

**Russell's Approach to Target-Date Funds:  
Building a Simple and Powerful Solution to Retirement Saving**

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Target-date funds are designed to provide a simple investment solution for participants in defined contribution plans and others who contribute regularly to retirement savings plans. In this paper, we outline the Russell methodology for designing target-date funds. Russell's target-date funds have distinguishing features that work to improve the odds for successful investment for retirement. Although there is no certainty that this objective will be met, the funds should appeal to investors who would like to know their fund is explicitly designed to overcome the uncertainty found on the long path to financial independence in retirement.

**Target-date fund basics**

Although target-date funds are offered by many investment managers with varying investment philosophies, they share common features. The investor chooses a fund targeted to an expected year of retirement – say, Target Date Fund 2040. The investor makes regular contributions, while the fund manager selects appropriate asset classes, allocates the fund among them, and devises the best investment strategy within each asset class.

The strategy evolves over time in a way considered appropriate for a typical investor planning to retire at the target date. But the managers of these funds are unable to exercise full discretion over investment decisions because target-date funds come with a full specification of the way in which aspects of the investment strategy should evolve over time. In particular, the asset allocation among the major asset classes is mapped out by date through the life of the fund. This industry convention is a response to concerns of investors who would be hesitant to pour their life savings into a black-box investment strategy. Moreover, the sponsors of defined contribution plans that offer these funds would feel uncomfortable allowing their participants to handle investments without such guidelines.

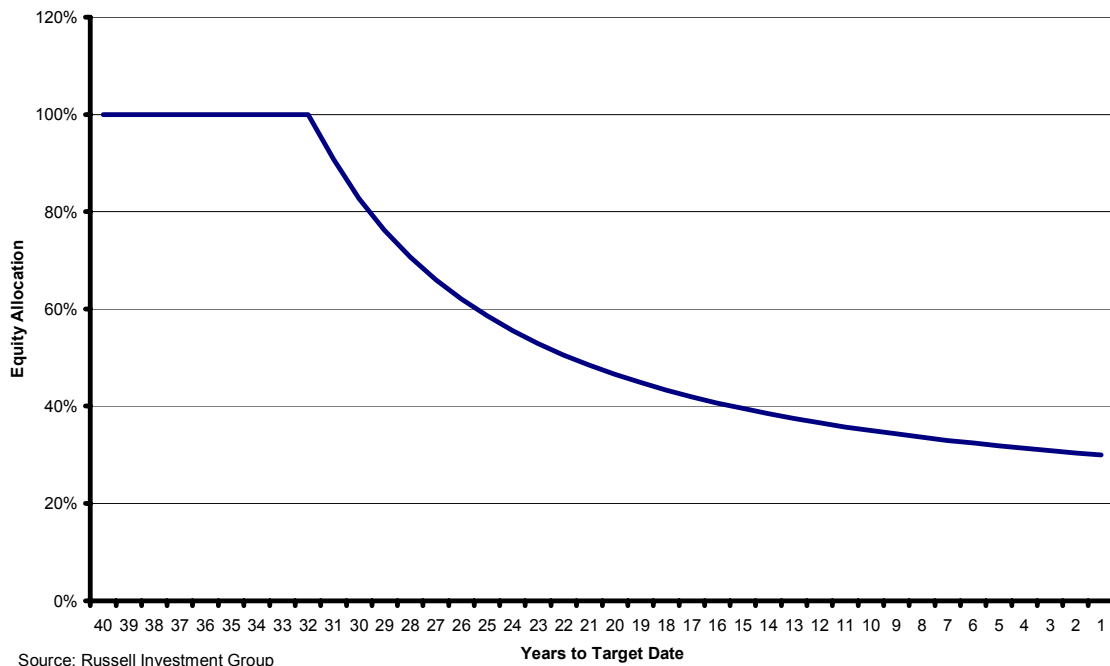
The path of asset allocation over time is the primary determinant of the risk-and-return characteristics of a target-date fund. More specifically, since the bulk of assets held in these funds are equities and bonds, the evolution of the total equity/total bond split over time determines the essential risk and return nature of such funds. Although diversification across equities and bonds and the investment performance within these

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categories can affect fund performance, it is critical to the fund’s success that the manager get right the “glide path” of the equity/bond split over time.

Regardless of the provider, the glide paths of target-date funds have a common feature: The allocation to equity declines as the fund approaches the target date. Younger investors in funds with distant target dates therefore will have a higher allocation to equity than older investors in funds with nearby target dates. This characteristic is reflected in Figure 1, which shows a typical glide path for a 40-year target-date fund.

Figure 1  
Typical Target Date Glide Path



## The “human capital” model and glide path

A good explanation for this common characteristic is found in a “human capital” model of lifetime saving and investing.<sup>1</sup> The essence of this approach is to view an investor’s stream of future savings as the cash flows from an asset whose present value can be calculated.<sup>2</sup> Thus, at any age before retirement, the investor’s wealth has two components: financial wealth in the form of equity, bonds, and other financial assets, and human capital which is the present value of remaining savings flows discounted at an appropriate risk-adjusted discount rate.

To help explain this approach, we outline a “make-believe” case where this human capital is liquid. Investors can sell their human capital, in effect swapping the stream of future savings for an immediate cash payment, and invest that cash in financial assets. An investor, say a 25-year-old who plans to retire at 65, must choose an investment strategy to manage this wealth until age 65. In the spirit of target-date funds, the portfolio should change over time, but the glide path of the equity/bond mix must be fully specified in advance.

The investor’s wealth at retirement is the sum of (liquidated) human capital, plus any other wealth, compounded by the rate of return on the portfolio over the next 40 years. In notation:

$$W_{64} = [W_{24} + H_{24}](1 + r_{25})(1 + r_{26})(1 + r_{27}) \cdots (1 + r_{64})$$

where  $W_{64}$  is financial wealth at the end of the investor’s 64<sup>th</sup> year (that is, 65<sup>th</sup> birthday),  $W_{24}$  is financial wealth at the end of the 24<sup>th</sup> year,  $H_{24}$  is the value of human capital at the end of the 24<sup>th</sup> year and  $r_t$  is the return on the portfolio during year  $t$ . The investor wants an investment strategy that balances reward and risk over the entire investment horizon.

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<sup>1</sup> The idea of incorporating human capital in portfolio decisions has long tradition in the academic finance literature. The classic article is Robert Merton, “Optimum Consumption and Portfolio Rules in a Continuous-Time Model,” *Journal of Economic Theory*, vol. 3, no. 4 (December 1971), pp. 373-413. Other academic work in this area includes Z. Bodie, R. C. Merton, and W. F. Samuelson, “Labor Supply Flexibility and Portfolio Choice in a Life Cycle Model,” *Journal of Economic Dynamics and Control*, vol. 16, nos. 3/4 (July/August 1992), pp. 427-449 and R. Jagannathan and N. R. Kocherlakota, “Why Should Older People Invest Less in Stocks Than Younger People?” *Federal Reserve Bank of Minneapolis Quarterly Review*, vol. 20, no. 3 (Summer 1996), pp. 11-23. A recent application that includes life insurance as well as investment is P. Chen, R. G. Ibbotson, M. A. Milevsky, and Kevin X. Zhu, “Human Capital, Asset Allocation, and Life Insurance,” *Financial Analysts Journal*, vol. 62, no. 1 (January/February 2006) pp. 97-109. Thomas J. Fontaine, “Target-Date Retirement Funds: A Blueprint for Effective Portfolio Construction,” Alliance Bernstein Global Investment Research (October 2005) applies the basic concepts of human capital to target-date glide path design and recognizes the important effects of the timing of savings flow on the performance of a target-date fund glide path. This approach differs from our approach (and the approach generally used in incorporating human capital into investment decisions) in that it does not apply formal optimization techniques.

<sup>2</sup> In the academic literature, human capital is typically defined as the present value of labor income rather than savings. In these models, consumption, saving and investment strategy are determined simultaneously. In contrast, Russell’s model is limited to investment strategy alone, implicitly taking saving and consumption as predetermined. In this framework that considers only portfolio construction, it is more appropriate to define human capital as the present value of the savings flows into the portfolio.

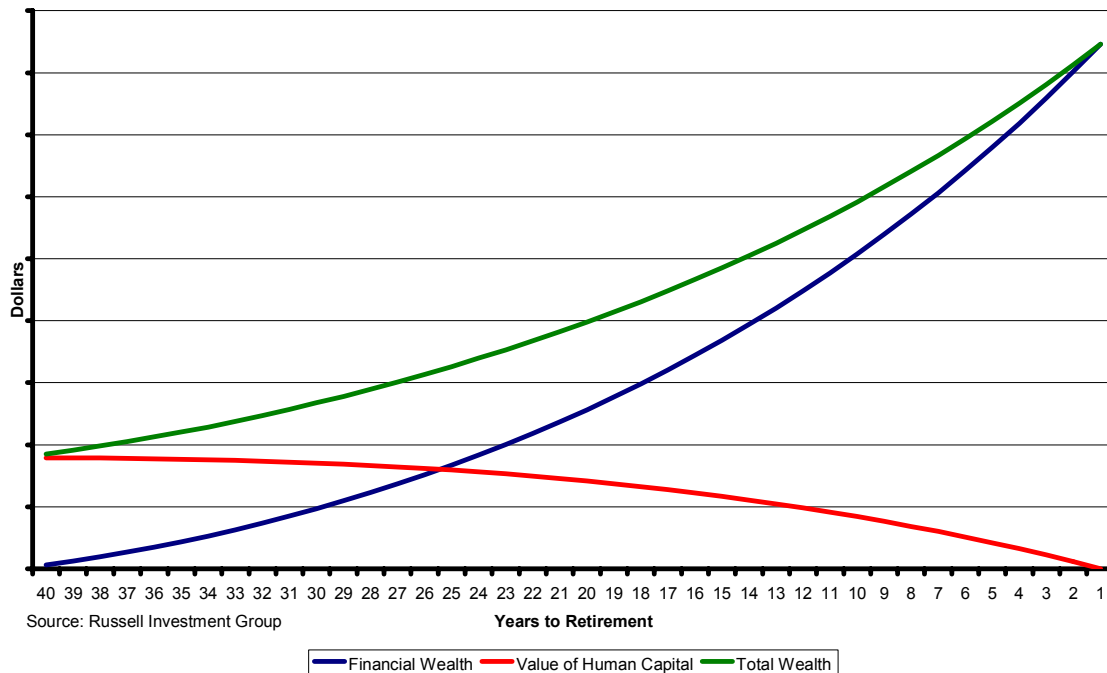
It is clear that each period's return has the same influence on final wealth as any other. The ordering of the returns makes no difference. If we assume, therefore, the same behavior of asset returns in all periods, the only type of strategy that makes any sense is to hold the same portfolio in all periods. If all periods have the same impact on final wealth, why would an investor do different things in different periods? This result is confirmed by formal mathematical optimization. Thus, in this make-believe case where human capital is immediately liquidated and invested in financial markets, the glide path is flat. The precise mix of stocks and bonds depends on the investor's ending wealth target and attitude about risk, but for every case the glide path will be flat.<sup>3</sup>

Now we return to the real world where human capital is illiquid. This human capital can still be thought of as an asset with a present value, but it is an asset that cannot be sold. The solution to the investor's glide path problem is to find the best mix of stocks and bonds *given that he or she is stuck with an allocation of human capital*. Figure 2 illustrates the situation. At age 25, the investor's wealth is mostly in the form of human capital. As time passes and this human capital is liquidated in the form of savings, financial wealth begins to grow and human capital depletes. At retirement, human capital is depleted and all wealth is in the form of financial assets.

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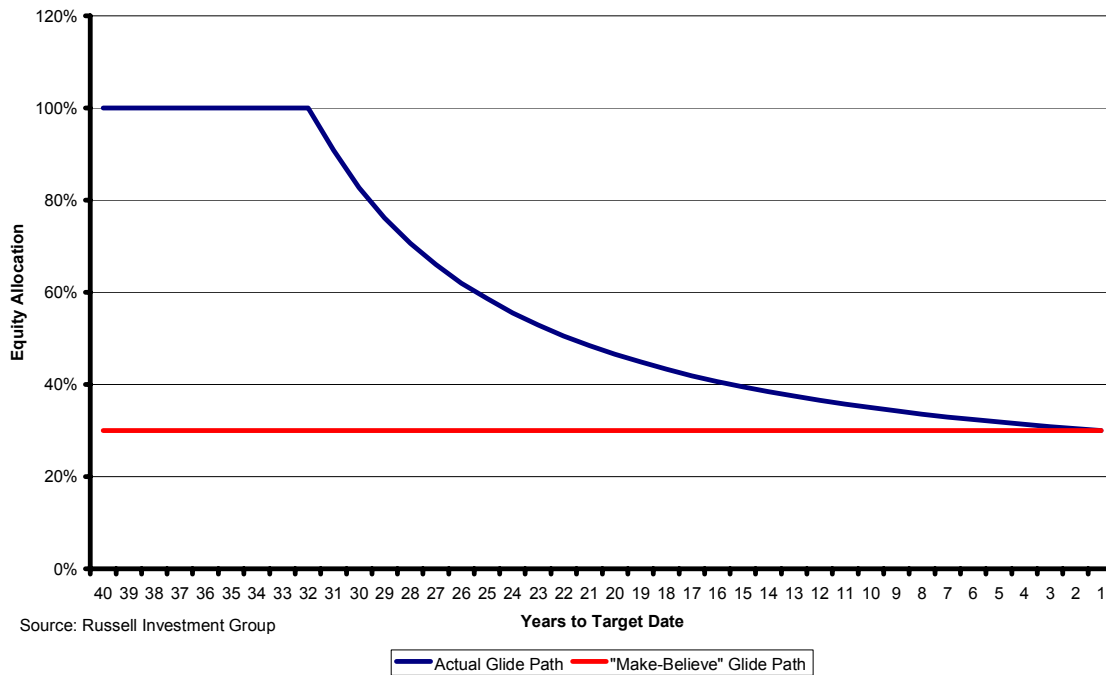
<sup>3</sup> This result sheds light on some muddled thinking that often passes for conventional wisdom. It is sometimes stated that investors should hold more equity when they are young. Then, as they age, they should plan to switch to a more conservative portfolio. The reasoning is that when the investor is young, he or she has the opportunity to wait out the ups and downs of the equity market. However, as this example illustrates, the age of an investor in and of itself should not influence the mix of equity in the portfolio. The reason that young people should typically hold a lot of equity is not because they can afford to wait for market ups and downs, it is because their future savings will be available to make up for any early market losses. This logic will be explained shortly. For details on good and bad explanations of why young people should hold equity see Jagannathan and Kocherlakota (cited previously).

**Figure 2**  
**Human Capital and Financial Wealth**



What will the glide path look like in this situation? The optimal solution is a flat glide path as there is complete liquidity. Without liquidity, the investor will allocate the available financial wealth in a way that comes as close as possible to optimal risk/return tradeoff of the flat glide path of the liquid case. If human capital is more like a bond than a stock, then young investors will typically want to hold most or all of their financial wealth in equity to offset their illiquid bond position. As time passes, human capital depletes and financial wealth grows. To maintain the same risk/return exposure, the investor will want to move out of equity into bonds. At retirement, when all human capital is depleted, the glide path will be at the same level as the flat glide path of the liquid case. This path is shown in Figure 3.

Figure 3  
Target Date Glide Paths



Two more aspects of the human capital approach are important. First, the declining equity allocation in the glide path depends on the assumption that savings risk is similar to that of bonds. If savings were more like equity, which might be the case for an investment banker or equity manager, the same logic we have used here would suggest a glide path that starts with a high exposure to bonds early in life. The presumption of bond-like behavior in savings seems sensible for investors with income based mostly on salary and not directly driven by the equity market. Second, because the human capital approach casts the glide path problem as a conventional asset allocation problem, the intuition developed over decades of use of this conventional paradigm can be used as a reality check.

### Details of Russell’s glide path

Although the human capital approach explains the basic shape of the equity glide path, more information is needed to construct a sound strategy. The essential nature of a target-date fund is to provide a sound investment strategy for an individual saving for retirement at a specific date. To create a sound strategy, we need to know the target date, initial wealth and savings over time, the wealth goal at the target date, and the investor’s attitude toward risk and return. In addition, constraints on the strategy are imposed by the need for *simplicity*, *transparency* and *consistency*.

### *Simplicity*

Although each individual should have a unique investment solution because each is unique in terms of wealth, savings behavior and attitude toward risk, practicality demands one fund, or at most a handful of funds, that will work for almost all investors with a given target date. In designing a fund strategy to meet the needs of such investors, the manager must define a “typical” investor who epitomizes the bulk of the likely investors. We assume this investor is a participant in a defined contribution retirement plan. In this paper we will specify what we see as typical. This information should give investors insight into judging whether this strategy fits their circumstances. Moreover, we will demonstrate how the strategy will work for an investor who is “not typical.” We believe an investor or defined contribution plan sponsor should demand this type of information when evaluating a target-date fund.

### *Transparency*

The need for transparency also constrains the design of target-date strategies. Because target-date funds are long-run strategies meant to be put in place and allowed to run their course, industry convention requires that the basic investment strategy, including the glide path, be specified in advance. Although discretionary management or even pre-specified rules for changing asset allocation in response to market behavior could potentially improve the investment performance of the strategy, this potential is declined for the sake of transparency.

### *Consistency*

The requirements of simplicity and transparency lead to an additional constraint on the design of the glide path—*consistency*. The concept of consistency is that a single glide path must be used for all target dates. That is, the glide path for a 10-year target-date fund started today will be the same as the glide path of the final 10 years of a 40-year fund. The internal logic behind this requirement is that the investment strategy is designed for the same typical investor whether retirement is 10 or 40 years away. This requirement is an industry norm, and we will follow it. It is important to understand, however, that this requirement implies that someone just entering a 10-year target-date fund has spent the past 30 years saving and investing in a way similar to that of the typical investor and has current wealth and future savings plans consistent with that individual. Common sense demands an evaluation of whether the glide path actually works well for someone who is atypical when entering the strategy.

Russell seeks to build funds with target dates out to a maximum of 40 years. Consequently, our typical investor in a 40-year fund must start out 40 years from retirement. We assume the investor starts with no wealth.

### *Modeling uncertainty*

The investor faces uncertainty about asset returns, inflation, and the level of savings on the path to reaching the retirement goals. Moreover, the investor must cope with the difficult question of how much wealth will be needed to fund retirement.

In constructing a glide path, we address this uncertainty. We generate 20,000 scenarios of savings, interest rates, inflation and asset returns and find the glide path that, when averaged over these scenarios, does the best job of balancing the desire to have as much

wealth as possible at retirement against the risk of falling below a wealth target needed to finance a comfortable retirement. The assumed behavior of the returns on equity and bonds as well as inflation is shown in Table 1.

**Table 1**

**Asset Class Return and Inflation Adjustments**

<b>Asset Classes</b>	<b>Expected Return</b>	<b>Standard Deviation</b>	<b>US Equity</b>	<b>Non-US Equity</b>	<b>Fixed Income</b>	<b>Inflation</b>
<b>US Equity</b>	<b>8.9</b>	<b>18.0</b>	<b>1.00</b>			
<b>Non-US Equity</b>	<b>8.9</b>	<b>19.1</b>	<b>0.54</b>	<b>1.00</b>		
<b>Fixed Income</b>	<b>6.3</b>	<b>2.9</b>	<b>0.26</b>	<b>0.21</b>	<b>1.00</b>	
<b>Inflation</b>	<b>3.2</b>	<b>4.0</b>	<b>0.14</b>	<b>0.16</b>	<b>0.64</b>	<b>1.00</b>

*Note: Russell’s methodology for forecasting asset class returns and inflation for the purpose of asset allocation produces forecasts that differ by time horizon. See Steve Murray, “The Russell Forecasting Framework: A Technical Reference,” Russell Research Report (March 2001) for a description of this methodology. The forecasts in Table 1 are Russell forecasts at a 20-year horizon, as of December, 2005.*

*The “equity” portfolio used in the construction of the glide path is a 67%/33% mix of US Equity and Non-US Equity.*

*Investor income*

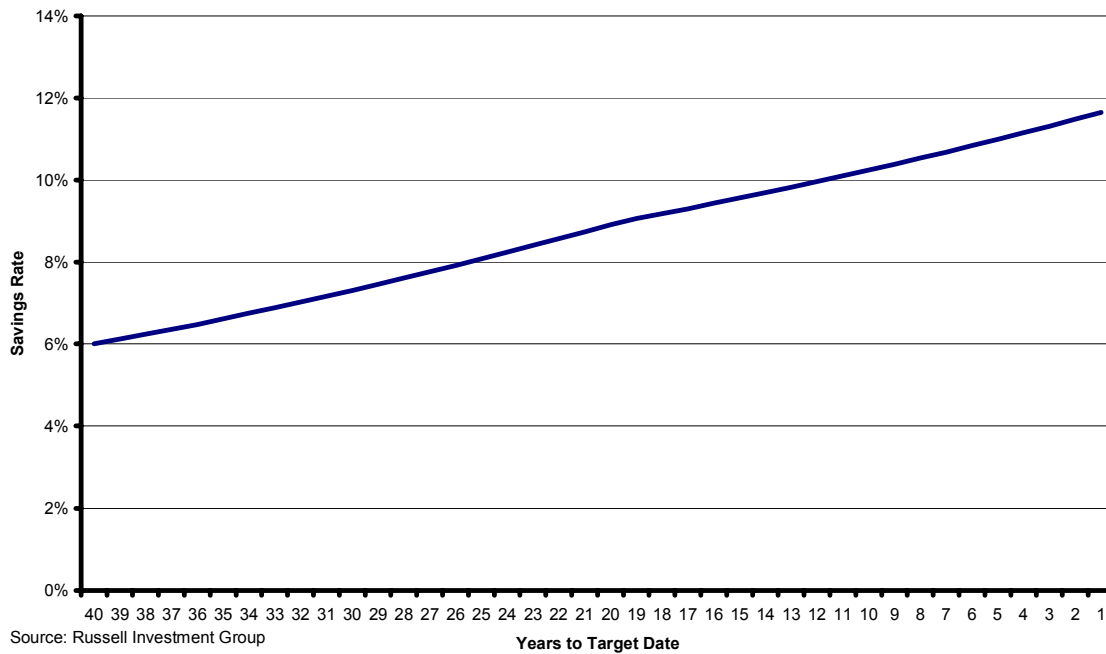
We explicitly model the growth of an investor’s income over a 40-year working life. We assume income, which determines annual savings and target wealth, grows at the rate of inflation plus the rate of real income growth. In our model, inflation is a stochastic variable with a mean of 3.2 percent a year and a standard deviation of 4 percent. The correlation of inflation with the returns of equities and bonds is shown in Table 1. We assume real wages grow at 1.5 percent a year. Because the level of savings and target wealth are both linked to income, the starting level of income has no effect on the glide path. We pick an arbitrary value of \$1,000 a year.

*Savings behavior*

Annual savings are the product of the investor’s income and a savings rate. Our assumed yearly savings rates are shown in Figure 4. These rates represent the recommended individual contributions to a defined contribution plan plus typical company matching policies and are based on Russell research and industry sources.

The pattern is clear. The savings rate for younger workers is low but increases each year. Whereas we assume the savings rate is predictable, we treat savings income as a stochastic variable due to the uncertainty of inflation. Thus the amount of savings each period is a stochastic variable. Our modeling takes account of this uncertainty in savings.

**Figure 4**  
**Savings Behavior**



*Target wealth*

To create a sound investment strategy, we must be clear about the goal. The goal is to have as much wealth as possible at retirement, but to avoid having wealth fall below a target level. What should that target be? The quick answer is “enough to allow the investor to retire comfortably,” but what does that mean? Our definition of the target wealth level is the amount of final wealth it takes to purchase an immediate annuity that replaces a given percentage of the investor’s income in his or her final year of work. This concept can be broken down into its component pieces:

$$Target\ Wealth = Final\ Year\ Income \times Income\ Replacement\ Ratio \times Annuity\ Factor$$

Retirees typically do not need as much income as they did before retirement to maintain their standard of living. They stop saving and do not need to replace that part of their income. Also, taxes decline because they may be living off wealth rather than taxable income. In addition, most retirees in the US will draw Social Security benefits. Because of the way Social Security is structured, the fraction of final-year income replaced by benefits declines as income increases.

Taking these factors into consideration, Aon Consulting and Georgia State University studied replacement rates for a variety of income levels. Based on their research, we use a replacement rate of 42 percent.<sup>4</sup>

<sup>4</sup> See the Aon Consulting/Georgia State University, “Replacement Ratio Study: A Measurement Tool For Retirement Planning,” Aon Consulting (2004) p. 10. The 42% replacement rate corresponds to a pre-retirement income of \$80,000.

How much wealth does the investor need to provide that income? One easily quantifiable answer to that question is that the investor needs enough wealth to purchase an immediate life annuity that delivers that amount of income. The annuity factor is the cost of a one-dollar annuity and thus translates the investor's income target into a wealth target. The value of the annuity factor depends on age, sex, and the level of interest rates. For our modeling purposes, we calculate the annuity factor for a 65-year old male.<sup>5</sup> The interest rate is a stochastic variable generated in our model. Thus each of our 20,000 scenarios has a different target wealth that depends on the investor's final-year income and the level of interest rate that prevails at retirement.

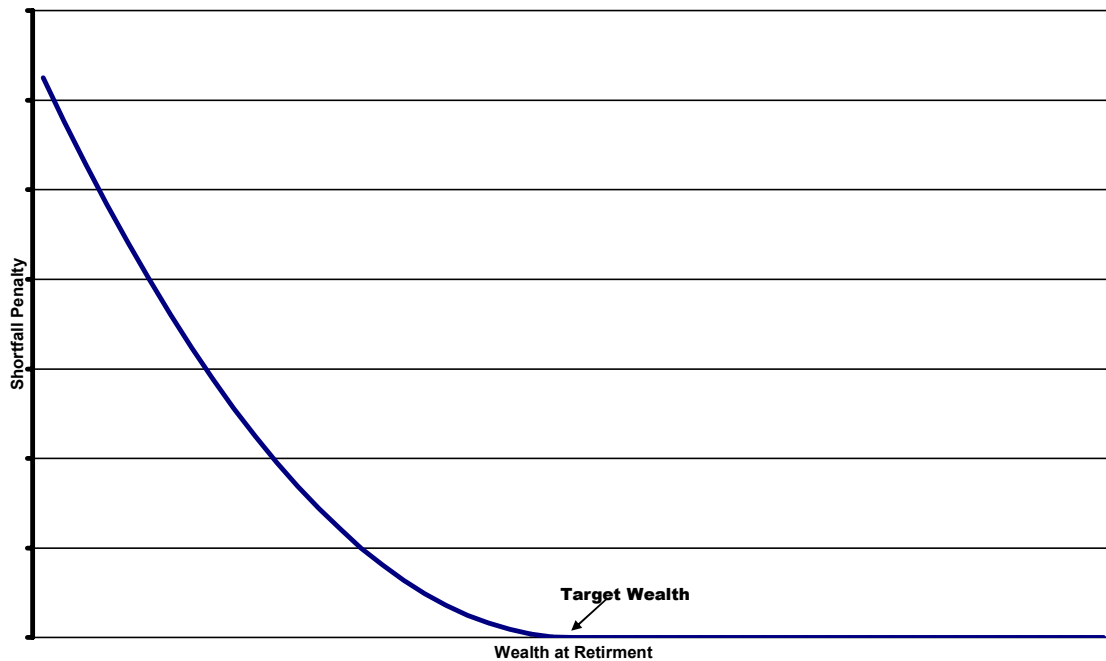
*Attitude toward risk*

In the model we use to construct the glide path, risk is the danger of falling below target wealth at retirement. Our measure of risk is the "shortfall penalty function" shown in Figure 5. The horizontal axis shows wealth at retirement. If wealth at retirement is greater than the target, the penalty is zero. If wealth falls below the target, there is a "shortfall." The greater the shortfall in wealth, the greater the penalty. Moreover, the curvature of the function means the penalty grows in increasing proportion to the shortfall. In other words, if the shortfall doubles, the shortfall penalty more than doubles. This aspect of the shortfall penalty function means that we heavily penalize large shortfalls. In using mathematical optimization to search for the best glide path, we reward candidate paths for producing a high level of wealth at retirement, and we penalize paths for falling below the wealth target.

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<sup>5</sup> The annuity factor varies by age and sex. For a given age, the annuity factor is greater for women than for men. For individuals of the same sex the annuity factor declines with age. The choice of a 65-year old male gives an annuity factor that is in the middle of the range of annuity factors for individuals of both sexes between ages 60 and 70. In that sense it represents the "typical" retiree.

Figure 5  
Shortfall Penalty Function



Source: Russell Investment Group

### Constructing the Glide Path

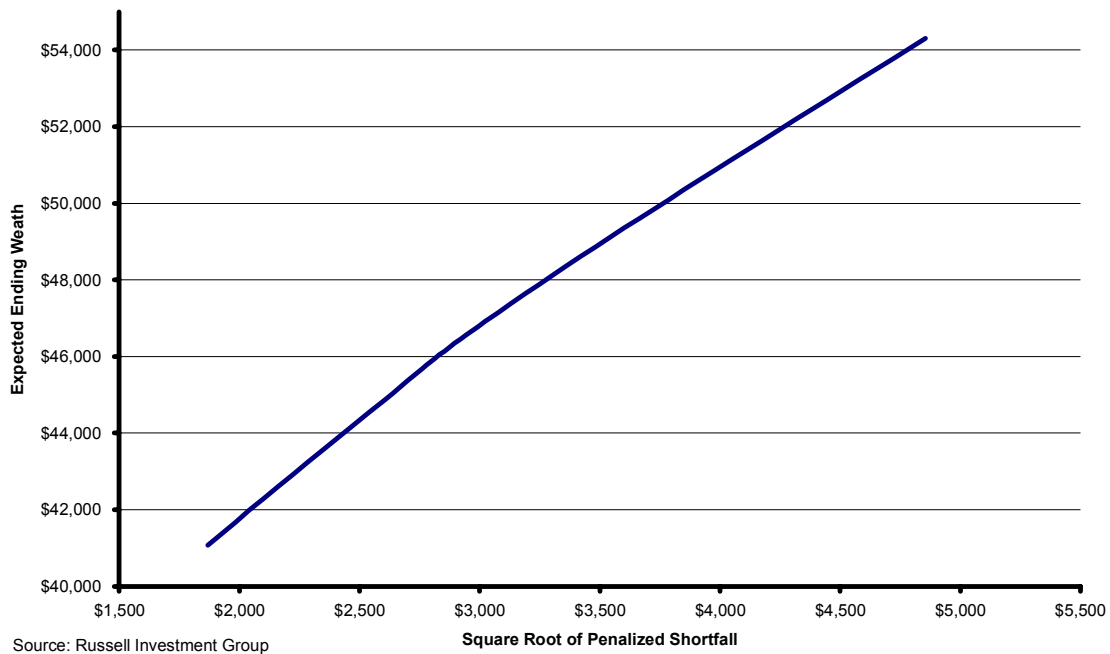
We derive our glide path by finding the mix of equity and bonds in each of the 40 years that maximizes:

$$\text{Expected Value of Wealth at Retirement} - (\text{Risk Aversion Parameter} \times \text{Expected Shortfall Penalty})$$

The size of this risk aversion parameter reflects the investor's attitude about the trade-off between risk and reward. In principle, there is a different optimal glide path for each possible value of this parameter. Thus, in order to decide on a glide path of a typical investor, we must choose this parameter value for a typical investor. Unlike the savings rate and income replacement rate, this parameter cannot be directly observed or estimated from data.

To pick the value of the risk parameter and thus the single glide path from the possibilities on the efficient frontier, we let the marketplace define "typical." First, we find the optimal glide paths for a wide range of values of the risk aversion parameter. Associated with each optimal glide path is an expected ending wealth at retirement and a value of penalized shortfall. We can graph these combinations of expected ending wealth and penalized shortfall to get a sort of efficient frontier of risk (square root of penalized shortfall) and reward (expected ending wealth) that is available with various optimal glide paths. This is shown in Figure 6. Each point represents the expected result of a glide path that is optimal for a particular value of the risk aversion parameter. The dollar amounts shown for expected ending wealth and the square root of penalized shortfall are based on an assumption of a \$1,000 initial income.

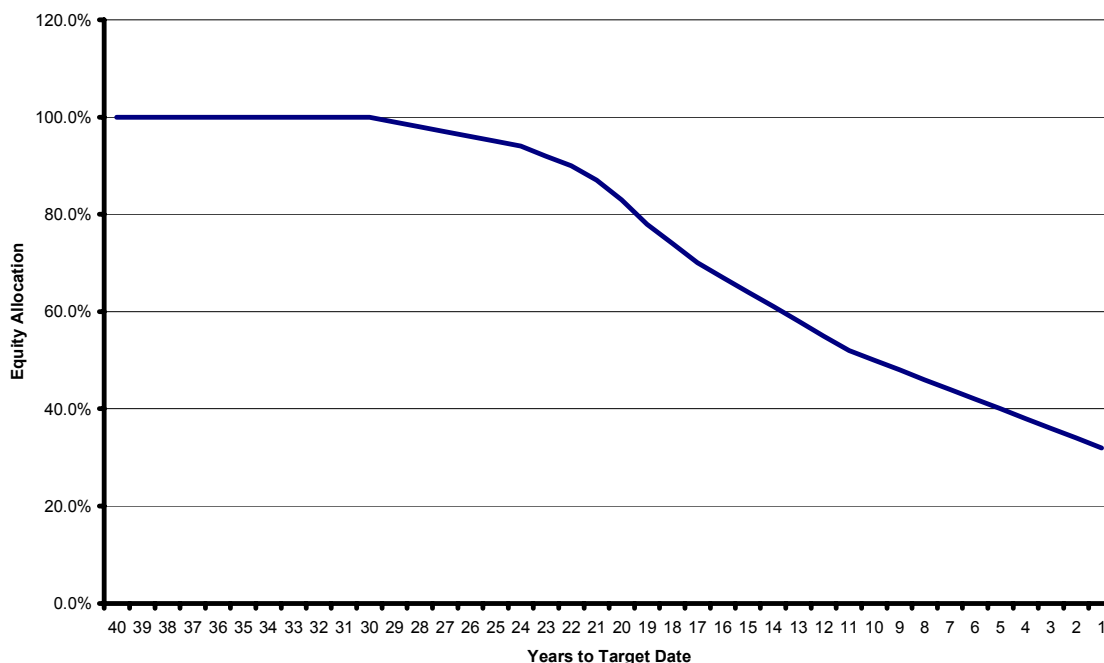
**Figure 6**  
**Efficient Frontier**



Next, we take the glide paths of major providers of target-date funds, simulate their performance using our assumptions regarding savings behavior and our definition of risk, and plot them on the efficient frontier. Since our paths are optimal given our assumptions, these competitor funds will fall on or below the efficient frontier. Not surprisingly, most of them cluster in a fairly narrow range below the efficient frontier. We take this as evidence that a typical investor exists and a competitive marketplace is trying to meet that investor's needs. We choose a point on the efficient frontier that is near this competitive cluster. Thus, at least according to our assumptions, our glide path meets the needs of the typical investor, but does it a little better than the glide paths used by others.

Figure 7 shows our glide path. It has the general shape suggested by the human capital approach. It is aggressive in the early years, maintaining a 100 percent equity allocation through year 11. At retirement, the equity allocation is down to 32 percent. Other Russell research shows this level of equity exposure is consistent with funding lifetime income at the level assumed in the construction of our wealth target. In other words, if the investor meets or exceeds the wealth target, this 32 percent equity portfolio is a prudent portfolio in retirement.

Figure 7  
Russell Target Date Glide Path



Source: Russell Investment Group

### Evaluating the glide path

In evaluating how well this glide path should perform, we need appropriate performance measures. Although conventional performance measures, such as expected return and standard deviation of return, can be calculated under certain assumptions, they provide little useful information for target-date funds. The reason is that these “time-weighted” performance measures are designed to measure how well a strategy does at growing an initial level of wealth over a given time period. By design, they ignore the pattern of cash flows during the investment period. Although this aspect of their design is appropriate for evaluating managers who have no control over cash flows into and out of a portfolio, they ignore the essence of what a target-date fund is supposed to do: manage around an assumed stream of savings to build wealth at the target date. We need performance measures that evaluate a target-date fund in the context of what it is designed to do.

To generate meaningful performance measures that have intuitive appeal and are useful for comparing one fund against another, the best procedure is to specify a typical investor, as we have done above, and then simulate the investment results for a given glide path. We suggest the following measures:

- *The expected value of ending wealth.* This is a fundamental measure of the fund’s ability to build wealth. Its magnitude depends on assumptions about the level of savings. The absolute magnitude of this measure is unimportant for comparisons among funds simulated on the same set of assumptions. For that purpose only the relative size of ending wealth matters. To get an absolute measure that might have meaning to the investor, we can scale by the first year’s income level. For example, our recommended glide path has an expected ending wealth of \$44,800

for each \$1,000 of initial (age 25) income. Thus, an investor who begins saving according to our assumptions at the beginning of the 40-year glide path should expect to have wealth at retirement equal to 44.8 times his or her current income. Adjusted for inflation, expected retirement wealth should be about 12.2 times current income.

- *Probability of failing to achieve the wealth target.* This is the first of two measures of risk. Recall that the wealth target is the cost of an annuity to replace 42 percent of final year income. For our assumptions, the average value of this wealth target is \$30,200 for each \$1,000 of initial income. The probability of not achieving this target wealth is 0.188 for our glide path. In other words, there is less than a 19 percent chance that the investor will not meet the goal of a comfortable retirement.
- *Shortfall measure.* The probability of failing to achieve the wealth target, while informative, is flawed as a risk measure. The reason is clear: under this measure of risk, failing to make the wealth target by \$1 is considered just as bad as failing to make it by \$1,000. Obviously, the first case is not nearly as bad as the second. The measure of risk used to construct our glide path takes the magnitude of failure into account, and so, too, should a performance measure of risk. A well specified measure is the expected shortfall penalty, or its square root, which is used as the risk measure in Figure 6. By design, the square root of the shortfall penalty is expressed in units of dollars. However, this measure has no simple intuitive meaning. An alternative measure of the magnitude of shortfall is its expected value when there is a failure to achieve the wealth target. Note that this is a conditional expected value of shortfall. It is different from the simple expected value of shortfall because it does not average in all the zero values of shortfall that occur in those scenarios where the wealth target is satisfied. Obviously, the smaller this number, the less the risk. For our glide path, this measure of risk is \$4,630, which can be compared with the expected target wealth of \$30,200.

These recommendations on measuring performance have been made in the context of forecasting the future performance of the glide path. However, the concepts also apply to performance evaluation of existing funds over historical time periods. Sensible comparisons of historical fund performance should, of course, take into account the target date. However, even if comparisons are among funds with similar target dates, there can be a serious problem if funds are compared using typical time-weighted returns. The relative performance among funds will be primarily driven by the equity/bond mix. The fact that Fund A has a glide path with more equity than that of Fund B over a period where equity outperforms bonds really says nothing about the relative merits of the glide paths in terms of these investments doing their job of building wealth. The glide path does not reflect a manager's judgment on whether stocks will outperform bonds over a given horizon. It is just an aspect of a predetermined, long-range strategy aimed at building wealth.

In order to evaluate funds in the context of their intended purpose of building wealth, we need some measure of how a fund transforms savings into wealth. One approach is to assume a flow of savings over a period of a few years and then calculate the ending

wealth generated by investing this savings flow into a fund.<sup>6</sup> This approach is not perfect, but it is an improvement over time-weighted return calculations.

Clearly, performance evaluation of target-date funds is a difficult issue. Investors and plan sponsors should consider these difficulties and not jump to conclusions when comparing funds based on historical performance.

### **Providing for the atypical investor**

In order to design a glide path, we need assumptions regarding the savings behavior, the wealth target, and the attitude toward risk of a typical investor. Otherwise, there is no way to quantify the glide path and evaluate its performance. Through the use of the methodology we have described, we can have confidence in a good outcome for the typical investor. But what happens if the investor is atypical? Is our glide path robust enough to provide a good investment solution for a variety of investors with different circumstances?

Probably the most common and important case of an atypical investor is one that is approaching middle age and has saved very little.<sup>7</sup> In our glide path model, we assume a 45-year-old new entrant into a 20-year target-date fund has been saving and investing for the past 20 years in a manner consistent with the first 20 years of our typical investor. If that is the case, the investor has accumulated significant wealth, and picking up in the “middle” of our glide path is the right strategy. However, what if the new entrant has materially less wealth? Will our glide path provide a good investment solution?

This question must be evaluated in realistic terms. A person who has not saved much at age 45 is unlikely to have as much at retirement as someone who has been following a disciplined savings and investment program since age 25. An example will provide some insight. Suppose that the low saver enters year 21 of our glide path with accumulated wealth that is only 60 percent of the expected wealth of the typical investor at that stage of life. As Figure 7 shows, such an investor’s initial equity allocation will be 83 percent and will begin declining significantly each year. If this investor begins to save according to our assumptions, the chance of meeting the fund’s wealth target is 53 percent. The expected shortfall when the target wealth is not achieved is around \$5,060, which can be compared with an expected target wealth of \$29,020.<sup>8</sup>

It is difficult to judge whether this is a good outcome for an investor in these circumstances. The attractiveness of this outcome compared with others available with alternative strategies depends on the investor’s attitude toward risk. An alternative to our glide path is for the low saver to choose a riskier, more aggressive strategy with a high

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<sup>6</sup> An interesting initial attempt in measuring performance this way is described in Mark Labovitz, “Targeting Target Maturity Funds,” Lipper Fund Industry Insight Report (2006).

<sup>7</sup> We use the word “atypical” to designate an investor who does not behave in a manner consistent with the assumptions of our model. Sadly, demographic evidence suggests that this case is all too typical in the US.

<sup>8</sup> This expected target wealth is slightly different from that given earlier for the glide path. The reason for this difference is that in calculating the results for the twenty-year glide path we had to choose a beginning level of income, in effect “resetting” the income path. We chose to reset at the mean value of income at the beginning of the 21<sup>st</sup> year of the 40-year glide path.

equity allocation that lasts for a number of years. For example, suppose the investor chooses an all-equity portfolio and holds it to retirement. The probability of success in meeting the fund's wealth target increases from 53 percent to 57 percent. However, the expected shortfall when the target is not achieved increases from \$5,060 to \$8,100. In sum, increasing investment risk above that implied by our recommended glide path slightly improves the odds of reaching the wealth target but increases the chances of a severe shortfall in retirement wealth.

Another alternative is to focus on our risk measures and follow a strategy that is more conservative than our recommended glide path, in effect accepting that achieving the wealth target is unlikely and trying to protect against a bad retirement outcome. What would such a conservative strategy look like? To answer this question, we designed an optimal target-date strategy specifically for the circumstances of this low saver, using the same risk criteria employed in designing our recommended glide path. This optimal strategy is more conservative, starting with an equity allocation of only 49 percent and ending with an equity allocation of only 8 percent. The probability of meeting the wealth target is only 36 percent, but the expected shortfall when the target is not reached is only \$3,700.

Whether a low saver would prefer one of these alternatives to our recommended glide path depends on the person's willingness to take risk. We can say that our glide path provides a reasonable, middle-of-the-road solution for this atypical investor. It is by no reasonable standard a bad solution for someone in this situation, and this perhaps is the best that reasonably can be hoped for in a "one-size-fits-all" investment solution.

### **From glide path to target-date fund**

Although the overall equity/fixed income mix embodied in the glide path is the single most important factor in determining the success of a target-date fund, other aspects of fund construction are also important. The first of these other aspects is the allocation of the portfolio among the various segments of the equity and bond markets. Sensible risk management and fundamental investment theory require broad diversification across these markets. In particular, the allocation should include exposure to all investable segments of both the U.S. and non-U.S. equity markets. Russell includes explicit exposure to small-cap U.S. stocks, real estate investment trusts, and emerging markets equity through most of the glide path.<sup>9</sup> Likewise, Russell fixed income exposure is broad, including most segments of the U.S. fixed income market. The precise allocation among asset class segments for each point on the glide path is determined using standard portfolio optimization techniques that attempt to give the best risk/reward tradeoff. In addition to constructing the best combination of currently available asset classes, Russell will continue to search for opportunities to extend exposure into other asset classes and additional segments of equity and fixed income markets, and we will add them to the portfolios when they are viable in terms of accessibility and we believe will serve to improve the risk/return characteristics of the portfolios.

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<sup>9</sup> Emerging markets equity is excluded from the asset allocation in the later years of the glide path where the overall allocation is primarily in fixed income and intended to have low volatility.

The second aspect of Russell's portfolio construction is the intelligent use of active management in the asset classes. Russell's target-date funds invest in Russell's actively managed asset class funds. For each of these underlying funds, Russell selects those whom it views as the best-of-breed managers from each category of manager investment style. It then combines these managers to produce fund returns intended to beat passive benchmarks with careful management of additional risk. The incremental return provided by active management – if successful – might have a meaningful impact on wealth at retirement in a long-term investment strategy, such as a target-date fund.

This description of how Russell constructs its target-date funds may sound familiar. These are the same principles used in constructing all of Russell's balanced fund products, called LifePoints® Funds. In fact, Russell's LifePoints Funds, *Target Date Series*, have the same design as our "target risk" LifePoints *Target Portfolio Series* lifestyle funds. That is to say, the target-date portfolio that corresponds to a 60 percent/40 percent equity/fixed income mix on the glide path is identical to the LifePoints target risk portfolio that holds a constant 60 percent/40 percent mix. This consistency means all of our LifePoints products implement our best thinking on portfolio construction.

### **Conclusion**

Target-date funds offer investors simple-to-use investment opportunities yet intelligent mechanisms for funding retirement. They provide them with an investment strategy designed to meet their needs. Although these funds cannot incorporate all of the specifics of an individual's circumstances and desires in the way a customized financial plan can, they do provide a disciplined strategy that should work well in transforming consistent savings into wealth at retirement. Because of their simplicity and sound strategy, target-date funds can be particularly valuable as an option for defined contribution plans. They provide the best solution for investors who lack the knowledge to make complicated investment planning decisions or do not want to take the time to manage their retirement investments.

While target-date funds are attractive in concept, the details of the design and implementation of a fund determine its value as an investment strategy. The most important element of a fund's design is its equity glide path. A well-designed glide path should incorporate reasonable assumptions regarding savings, inflation, and capital market returns as well as a clearly specified investment target. This investment target should be linked in a clear way to the retirement spending needs of the fund owner. Investors and defined contribution plan sponsors should demand to know what assumptions stand behind a glide path. Otherwise, they are buying a retirement savings black box that may be unsuitable for them or perhaps one that is flawed in its basic design. In addition to a well designed glide path, a target-date fund should have diversification across asset classes and sensible management within the asset classes.

Although success cannot be guaranteed, Russell's target-date funds combine all of the elements that have historically produced a successful investment for retirement.

***For more information, please contact Russell Retirement Services at 888-751-8355.***

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## About Russell

For more than 30 years, Russell Investment Group has been assisting many of the world's largest pools of capital in structuring multiple-manager portfolios in an effort to deliver consistent performance, manage risk, and manage cost.

Clients trust Russell to guide the investment of \$2.4 trillion<sup>1</sup> globally, including management of \$171 billion<sup>2</sup> in assets invested in our multi-manager programs in both traditional and alternative investments. Our consulting heritage helps us leverage the knowledge and experience gained from working with some of the world's most sophisticated investors.

### Simple Retirement Options and Experienced Investment Management

Providing defined contribution plan participants with an investment program to help them save for a comfortable retirement is a weighty responsibility. Russell's LifePoints® Funds are lifestyle funds that offer highly diversified portfolios among a variety of institutional quality money managers. These funds can be offered to participants based on personal risk tolerances (*Target Portfolio Series*) or date of retirement (*Target Date Series*). These funds can form the foundation of a retirement program that seeks to manage risk and provide consistent returns for participants, helping them to achieve their retirement goals. Russell's approach implements manager selection and diversification structures similar to those recommended to our consulting clients.

*Fund objectives, risks, charges and expenses should be carefully considered before investing. A prospectus containing this and other important information can be obtained by calling 800-787-7354 or visiting [www.russell.com](http://www.russell.com). Please read the prospectus carefully before investing.*

Diversification and strategic asset allocation do not assure profit or protect against loss in declining markets.

The LifePoints® Funds are exposed to the risks of the underlying fund proportionately to their underlying fund allocation. Investment in LifePoints® Funds involves direct and indirect expenses which together can be higher than those incurred when investing directly in an underlying fund. Currently, direct operating expenses, other than distribution fees, shareholder servicing fees and non-recurring and extraordinary expenses, are waived or reimbursed by Russell Investment Management Company.

Each of the LifePoints® Funds invests its assets in shares of a number of underlying Russell Investment Company Funds and may in the future invest in other funds which are not currently underlying funds. From time to time, Russell Investment Management Company expects to modify the target asset allocation for any fund and/or the underlying funds in which a fund invests. Each Target Portfolio Series fund expects the amount it allocates to each underlying fund will generally vary only within 10% of the ranges specified. The assets allocated to the underlying funds of each Target Date Series fund will become conservative over time and is based solely on time horizon.

Please remember that all investments carry some level of risk, including the potential loss of principal invested. They do not typically grow at an even rate of return and may experience negative growth. As with any type of portfolio structuring, attempting to reduce risk and increase return could, at certain times, unintentionally reduce returns.

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While at Duke for most of the 1980s, Grant was responsible for conducting research and teaching undergraduate, M.B.A., and executive education courses in macroeconomics, international economics, international financial management, international business and corporate finance.

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Yuan-An has published widely in his field of expertise and has presented numerous papers at technical meetings and conferences. Among his recent work is, "Protecting National Resources," co-authored with S. Murray and published in the *Foundation News & Commentary*, July/August 2005.