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# The Tracker Plan: A Controlled Risk Defined-Contribution Retirement Program

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## Abstract

The U.S. retirement system is not working. Reform is needed, and this paper explores one idea to help expand coverage and increase the level of retirement savings among all workers. The Tracker Plan is designed so that financial risk can be shared between the participant and employer, but it is a defined-contribution program in the sense that any residual risk ultimately falls to the participant. The employer obligations are subject to a hard cap. Various features are utilized to ensure that the level of shortfall risk to the participant is carefully controlled, with specific probability targets for successful outcomes. The paper describes how the Tracker Plan can be structured and tests the effectiveness relative to specific, measurable goals. Public policy choices are explored, and suggestions are offered.

## 1. Introduction

The U.S. retirement system is in the early stages of a slow-motion crisis. Numerous articles and books have provided 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 that we will be passing on to future generations of workers and taxpayers, albeit a largely hidden obligation).

The current retirement system can be characterized as a relatively modest paygo defined-benefit Social Security program, supplemented by a highly fragmented collection of voluntary savings and benefit arrangements. At the employer level, the voluntary nature of the system has resulted in no coverage at all for nearly half of the workforce, and sudden sharp reductions in coverage for many others 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-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 fall to the sponsor. (However, the worker is actually exposed to a significant amount of risk as long as the arrangement is voluntary. 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 as sponsors have abandoned their pension arrangements.) At the other end of the spectrum are the "traditional" defined-contribution 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, and 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.”

A new framework is needed—one that significantly increases our aggregate savings, spreads it among all workers, and shares risk in a way that makes it manageable 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 very long-term endeavor, and 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 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 the effectiveness through the use of a Monte Carlo simulation model. Section 5 describes the major choices available to policymakers and offers some suggestions and the 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.

## 2. Retirement System Framework

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

- Zero Pillar—noncontributory basic benefit financed by the government.
- First Pillar—mandatory paygo 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).

In the United States there is really no broad-based Zero Pillar program specifically for senior citizens, and Social Security provides the First Pillar benefits. There are no mandatory Second Pillar programs, and all the various plans that makeup our private retirement system fall into the Third Pillar.

In this paper I assume that the Social Security system remains largely in its current form, where all workers must participate and contribute, and where 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 use projected Social Security benefits in 2049, at which time benefits for an average worker will be about 20 percent 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 U.S. government is in no 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.

I also believe that trying to accomplish everything through a single program is unrealistic. So 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 meet their basic retirement needs easily, without the need for complex decisions or choices. This indicates that a highly standardized set of provisions is needed, where the primary decision is to be in the plan (the default option) or to be out, and that a strong emphasis on risk control is paramount. 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 that would entail more risk and uncertainty.

### **3. The Tracker Plan**

This section describes the specific operation of the Tracker Plan—the particulars of how money flows into the plan, how it 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 paper and the rationale for these selections. Section 5 will provide more discussion of policy choices that are required before implementation. However the program is implemented, I strongly believe that the parameters for the program must be uniform, or very nearly uniform, across the full U.S. workforce. Without this uniformity the Tracker Plan concept loses a great deal of its strength.

#### **3.1 Overview**

At the participant level, the major goals for the Tracker Plan 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 macroprogram 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 any unfunded obligations.

With traditional defined-contribution arrangements, two of the most common criticisms are that they are too risky for participants, and that 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 with a primary emphasis on 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 toward the target is monitored, and adjustments are made according to a fixed set of operational rules based on tracking error:
  - o 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.
  - o 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, and specific measures and standards are needed to determine whether the amount of risk is contained within reasonable levels. My selected standards are that (1) with about 90 percent confidence, the participant will meet or exceed the desired target asset accumulation and (2) 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 my benchmark test for each design option I 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.

### 3.2 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 it as a core benefit, to work in combination with Social Security. To maintain this 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 median income workers seems reasonable, and 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 information from the Census Bureau, the median earnings for workers aged 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. A good candidate might be 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 at something like 130 percent 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, and I believe 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 a focal point for communication with all workers about the need for adequate retirement savings.

### 3.3 Retirement Income Target

The first parameter choice is to select a target level for retirement income. I choose a target 75 percent 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 percent of the gross income at the time of retirement. The Tracker Plan benefits are based on annuitizing the accumulated funds at age 65, with an assumed post-retirement increase factor of 2.5 percent per year. The Social Security benefit used is based on retirement at age 65 in 2049, and this produces a 32 percent replacement ratio for Social Security alone. To meet the 75 percent overall target, the Tracker Plan benefit should replace 43 percent 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 percent of final pay with about a 90 percent probability, and should almost never fall much below 38 percent of final pay (a 5 percent to 6 percent shortfall is about what a worker can expect to recover by working to age 66 instead of to age 65).

The 75 percent 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, reflecting the changes that occur in their tax and saving situations. In particular, the long-running Georgia State University/Aon Insurance project on replacement rates shows that medium earners need 74 percent of

their pre-retirement income in order to maintain the same standard of living after retirement. However, some experts note that a higher income replacement target is required when medical costs after retirement are more carefully recognized. Two key factors are 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 retirement age to reflect that many workers retire before the age when 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.

### 3.4 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 now well-accepted idea behind target-date funds, 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.

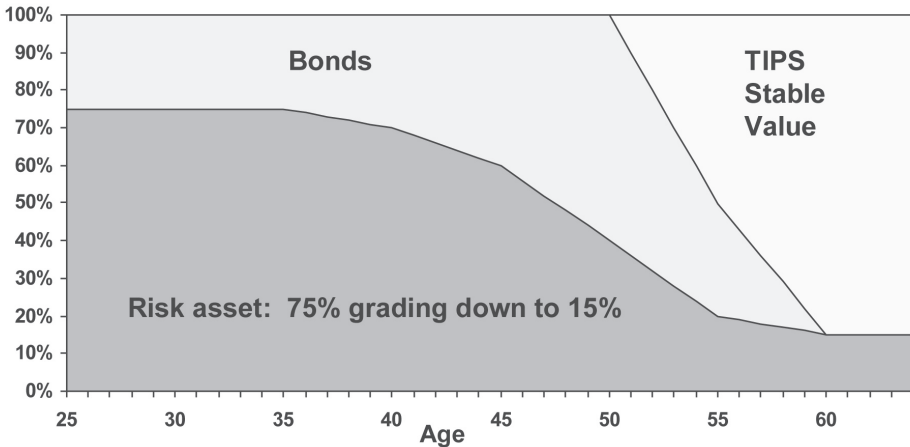
The fund allocations will be among three separate investment pools: (1) a risk asset portfolio, which would be a diversified portfolio of equities and other assets that has the objective of earning the best long-term risk premium possible; (2) a fixed-income portfolio, which would include core bond holdings similar to the Barclay's Aggregate Bond Index; and (3) a stable value fund invested in Treasury inflation-protected securities (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 through managing funds on a large 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

## Tracker Plan Glide Path



The fund starts with a 75 percent allocation to the risk asset portfolio and a 25 percent 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 percent 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, that is the age when a worker would enter his specific tracker fund. Prior to age 35 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 of these would own the appropriate number of units in each of the three portfolios to maintain their allocation targets.

### 3.5 Contribution Schedule

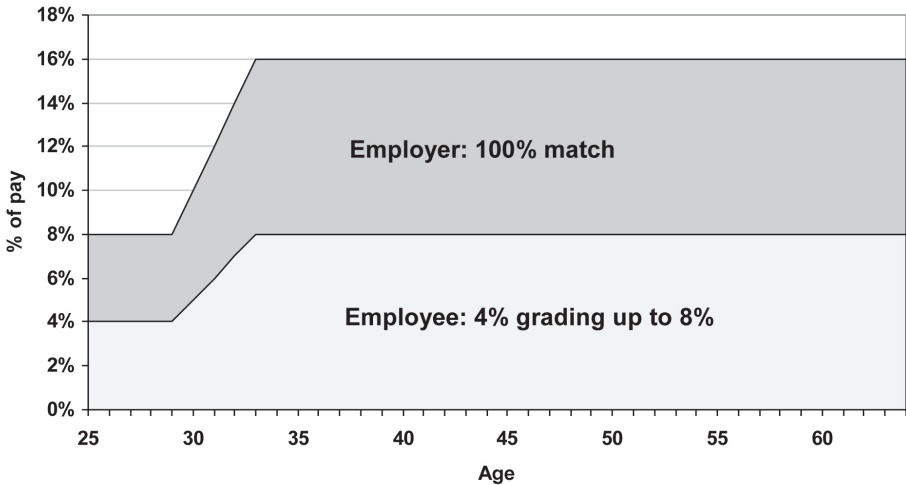
To provide a lifetime income equal to 43 percent of final pay requires a total fund accumulation equal to 7.5 times final pay at age 65, assuming a 2.5 percent annual increase in the benefit after retirement and using a real yield rate of 2 percent and projected future mortality rates to price an annuity 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 percent 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 we defined a specific investment process 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 percent confidence objective. The process actually involves an iterative test of multiple variables, but in the illustrations used for this paper I derived a target accumulation at age 65 equal to 8.85 times final pay.

With this working target amount at age 65, plus a specific investment process, we can find 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 paper.

**Chart 2**  
**Tracker Plan Contribution Schedule**



Total contributions start at age 25 equal to 8 percent of pay, and then increase in 2 percent steps for each year between ages 30 and 33, reaching an ultimate level of 16 percent 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 paper 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 percent level of confidence. The rates really reflect the always present trade-off between risk and reward—an arrangement with low risk will require larger inputs to meet the required target. Many employers in the United States 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 will 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.

### **3.6 Automatic Tracking Adjustments**

The truly unique feature of the Tracker Plan is a set of automatic adjustments that will help to 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:

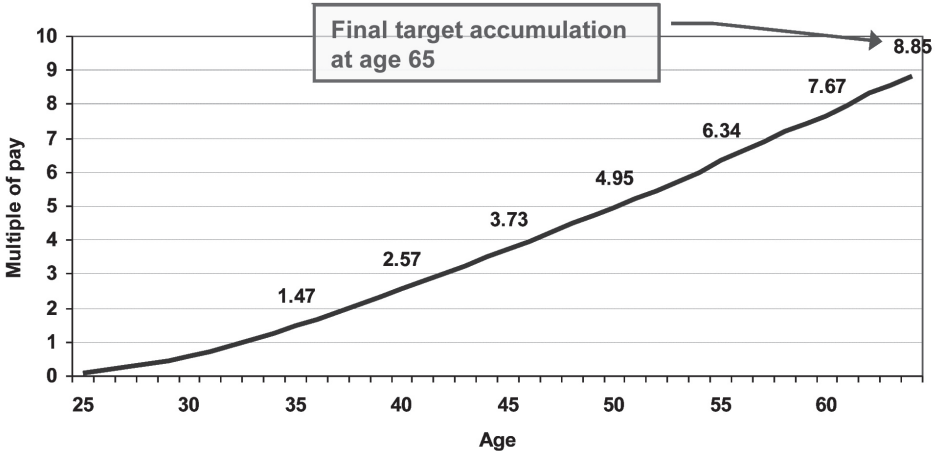
- If performance is adverse and the fund is tracking below the desired target path, then additional contributions may be triggered, up to a fixed maximum add-on.
- If performance is favorable and the fund is tracking above the desired target path, then the investment risk may be reduced to preserve the cushion.

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. 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 3.5 and accumulate these fund returns based on the tracker fund allocations described in Section 3.4. The resulting accumulation values at each age can be expressed as a percent of pay, and we then have the 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 paper. Note that the ending value at age 65 is the 8.85 value mentioned in the previous section.

Chart 3

Tracker Plan Target Accumulation



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 paper are shown in Chart 4. I have chosen to begin the adjustment process at age 40, which was about the latest age where the process could control downside risk to the needed degree.

## Chart 4

### Tracker Plan Automatic Adjustments

**If experience is favorable and tracking error after age 40 is greater than +5%, reduce investment risk:**

- Reduce the allocation to the risk asset portfolio by one percentage point for every percentage point that the tracking error exceeds +5%
- If adjustment is made, switch to the bond portfolio
- Example: tracking error at age 48 of +15% triggers a 10% reduction in the risk asset allocation, and a 10% increase in the bond portfolio allocation.

**If experience is unfavorable and tracking error after age 40 is less than trigger level, employer makes additional contributions:**

- The tracking error trigger level is -15% from age 40 to 44, -10% from age 45 to 49, and -5% from 50 to retirement.
- Additional contribution rate is 0.6% of pay for every percentage point that the tracking error is below the trigger level, up to a maximum of 7% pay.
- Example: tracking error at age 48 of -12% triggers an additional contribution of 1.2% pay.

One issue 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. I believe this is the preferred approach since the worker ends up taking on any residual risk under any defined-contribution plan, including the Tracker Plan, so the additional contributions are the primary way for the employer to share in the overall risk of the program.

Another issue is whether some sort of claw-back arrangement could be used if the employer made additional contributions, which later became unnecessary if strong investment performance created a significantly positive tracking error. Again, this is possible and would lower the expected cost somewhat, but my view is 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 percent 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.

### 3.7 Participant Communication and Retirement Planning

I believe 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 their 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 become a very powerful and intuitive metric when there is a benchmark multiple to compare with. Workers who have not made full contributions, or whose pay has exceeded the cap, can quickly see how much less their own pay multiple is than the current multiple achieved by their tracker fund, and also with the target pay multiple for their age. Convenient online tools could show how additional supplemental savings might be used to close the 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.

### 3.8 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 means that workers would get exactly the same benefit if they work for a single employer during their entire career, or if they work for 15 or 20 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 immediate 100 percent vesting, and a requirement that the account be preserved in their current tracker fund until they are re-employed and then transferred to an equivalent tracker fund—which would always be available since Tracker Plan 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), staying on the same path toward their 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 where new ideas are developing, and I would want the Tracker Plan to remain flexible enough to benefit from these new developments. I would suggest, However, that the plan include at least some level of mandated "long life" protection so that old age poverty is prevented for almost all workers.

My current thinking is that the best 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 percent or 2.5 percent per year. This insurance could be through private insurers, or through something like 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 perhaps be based on an assumed 2 percent real return to avoid fluctuating annuity buy-in prices, with some form of participating adjustment made when payments commence, 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 usually 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 some kind of structured payout pattern. If lump-sum distributions are allowed, they might be restricted in size to some 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.

## 4. Tests of Effectiveness

In this section we will look at how well the Tracker Plan concept works. In Section 4.1 we illustrate 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.

### 4.1 Two Illustrations

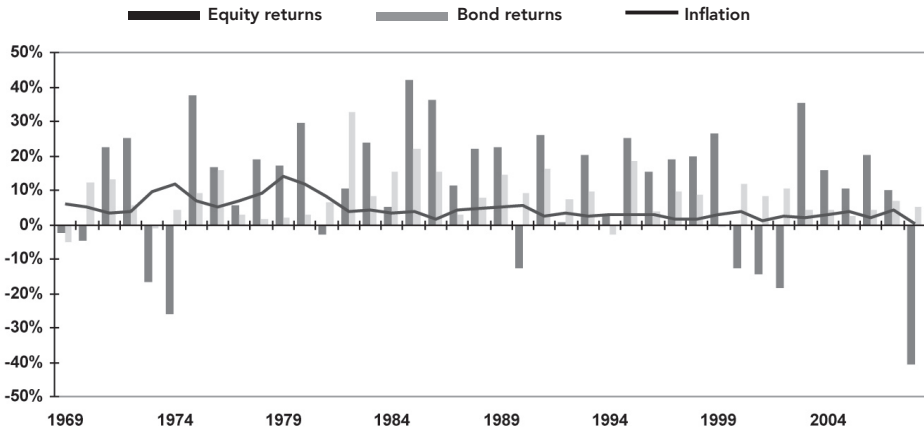
This section will show how the tracking process works over two specific illustrative periods, both based on actual historical experience for inflation, wage inflation and investment returns. Specifically, I have used investment experience as follows to illustrate how the accumulation and tracking adjustments would operate:

- *Risk asset portfolio:* For these returns I have used a portfolio of 60 percent U.S. equities (total stock market) and 40 percent 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 percent.

The first illustrative period covers the 40 years from 1969 through 2008. This period is of special interest because it is the most recent, and ends with the turbulent market results of 2008—which created significant trauma for many individuals who will be reaching retirement age in the near future. Chart 5 shows the year-by-year investment returns for the risk portfolio, the bond portfolio, and CPI results and shows average compound results over the full period, as well as over the last 15 years. In a defined-contribution plan the last 15 years are especially important because that is when account balances are large and returns carry more weight on the ultimate outcome.

## Chart 5

### First Illustrative Period: 1969–2008 Experience



	<b>–Avg. Real Returns–</b>		
	<b><u>Avg. Inflation</u></b>	<b><u>Equity</u></b>	<b><u>Bond</u></b>
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 1970s and early 1980s, followed by relatively low and stable inflation.
- Very good equity returns prior to 2008; and even with 2008 the average real returns on equities are reasonable, although below the long-term average real return of 6.0 percent for 1926 through 2008.
- Weak bond returns early on as a result of the unexpected inflation during the 1970s and early 1980s, followed by very strong bond returns thereafter. The 4.5 percent real bond return during the last 15 years is well above the long-term average real return of 2.1 percent for 1926 through 2008.

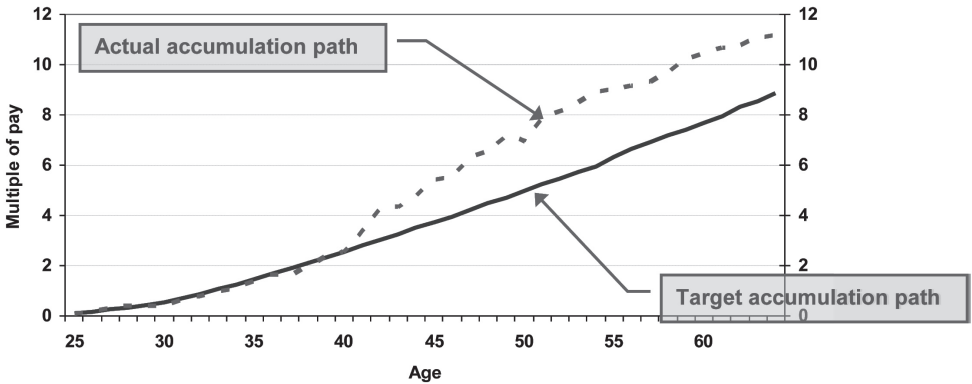
The Tracker Plan would have performed very well with this experience:

- The final total replacement ratio (including the same 32.0 percent Social Security benefit mentioned earlier for a 2049 retirement at age 65) is 93.8 percent—18.8 percentage points higher than the 75 percent minimum target.
- No additional contributions were triggered at all during this 40-year period.

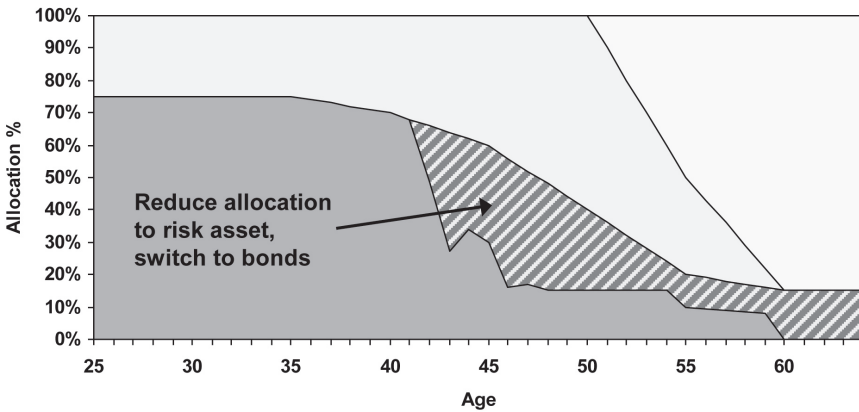
- Because of strong tracker fund returns, a significantly positive tracking error developed. This led to reductions in the risk asset allocation starting at age 42, and the fund had no risk asset exposure after age 60. Because of these adjustments the large negative equity returns for 2008 had no impact 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**  
**First Illustrative Period: Accumulation Pattern**



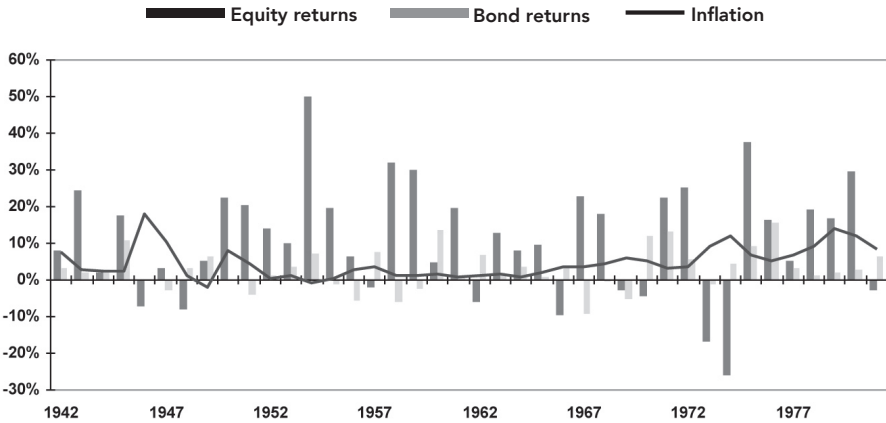
**Chart 7**  
**First Illustrative Period: Accumulation Adjustments**





The second illustrative period covers the 40 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 80+ years. Chart 8 shows the year-by-year investment returns for the risk portfolio, the bond portfolio, and CPI results and shows average compound results over the full period, as well as over the last 15 years.

**Chart 8**  
**Second Illustrative Period: 1942–1981 Experience**



	<b>Avg. Inflation</b>	<b>–Avg. Real Returns–</b>	
		<b>Equity</b>	<b>Bond</b>
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 1970s and early 1980s, 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 15 years is almost 6 percent.
- Over the whole period the average real return on equities was 5.3 percent, fairly close to the long-term average of 6.0 percent. However, over the critical final 15-year period the average real return was only 1.5 percent.

- Real bond returns were extremely poor, with an average of -1.7 percent for the full period and -2.1 percent during the final 15-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 percent Social Security benefit mentioned earlier for a 2049 retirement at age 65) is 79.5 percent—4.5 percentage points higher than the 75 percent minimum target.
- The key reason for the favorable outcome was that the automatic tracking and adjustment process triggered additional contributions during 12 of the final 14 years. During these 12 years the average additional contribution was 3.9 percent 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**  
**Second Illustrative Period: Accumulation Pattern**

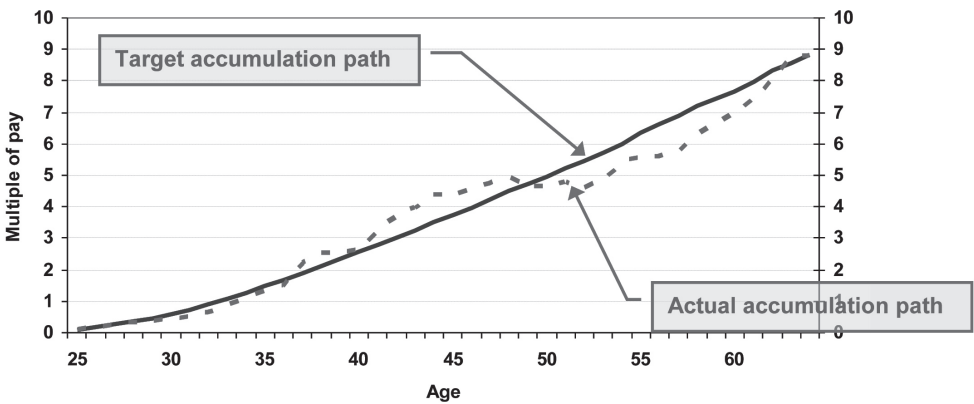


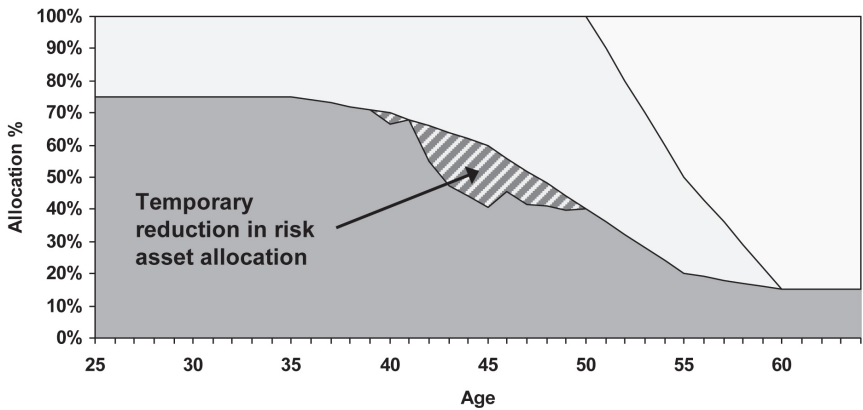
Chart 10

Second Illustrative Period: Additional Contributions



Chart 11

Second Illustrative Period: Allocation Adjustments



## 4.2 Complete Historical Replication

I now extend the same type of analysis used in the preceding section and show how the Tracker Plan would have performed over all rolling 40-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 percent 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 25 through age 65 retirement, with employee contributions of 6 percent of pay each year.
- Employer contributions each year equal to 3 percent of pay, based on a 50 percent match.
- Investment in a target-date fund typical of those currently used by 401(k) plans, with an initial allocation to equities of 90 percent, starting to grade down at age 35 to an ultimate level of 50 percent 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

### Complete Historical Replication: Replacement Ratios

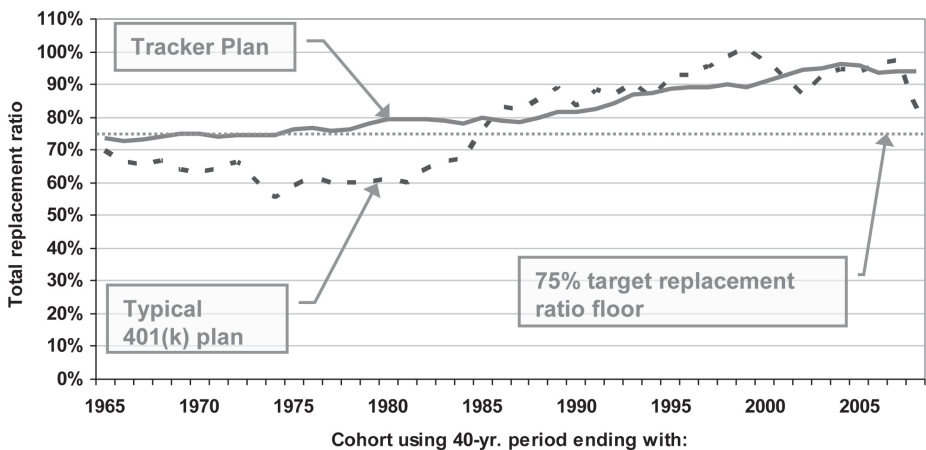
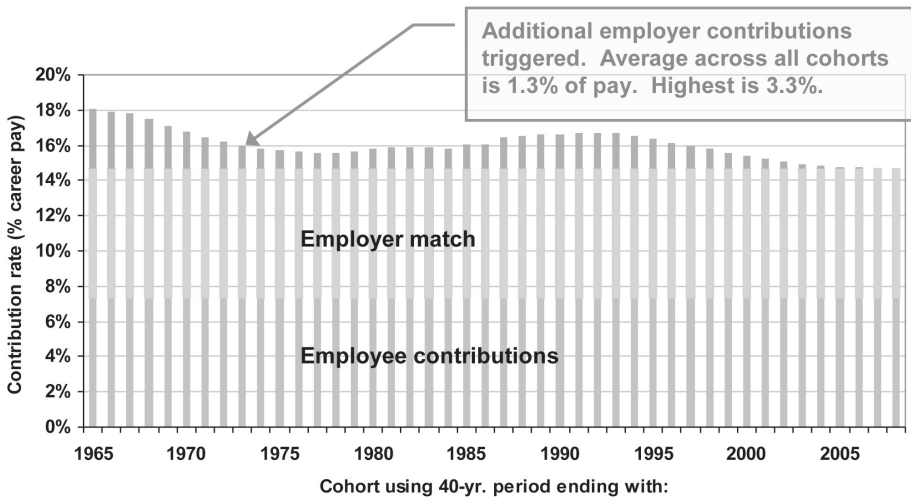


Chart 12 shows that the Tracker Plan total replacement rates are almost always above the 75 percent floor target. Only for the first 10 cohorts (reflecting retirements from 1966 through 1975) are there shortfalls, usually less than 1.0 percentage point and never more than 2.5 percentage points. After this point all of the cohorts are above the 75 percent 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 percent (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 percent level, which I would characterize as an extreme shortfall for a core retirement benefit. Across all 44 cohorts the average replacement ratios are 82.6 percent for the Tracker Plan and 77.8 percent 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 44 cohorts in this analysis, including the regular employee contributions and the 100 percent matching employer contributions, plus any additional contributions triggered for that cohort by the automatic adjustment process. For this purpose I have assumed that every individual in the cohort is at or below the pay cap for their entire career, and all rates are averaged over the 40-year career.

### Chart 13

#### Full Historical Replication: Contributions by Cohort

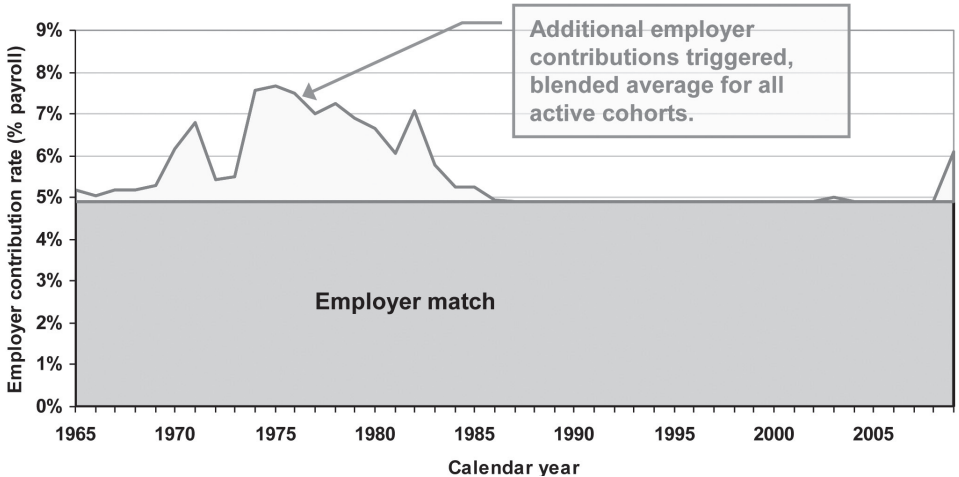


Some additional contributions were triggered for almost all of the cohorts, with the exception of the last three. The average additional rate across all 44 cohorts is 1.3 percent of pay. The highest value is 3.3 percent for the very first cohort (reflecting an individual retiring in 1966, who started contributing in 1926). After the 1972 cohort the additional contributions never exceed 2 percent of career pay.

Of course, the way employers would actually experience additional contributions for any year is a blended average of the 25 cohorts between ages 40 and 64, since these are the only ages when additional contributions would be triggered. 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 percent 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 25, for whom I assumed no contributions were made, and individuals with pay above the \$50,000 pay cap, where I reflected only contributions made on pay up to the cap. Above age 25 I assumed 100 percent participation in the Tracker Plan, up to the pay cap.

**Chart 14**

**Full Historical Replication: Employer Contributions by Calendar Year**



The chart shows that the regular 100 percent matching contribution on pay up to a \$50,000 cap works out to just less than 5 percent of total payroll. Additional contributions were triggered for each of the first 22 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 percent of total payroll, and for the highest year the additional contribution rate was 2.75 percent of total payroll. After that we see no additional contributions

until 2009, where the 2008 equity market losses would have triggered additional contributions equal to 1.2 percent of total payroll.

The results in Charts 12 and 14 have important implications, I believe. The interpretation is that a Tracker Plan framework, if in place over the last 80+ years, would have done the following: (1) 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 through-out retirement; (2) 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; (3) provided all current workers with a fully funded account balance that is on track toward meeting their retirement needs; and (4) required annual employer contributions within a range of about 5 percent to 7.75 percent of payroll (and no exposure to unfunded liabilities). Compared to what our current system offers, I think these results offer a powerful indication of the aggregate economic efficiency of the Tracker Plan approach.

### 4.3 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 reflecting 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 I use is essentially the same one I use 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:* I use an average price inflation assumption of 2.8 percent, which is the same as that used by the Social Security actuaries for their intermediate long-term projections. The model I use is a nonlinear one that includes both mean reversion effects (i.e., the operation of the Federal Reserve), but also 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 percent, the median value is 2.6 percent.
- *Wage inflation:* Real wage growth is assumed to average 1.15 percent 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 my analysis, I assumed starting pay at age 25 equal to \$30,000. The level of pay is then increased by 1.6 percent each year until it reaches \$44,613 at age 50. After that I assume increases in the pay level of 0.25 percent each year. The final pay level at age 65 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 percent, 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 I have modeled the risk asset portfolio as a simple blend of 60 percent U.S. equities and 40 percent non-U.S. equities. In actual practice I would expect a more diversified approach, similar to what a sophisticated defined-benefit sponsor might use for its risk asset portfolio construction. For the blended equity portfolio in the model I assume an average long-term (i.e., compound, or geometric average) real return of 5.35 percent. The resulting equity risk premium (spread of equity returns over bond returns) is 2.35 percent. 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 percent, and the average equity risk premium would have been 3.8 percent). This reflects both a deliberate choice on my part to be slightly conservative, but also 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 percent. However, the returns are not normally distributed, as I have used a model that reflects the potential for periods (such as the 2008–2009 period) where markets become very turbulent and large negative returns are likely. Specifically, I am using a regime-switching lognormal model, 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, we can now model the range of outcomes from the Tracker Plan for our hypothetical median-wage worker who participates from age 25 through retirement (normally age 65, except I use an age-66 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 percent to 75 percent range, and for below 70 percent. These shortfall probabilities are the key metric for risk control, and my own goals were for the total shortfall probability (below 75 percent replacement ratio) to be around 10 percent for retirement at age 65, and to be close to zero for retirement at age 66. The chart shows results for various scenarios:

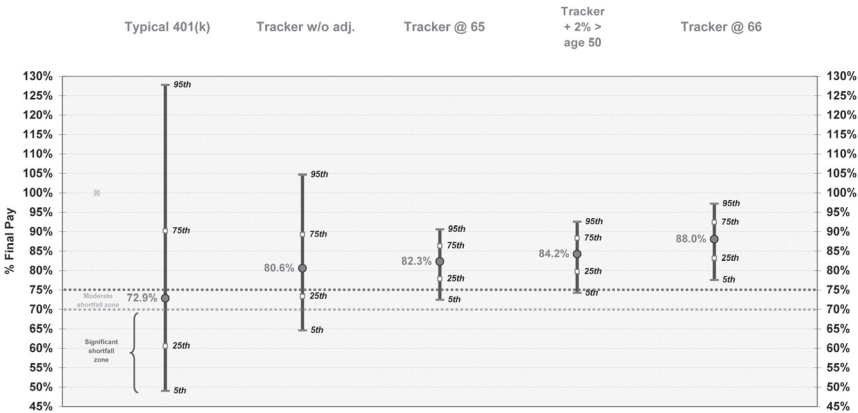
- The leftmost bar is a benchmark for comparison that is based on 40 years of continuous participation in a typical 401(k) plan, as described in the previous section. The median replacement ratio here is 73 percent. The total shortfall probability is 53 percent, but included in that is a 45 percent probability of falling below a 70 percent replacement ratio. If we look at just the bottom quartile of results, the average replacement ratio is only 53 percent. 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 one-in-four 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. In my opinion, that 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 percent, and the total shortfall risk has been reduced to 29 percent. Good progress, but more risk control is needed.
- The next bar is the Tracker Plan, including the automatic adjustment features. Now the median replacement ratio is a bit higher at 82 percent, but the total shortfall risk has been reduced to 12



percent. This is now close to our goal of having about 90 percent confidence that a worker would meet at least the 75 percent replacement ratio target. Furthermore, when a shortfall does occur it is usually relatively modest—there is less than a 3 percent probability of falling below 70 percent.

- In the next scenario we have just added supplemental contributions of 2 percent of pay starting at age 50. 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 percent.
- Finally, in the last scenario we show the results for a worker retiring at age 66, one year beyond the age-65 retirement used in each of the preceding scenarios. Here the shortfall risk is cut to just 2 percent. This achieves the goal of ensuring that when a shortfall risk does occur, it can be eliminated by working no more than one additional year beyond age 65.

**Chart 15**  
**Simulation Analysis: Range of Replacement Ratios**



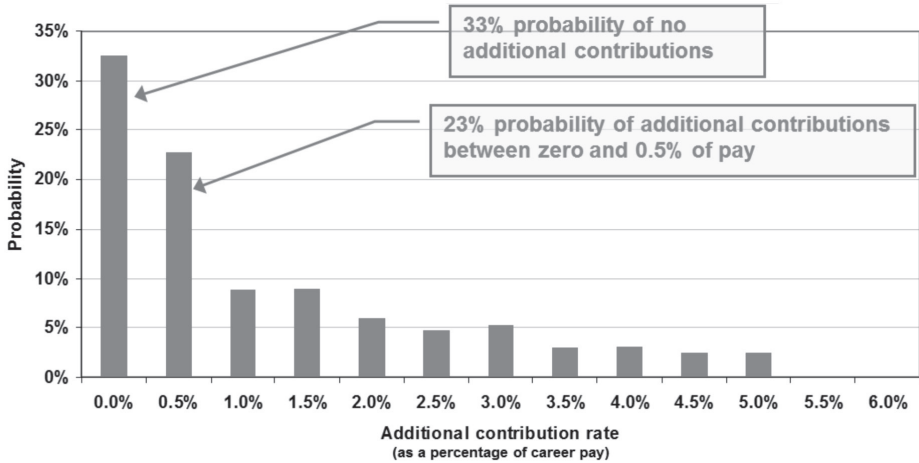
**Shortfall probabilities (percent of simulated outcomes below targets):**

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%

We can also use the simulation model 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 percent probability that no additional contributions will be triggered at all. The average additional contribution is 1.0 percent of covered pay (i.e., pay up to the pay cap). For the worst 10 percent of outcomes the average rate is 4.2 percent. Although this is a subjective judgment, I believe 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

### Simulation Analysis: Range of Additional Contributions



## 5. Public Policy Issues

My own belief is that the federal government must take the lead role in a reform of the retirement system. The Tracker Plan program outlined in this article 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, and the effectiveness of the final program will depend on these political choices. In this section I review some of the more important areas where public policy choices will be required.

### 5.1 Coverage

No decision will be more important to the aggregate impact of reform than the decision on how workers will become 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. The track record for individual IRA-type arrangements is that lower-paid workers do not participate in significant numbers. To have a real impact on increasing the retirement savings throughout our economy, I believe a muscular approach is needed. A full mandate that all workers participate might be overkill and would likely find lukewarm congressional support, but it can and should be considered as one option. Absent a full individual mandate, I believe the program requires 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 prevailing environment should be that plans that do not attain at least 95 percent coverage of workers (age 30 and up) should institute special operational and communication efforts to raise their coverage levels.

## 5.2 Uniformity

I believe that when a program, like the Tracker Plan, is designed with very specific risk control objectives, then uniformity of provisions is 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 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 I believe that innovative product design and choices can be preserved for supplemental plans that cover the higher paid workers who have the interest and required skills to utilize choice effectively.

## 5.3 Size of Benefits and Employer Cost

My design was based on a reasonable income replacement target of 75 percent of pay, and the resulting contribution schedule is that required to have a high confidence of successfully meeting the target. A lower contribution schedule would necessarily require some combination of changes in these factors:

- A lower replacement ratio target than the 75 percent that I used (even though recognition of medical costs might argue for a higher target, not a lower one)
- A higher retirement age target, such as age 66 or age 67
- 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 then also accommodate more investment risk

The way that costs are split between employees and employers is also a public policy choice. The legal framework could allow some level of choice for the employer, but there should then 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 their 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 say \$25,000 to \$75,000 with more employer flexibility on cost sharing.

A major advantage of working within a framework like the Tracker Plan is that 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:

- 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.

A wide range of choices is available, and each choice will vary in terms of cost and benefit adequacy—there is a direct link between these two features. As one example of a radically scaled-back Tracker Plan design, let us make these three changes from the design discussed in this paper:

- Shift our target retirement age from age 65 up to age 67,
- Eliminate any post-retirement increases in benefit levels, and
- Drop our confidence target for avoiding shortfall outcomes from 90 percent to 80 percent.

A Tracker Plan can be designed to meet these revised objectives with a contribution schedule of 5.2 percent of pay each year. This is a very dramatic reduction from the contribution schedule used for the basic design analyzed in this paper (which starts at 8 percent of pay, then increases to 16 percent of pay at age 33), but this reflects a very dramatic reduction in overall benefit adequacy. This particular scaled-back version of the Tracker Plan would be essentially equivalent to a defined-benefit pension plan that provides a benefit of 1 percent 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 cost-of-living-adjustment (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.

## 5.4 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 plans. 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.

What is thus required are outside organizations to run the program in a professional and cost-effective way. I believe that 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. 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.

I also encourage 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. Included here would be a mechanism to set broad standards for all retirement administration organizations and to monitor their effectiveness.

## 5.5 Investment Framework

I have previously stated the importance of having all tracker funds operated with the same basic glide-path allocations 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 that can be done cost-effectively,
- 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, and
- Set long-term objectives, and determine the best policy to meet those objectives.

The biggest difference with defined-benefit investment operations is that the tracker fund objectives are much more specific in nature. There is a fixed time frame, 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, I believe, 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.

## 5.6 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 paper, using a pay cap of around \$50,000 (2009 dollars), would ensure that half of the workforce had 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 all 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 percent of the gross domestic product (GDP)—the largest single “tax expenditure” item in the federal budget. 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.

## **6. Comparison with Comparable Defined-Benefit Plan**

One possible reaction to the Tracker Plan described in this paper is that the cost is too high, perhaps based on previous experience with traditional defined-benefit pension plans where the expected long-term cost often falls into a range of 5 percent to 10 percent of payroll for corporate plans (with no post-retirement COLAs), or 10 percent to 15 percent 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. Let me start by commenting on a few of the features that are part of the Tracker Plan cost levels used in this paper:

- The 75 percent replacement ratio target includes the age-65 Social Security benefit expected to be available 40 years from now, in 2049. That benefit for a median-level earner is 32 percent of final pay, which compares with a benefit of about 40 percent of final pay for a worker retiring in 2009 at age 65. The benefit needed to reach the 75 percent total replacement ratio target has increased from 35 percent to 43 percent of final pay, a 23 percent increase in the benefit level.
- The Tracker Plan is designed to provide post-retirement benefit increases of 2.5 percent per year to control exposure to inflation risk. Compared to a plan with no post-retirement increases, this adds about another 30 percent to the cost.
- The benefit payouts from the Tracker Plan in this paper reflect future mortality improvements expected over the next 40 years, which adds about another 8 percent 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 I would like to construct 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 percent of pay and increasing to 16 percent 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 percent each year,
- Payout at age-65 retirement of the full cash balance account, or using the account balance to purchase a risk-free annuity with 2.5 percent post-retirement increases, and
- Full and immediate vesting in the cash balance account.

Let us also assume that the sponsor adopts an investment policy of 50 percent equities and 50 percent bonds. In this case the expected net employer cost would be 4.9 percent, which is lower than the 8.5 percent 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 percent, while the Tracker Plan increases only to 11.7 percent. At the second percentile outcome, the cash balance cost is 21.5 percent and the Tracker Plan cost is 12.0 percent.

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 percent, the expected cash balance plan cost becomes 8.5 percent of pay, matching the Tracker Plan. Now the average cost for the worst decile is 14.2 percent of pay, and the cost at the second percentile outcome is 15.7 percent of pay.

*Nullum gratuitum prandium.*

## 7. 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, inflation) create some level of uncertainty in either one, or both, of these metrics on a forward-looking basis. This means we need to deal with a distribution of possible outcomes, and we can capture the important features of this in a chart where projected benefits (expressed as a replacement ratio) are plotted against cost. The points which 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

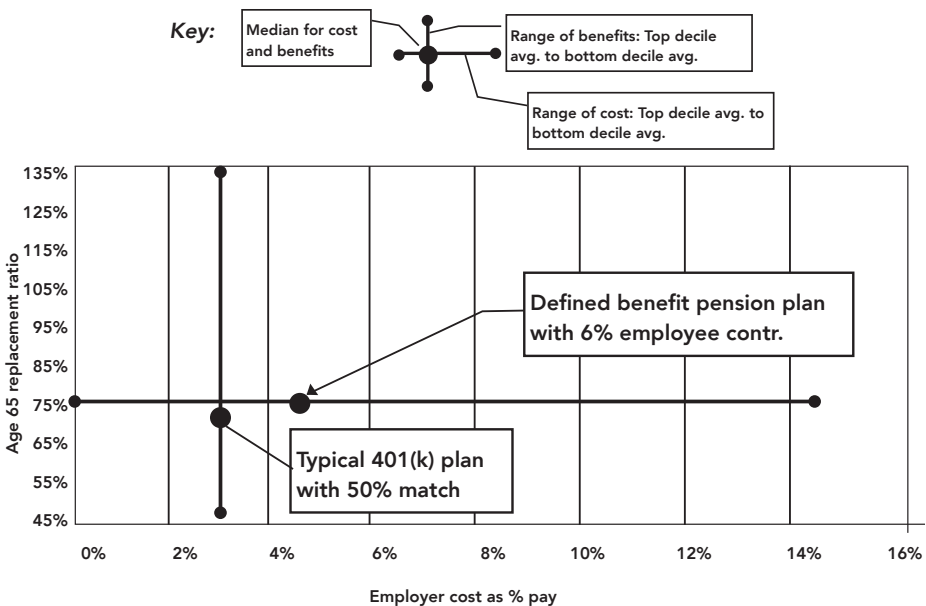
Monte Carlo simulation model). The range of uncertainty is the only way to quantify risk, and any comparison of alternative retirement system designs must incorporate a clear analysis of the risk to all stakeholders that is embedded within the design structure.

If we first look at traditional plans, we see 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, and with 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 percent of pay to provide a 50 percent match on a 6 percent employee contribution), and
- A pension plan that targets a 75 percent replacement ratio at age 65 (inclusive of Social Security), includes a post-retirement COLA of 2.5 percent, 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 percent of their own pay in order to participate.

Chart 17

Traditional Plans in Benefit/Cost Framework

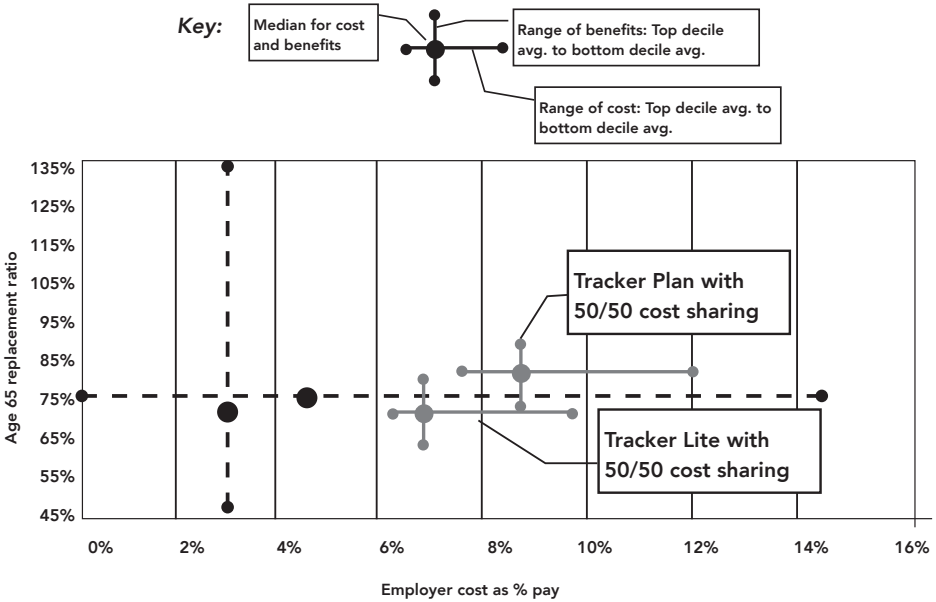


In contrast to these one-dimensional approaches, the Tracker Plan operates in two dimensions. The same will be true for any other plan that includes risk-sharing features. Chart 18 shows how the Tracker Plan, as described in this article, plots in this benefit/cost space. I also plot the location for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



### Chart 18

## Tracker Plans in Benefit/Cost Framework



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 get good results without any risk, but the risk has to flow somewhere. By explicitly showing the risk to each stakeholder, the trade-offs become transparent. Only then can we have a clear dialogue for policy decisions.

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