total payroll. Additional contributions were triggered for each of the first twenty-two years, driven to a large extent by the combination of very high and unexpected inflation during the 1970s and early 1980s, plus very poor real rates of investment returns. However, except for a few years, the additional contributions do not exceed 2% of total payroll, and for the highest year the additional contribution rate was 2.75% of total payroll. After that there are no additional contributions until 2009, when the 2008 equity market losses would have triggered additional contributions equal to 1.2% of total payroll.

The results in Charts 12 and 14 have important implications. The interpretation is that a Tracker Plan framework, if in place over the last eighty-plus years would have: (A) provided all retired workers at or below the median income level with a secure, and fully funded, retirement benefit sufficient for maintenance of their standard of living though-out retirement; (B) provided all retired workers above the median income level with a secure, and fully funded, base benefit that would prevent their standard of living from falling below that of a medium earning worker; (C) provided all current workers with a fully funded account balance that is on track towards meeting their retirement needs; and (D) required annual employer contributions within a range of about 5% to 7.75% of payroll (with no exposure to unfunded liabilities). Compared to what our current system offers, these results offer a powerful indication of the aggregate economic efficiency of the Tracker Plan approach.

### *C. Monte Carlo Simulation Analysis*

This section provides the results of a Monte Carlo simulation of Tracker Plan results. The simulation analysis creates the full range of possible outcomes under reasonable assumptions about the expected levels of future returns and inflation, but also reflects the degree of uncertainty about each of these assumptions. This uncertainty is the fundamental source of financial risk, and the simulation analysis thus becomes the most critical tool for shaping the risk control mechanisms of the Tracker Plan to minimize the probability of unacceptable shortfall outcomes.

The simulation model used here is essentially the same one used in my work with large defined benefit pension plans to help the sponsors understand the financial risk of investment policy decisions. Some of the key assumptions and model features are discussed below:

- *Price inflation:* An average price inflation assumption of 2.8% is used, which is the same as that used by the Social Security actuaries for their intermediate long-term projections. The model used here is a nonlinear one that includes both mean reversion effects (i.e., the operation of the Federal Reserve), and surprise inflation events that can become persistent through self-reinforcing effects. The resulting distributions of rates of inflation are skewed to the high end, so while the mean value for any year (or period of years) is 2.8%, the median value is 2.6%.
- *Wage inflation:* Real wage growth is assumed to average 1.15% per year, again matching the intermediate assumption used by the Social Security actuaries.
- *Merit and promotional pay increases:* For the median-income

earner used in this analysis, it is assumed that starting pay at age twenty-five is equal to $30,000. Each year the level of pay is then increased by 1.6% until it reaches $44,613 at age fifty. After that increases in the pay level of 0.25% are assumed each year. The final pay level at age sixty-five is $46,613. This career pattern for pay growth very closely matches the observed pattern for medium earners.

- *Bond returns:* The long-term real return on bonds is assumed to average 2.9%, and the uncertainty is based on historical experience. The return distributions reflect the combined effects of inflation, inflation risk premiums, real yield rates, and credit spreads.
- *Returns on the risk asset portfolio:* For this analysis the risk asset portfolio is modeled as a simple blend of 60% U.S. equities and 40% non-U.S. equities. In actual practice a more diversified approach would be expected, similar to what a sophisticated defined benefit sponsor might use for its risk asset portfolio construction. For the blended equity portfolio in the model an average long-term (i.e. compound, or geometric average) real return of 5.35% is assumed. The resulting equity risk premium (spread of equity returns over bond returns) is 2.35%. Both of these average values are less than historical averages (from 1926 through 2008 the average real return on this type of portfolio would have been 6.0%, and the average equity risk premium would have been 3.8%). This reflects both a deliberate choice to be slightly conservative, and a forward looking view of real economic growth potential—which is a primary driver of equity returns over the long term. The uncertainty for risk asset returns is based on historical experience, and produces a standard deviation of 16.5%. However, the returns are not normally distributed, as here, a model is used that reflects the potential for periods (such as the 2008-2009 period) where markets become very turbulent and large negative returns are likely. Specifically, a regime-switching lognormal model is used, and the resulting distribution of returns can be characterized as having a "fat tail" that captures extra downside risk, especially over shorter time periods.

Based on these assumptions, it is now possible to model the range of outcomes from the Tracker Plan for our hypothetical median wage worker who participates from age twenty-five through retirement (normally age sixty-five, except I use an age sixty-six retirement for one of the examples). Chart 15 uses "floating bar" style graphics to show the percentile distributions for the total replacement ratio outcomes, and the table shows the probability of shortfalls for the 70% to 75% range, and for below 70%. These shortfall probabilities are the key metric for risk control, and the goal was for the total shortfall probability (below 75% replacement ratio) to be around 10% for retirement at age

sixty-five, and to be close to zero for retirement at age sixty-six. The chart shows results for various scenarios:

- The leftmost bar is a benchmark for comparison that is based on forty years of continuous participation in a typical 401(k) plan, as described in the previous section. The median replacement ratio here is 73%. The total shortfall probability is 53%, but included in that is a 45% probability of falling below a 70% replacement ratio. If just the bottom quartile of results is examined, the average replacement ratio is only 53%. To put this in context, that is the equivalent of providing a retirement program to a median pay worker and telling him that if he participates in the program for 40 years, there is still a 1-in-4 chance that when he retires he may have to cut his standard of living from what would then be his $47,000 pay level to the standard of living for someone who was only earning $33,000. This level of shortfall risk is far too great for a core Pillar 2 retirement program. Higher income workers may be able to handle this level of risk, but not workers at median income levels.

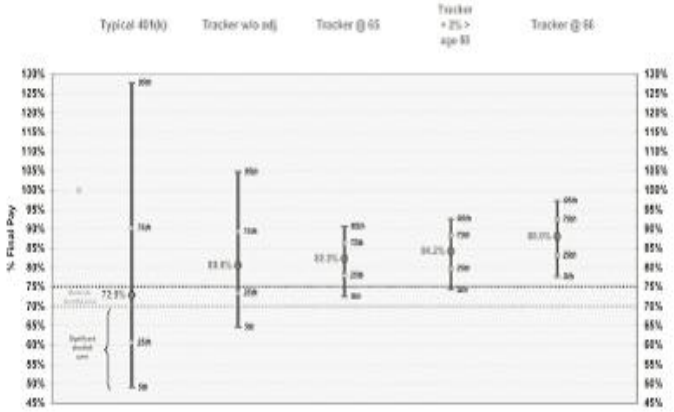
- The next bar is the Tracker Plan, but without the automatic adjustment features. Relative to the first bar showing results for a typical 401(k) plan, the results in this bar reflect the higher contribution schedule in the Tracker Plan and the lower level of investment risk in the tracker fund from reduced allocations to the risk asset. The median replacement ratio is 81%, and the total shortfall risk has been reduced to 29%. This provides better risk control, but more is needed.

- The next bar is the Tracker Plan, including the automatic adjustment features. Here the median replacement ratio is a bit higher at 82%, but the total shortfall risk has been reduced to 12%. This is now close to our goal of having about 90% confidence that a worker would meet at least the 75% replacement ratio target. Furthermore, when a shortfall does occur it is usually relatively modest—there is less than a 3% probability of falling below 70%.

- In the next scenario supplemental contributions of 2% of pay starting at age fifty are added. The purpose is to show how the shortfall risk can be reduced for workers who approach retirement and see that they are falling short of the target accumulation path. The total shortfall risk has been reduced to 6%.

- Finally, in the last scenario results are shown for a worker retiring at age sixty-six, one year beyond the typical retirement age of sixty-five used in each of the preceding scenarios. Here the shortfall risk is cut to just 2%. This achieves the goal of ensuring that when a shortfall risk does occur, working no more than one additional year beyond age 65 can eliminate it.

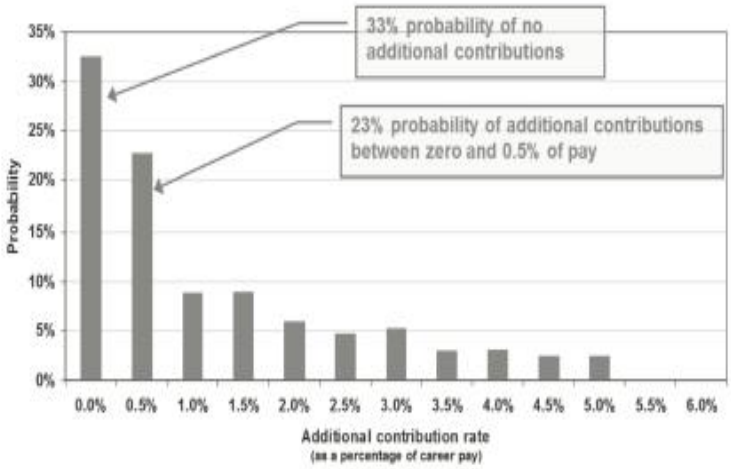
**Chart 15**




| *Shortfall probabilities (percent of simulated outcomes below targets:* | | | | | |
|---|---|---|---|---|---|
| Moderate (70% to 75%) | 8.7% | 12.7% | 9.3% | 3.9% | 1.4% |
| Significant (<70%) | 44.6% | 16.4% | 2.7% | 2.1% | 0.8% |
| Total shortfall prob. | 53.3% | 29.1% | 12.0% | 6.0% | 2.2% |

The simulation model can also be used to analyze the likely extent of additional contributions that may be triggered under the automatic adjustment provisions. The histogram in Chart 16 shows the probability of additional contributions for any cohort at specified levels (expressed as a percent of career pay). There is a 33% probability that no additional contributions will be triggered at all. The average additional contribution is 1.0% of covered pay (i.e. pay up to the pay cap). For the worst 10% of outcomes the average rate is 4.2%. Although this is a subjective judgment, this level of cost risk is something that sponsors should be able to manage well—it is certainly much less than the cost risk from a typical defined benefit pension plan.

**Chart 16**




## V. PUBLIC POLICY ISSUES

The federal government must take the lead role in a reformation of the retirement system. The Tracker Plan program is designed to provide a strong Pillar 2 arrangement that can supplement Social Security in such a way that a large majority of workers can expect to maintain a reasonable standard of living through their retirement years. Numerous political choices must be made as part of any major reform effort, however, the effectiveness of the final program will ultimately depend on these political choices. This section reviews some of the more important areas where public policy choices will be required.

### *A. Coverage*

No decision will be more important to the aggregate effectiveness of reform than the decision on how workers will be covered under the program. The current scheme of plans voluntarily sponsored by employers has left over half of the U.S. workforce without retirement plan coverage. With the current individual IRA-type arrangements, lower paid workers do not participate in significant numbers. To have a real impact on increasing the retirement savings throughout our economy a muscular approach is needed. A full mandate that all workers participate in the program might be overkill, and would likely find lukewarm Congressional support, but it should be considered as an option. Absent a full individual mandate, it is likely that the program will require that all employers automatically enroll new employees into a Pillar 2 program and make the needed payroll

deductions. Employees could then have the option to decline participation, or to participate at a rate lower than the regular contribution schedule. Nonparticipating workers could then be auto-enrolled again at certain ages. The ideal situation would be that plans that do not attain at least 95% coverage of workers (age thirty and up) should institute special operational and communication efforts to raise their coverage levels.

### *B. Uniformity*

When a program, like the Tracker Plan, is designed with very specific risk control objectives, uniformity of provisions is then critical for success. A wide range of choices may make sense for higher-income individuals, but lower- and middle-income workers need to have a simple framework for retirement savings that is the same from one employer to the next, where continuity of savings over the full career is a real necessity. All tracker funds should use the same basic asset allocation glide path, and any grouping of age cohorts (e.g. into three-year age groups) must be uniform from fund to fund. The regular contribution schedule and the automatic adjustment procedures should be uniform, and also be based on a uniform target accumulation path so that the tracking error concept can carry from one plan to another. Uniformity of these features is likely to be resisted by the financial services industry, but innovative product designs and choices can still be preserved for supplemental plans that cover the higher paid workers who have the interest and skills required to utilize choice effectively.

### *C. Size of Benefits and Employer Cost*

The design in this Article was based on a reasonable income replacement target of 75% of pay, and the resulting contribution schedule creates a high confidence of successfully meeting the target. A lower contribution schedule would necessarily require some combination of changes to these factors:

- A lower replacement ratio target than the 75% that is used here (even though recognition of medical costs might argue for a higher target, not a lower one).
- A higher retirement age target, such as age sixty-six or sixty-seven.
- An assumption of lower post-retirement benefit increases.
- A lower pay cap, which would mean that median level earners would not have full coverage.
- A lower standard of risk control, which might also accommodate more investment risk.

The determination of how costs are split between employees and employers is also a public policy choice. The legal framework of the Tracker Plan could allow some level of choice for the employer, but there should also be some arrangement of tax incentives so that employers are strongly encouraged to underwrite a significant share of the cost. There could also be rules that require some level of employer cost sharing before the employer could implement any form of tax favored supplemental plan for its higher paid employees.

Finally, the Tracker Plan concept could be implemented as a two-part arrangement. For example, the Basic Tracker Plan might only cover pay up to a lower limit like $25,000—and this is where incentives and penalties for cost sharing could be stronger. Then an Extended Tracker Plan could cover pay from $25,000 to $75,000 with more employer flexibility on cost sharing.

There is a major advantage of working within a framework like the Tracker Plan. This is because it forces a real discipline and transparency on the process that connects the cost of the program with very specific objectives for the key features that determine benefit adequacy, which includes:

- The replacement ratio target at a selected retirement age;
- The degree of post-retirement inflation protection; and
- The extent of risk control, expressed in terms of a confidence goal for outcomes.

Wide ranges of choices are available, and each will vary in terms of cost and benefit adequacy. In fact, there is a direct link between these two features. As one example of a radically scaled-back Tracker Plan design, three changes can be made from the design discussed in this Article:

- Shift the target retirement age from age sixty-five up to age sixty-seven;
- Eliminate any postretirement increases in benefit levels; and,
- Drop the confidence target for avoiding shortfall outcomes from 90% to 80%.

The Tracker Plan can be designed to meet these revised objectives with a contribution schedule of 5.2% of pay each year. This is a dramatic reduction from the contribution schedule used for the basic design analyzed in this Article (which starts at 8% of pay, then increases to 16% of pay at age thirty-three). However, this reflects a severe reduction in overall benefit adequacy. This particular scaled-back version of the Tracker Plan would essentially be equivalent to a defined benefit pension plan that provides a benefit of 1% times final five-year average pay for each

year of service, with a normal retirement age of 67, no early retirement subsidies, and no post-retirement COLA provision.

The single most important principle in economics is *"nullum gratuitum prandium"* ("There is no free lunch" . . . it just sounds classier in Latin)—and The Tracker Plan framework makes all the trade-offs very apparent. Section 7 explores these trade-offs in more detail.

### *D. Operational Framework*

Many employers are either unable, or unwilling, to sponsor and administer a retirement plan for their employees. This is especially apparent among smaller employers, as the administrative and legal obligations are far from trivial. To ensure broad worker coverage, employers should be relieved of any need to sponsor their own plan. As stated earlier, the primary obligation for employers is to enroll their employees in a program, make the required payroll deductions for employee contributions and transfer these contributions (plus any employer contributions) to the fund manager.

Therefore, outside organizations are required to run the program in a professional and cost-effective way. Reform efforts should include enabling legislation for the creation of large, regional not-for-profit organizations for this purpose. This is an idea promoted by others, including Keith Ambachtsheer.[4] The objective of low expense levels for administration and investment activities is very important—and these kinds of organizations are the best way to set the standard. Some current organizations like the Federal Thrift Savings Plan and TIAA-CREF provide good models. Private for-profit organizations could offer products, but they should win their business with good management and not with high marketing costs. Large employers that want to sponsor their own plan should also be permitted to do that.

This Article also encourages reorganization of federal oversight and regulatory bodies with respect to retirement issues. A single cabinet level position is needed with responsibility for Social Security, Medicare, and the oversight and regulation of all Pillar 2 and Pillar 3 arrangements. This person would have a mechanism to set broad standards for all retirement administration organizations and to monitor their effectiveness.

### *E. Investment Framework*

This Article previously stated the importance of having all tracker funds operated with the same basic glide-path allocations

4. KEITH P. AMBACHTSHEER, PENSION REVOLUTION: A SOLUTION TO THE PENSIONS CRISIS (Wiley Finance 2007).

and cohort groupings. Beyond this, the funds should have significant leeway for using all available investment vehicles that help them achieve the objective of earning a high real return (net of fees) over the appropriate time period for each tracker fund age cohort. The best current model would be large defined benefit plans that:

- Utilize both outside managers who can add value, and in-house management when cost effective.
- Seek the lowest fees for the services and skills obtained.
- Carefully monitor all managers.
- Continuously research capital market opportunities.
- Have a well-organized governance structure.
- Set long-term objectives, and determine the best policy to meet those objectives.

The biggest difference from defined benefit investment operations is that the tracker fund objectives are much more specific in nature. Specifically, there is a fixed timeframe, and there are clearly stated risk control objectives. This should vastly improve the ability of fund managers to set policy and monitor progress.

The potential also exists for large tracker funds to lead the way for the creation of newer products (or at least a deeper and more efficiently priced market for long-dated equity market options) centered on risk control (downside insurance). As the funds approach their maturity dates, they may be willing to pay a premium for downside insurance, and could quantitatively determine a reasonable level of premium for the desired level of protection. Other funds, further from their maturity date, could then judge whether selling that insurance to these mature funds and earning the premiums is a desirable activity that might enhance their own long-term return objectives. The premiums may be a combination of fixed dollar amounts, plus some degree of upside participation rights.

### *F. Supplemental Plans and Tax Incentives*

The Tracker Plan is envisioned as a core Pillar 2 benefit. A Tracker Plan program with the features described in this Article, using a pay cap of around $50,000 (2009 dollars), would ensure that half of the workforce has what they need for a secure retirement. Those who earn above the median level of pay would need supplemental plans for additional savings or benefits to reach the same level of income replacement—but even without any supplemental coverage the Tracker Plan would provide a substantial floor of retirement income for them as well.

Supplemental plans could take various forms. The most direct would be an Extended Tracker Plan, which would base contributions on total pay (up to some maximum similar to the current $245,000 for qualified plans). These contributions could be consolidated into the same tracker fund account as the regular Tracker Plan contributions for simplicity of administration and investment. Other supplemental defined contribution arrangements could be sponsored by the employer, or provided in the retail market to individuals, with much more flexibility on level of contributions (on pay over the Tracker Plan cap), employer match levels and investment options. Employer-sponsored defined benefit supplemental plans could also be designed to "wrap around" the expected benefits from the Tracker Plan.

Regulation of these supplemental arrangements could be accomplished by a simplified set of plan qualification standards—the uniform provisions in the Tracker Plan should eliminate the need for much of the current regulatory maze. I believe that one simple rule could be quite effective in this area—namely that no employer contributions could flow into a supplemental arrangement until some specified level of cost sharing was reached in the regular Tracker Plan for that employer.

Currently tax revenue forgone because of tax-preferred retirement savings arrangements is about 1% of the GDP. Pension reform efforts should include a close examination of who benefits from these tax expenditures and the degree to which they further the broad national interest. Opportunities should exist for restructuring these tax benefits in ways that better support the goal of expanding retirement savings opportunities across the population. The tax treatment of supplemental plans may differ from the basic Pillar 2 program, and incentives may be focused on employers, especially small employers, to encourage a sufficient level of cost sharing in the Pillar 2 plans.

## VI. COMPARISON WITH COMPARABLE DEFINED BENEFIT PLAN

One possible reaction to the Tracker Plan described in this Article is that the cost is too high. This is perhaps based on previous experience with traditional defined benefit pension plans where the expected long term cost often falls into a range of 5% to 10% of payroll for corporate plans (with no post-retirement COLAs), or 10% to 15% for public pension plans that include COLA provisions. However, the benefits provided by the Tracker Plan are substantially better than most traditional pension arrangements, so cost comparisons need to be carefully framed. This section first analyzes a few of the features that are part of the Tracker Plan cost levels used in this Article:

- The 75% replacement ratio target includes the age sixty-five

Social Security benefit expected to be available forty years from now, in 2049. That benefit for a median level earner is 32% of final pay, which compares with a benefit of about 40% of final pay for a worker retiring in 2009 at age sixty-five. The benefit needed to reach the 75% total replacement ratio target has increased from 35% to 43% of final pay, a 23% increase in the benefit level.

- The Tracker Plan is designed to provide post-retirement benefit increases of 2.5% per year to control exposure to inflation risk. Compared to a plan with no post-retirement increases, this adds about another 30% to the cost.
- The benefit payouts from the Tracker Plan in this Article reflect future mortality improvements expected over the next forty years, which adds about another 8% to the cost. This cost is seldom fully reflected in current defined benefit plan costs.
- The Tracker Plan provides full portability of benefits, which is not provided in most defined benefit arrangements.

Next, this section constructs a more meaningful comparison, where benefits provided are comparable. The following cash balance pension plan would closely replicate both the accrual pattern and the final retirement benefit (at the median expected Tracker Plan benefit):

- Total pay-based credits to the cash balance account at the same rates as the schedule used in the Tracker Plan, starting at 8% of pay and increasing to 16% of pay by age 33.
- Employee contributions equal to half of these pay-based credits.
- Interest credits on the cash balance account equal to 7% each year.
- Payout at age sixty-five retirement of the full cash balance account, or using the account balance to purchase a risk-free annuity with 2.5% post-retirement increases.
- Full and immediate vesting in the cash balance account.

When it is assumed that the sponsor adopts an investment policy of 50% equities and 50% bonds the expected net employer cost would be 4.9%, which is lower than the 8.5% for the Tracker Plan (assuming a 50/50 cost sharing for the regular contributions). However, if we look at only the outcomes in the worst decile, the cost for the cash balance plan increases to 17.9%, while the Tracker Plan increases only to 11.7%. At the second percentile outcome, the cash balance cost is 21.5% and the Tracker Plan cost is 12.0%.

If this degree of cost volatility is too much for the sponsor, then a more conservative investment policy is required. With an equity allocation of only 20%, the expected cash balance plan cost

becomes 8.5% of pay, matching the Tracker Plan. Now the average cost for the worst decile is 14.2% of pay, and the cost at the second percentile outcome is 15.7% of pay. *Nullum gratuitum prandium*.

## VII. Framework for Analysis and Comparison of Design Options

For any retirement system, two metrics are critical:

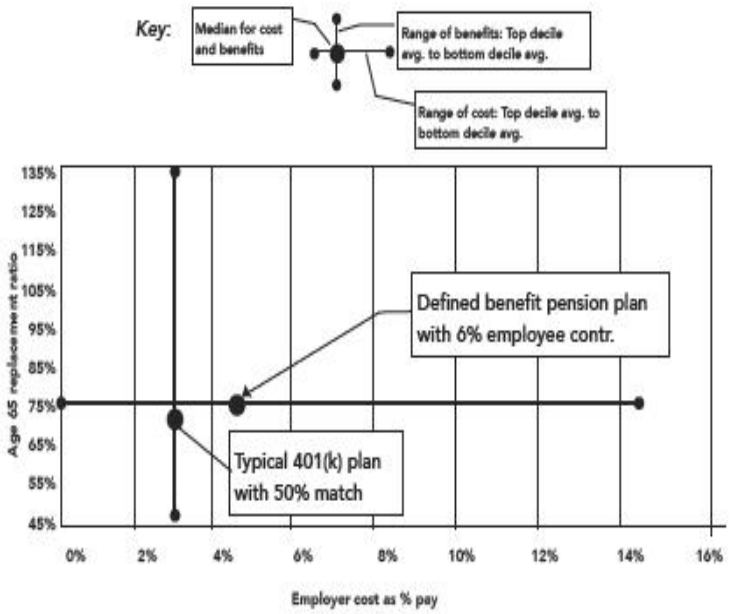
1. What is the cost?
2. What benefits are provided?

In the real world, financial risk factors (investment returns and inflation) create some level of uncertainty in either one, or both, of these metrics on a forward-looking basis. This means that a distribution of possible outcomes needs to be dealt with. The important features of these outcomes can be captured in a chart where projected benefits (expressed as a replacement ratio) are plotted against cost. The points that are plotted should reflect both expected (e.g. median) levels, as well as some measure of the range of uncertainty (e.g. the average value for top and bottom decile outcomes, which can be estimated using a Monte Carlo simulation model). The range of uncertainty is the only way to quantify risk, and any comparison of alternative retirement system designs must incorporate a clear analysis of the risk to all stakeholders that is embedded within the design structure.

Looking first at traditional plans, it can be seen that all of the uncertainty is forced into a single dimension. For a 401(k) plan all of the uncertainty emerges on the benefit metric. In a traditional defined benefit pension plan all of the uncertainty emerges on the cost metric. Chart 17 shows results for:

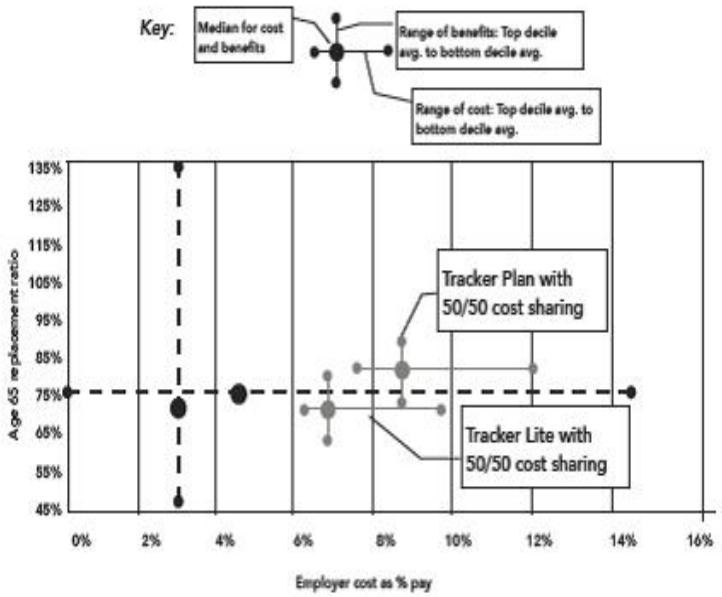
- The typical 401(k) plan described earlier (where the employer cost is fixed at 3% of pay to provide a 50% match on a 6% employee contribution), and
- A pension plan that targets a 75% replacement ratio at age sixty-five (inclusive of Social Security), includes a post-retirement COLA of 2.5%, and provides full and immediate vesting. In determining employer cost, we assume the sponsor uses a 50/50 asset allocation, and that employees contribute 6% of their own pay in order to participate.

**Chart 17**




Contrary to these one-dimensional approaches, the Tracker Plan operates in two dimensions. The same will be true for any other plan that includes risk-sharing features. Chart 18 shows how the Tracker Plan plots in this benefit/cost space. Chart 18 also plots the location for the dramatically scaled-back Tracker Plan described in Section 5.4 (labeled as Tracker Lite).

**Chart 18**




These charts clearly convey most of the critical information required to make meaningful comparisons among competing options for pension reform. Each stakeholder naturally prefers to receive good results without any risk, but the risk has to flow somewhere. By explicitly showing the risk to each stakeholder, the tradeoffs become transparent. Only then can we have a clear dialogue for policy decisions.