AN ISSUE IN BRIEF
CENTER FOR RETIREMENT RESEARCH AT BOSTON COLLEGE

May 2006, Number 47

LEARNING BY TEACHING

By Steven Sass, Francis Vitagliano, and Luke Delorme*

Introduction

A wise old colleague once quipped that the teacher is the only one who ever learns anything in a classroom. We hope this isn't so with the retirement-education game we recently developed. That is, we hope those who play the game actually learn something. But the punch line of the quip certainly turned out to be true. We were surprised to find how much we learned about the retirement planning process in putting the game together.

The game — Get Rich Slow — is not a financial planning tool. It's an educational program designed for married women, who have unique retirement income problems. Such women generally live longer than their husbands, have smaller Social Security and employer pension benefits, and are rarely comfortable making financial decisions. Our objective is to give women an overview of the retirement planning process and the challenges they face, and the confidence and motivation needed to become actively engaged in retirement planning.

Get Rich Slow is designed to be played in a group setting with an experienced moderator, which reduces defensiveness and opens participants to new ideas and perspectives. In the game, the group meets a fictional couple — Sally and her husband Norm — when Sally is 45. They meet them again at 55, at retirement (either 62 or 64), 75, and 85. The group makes decisions for Sally and Norm at the first four ages and experiences the implications of its decisions — and chance events like stock market booms and busts, job loss, and health shocks — at the subsequent age. The primary chance event is a spin of "the wheel of fortune," which results in Sally and Norm experiencing the investment outcomes of one of seven historical decades, from the 1930s to the 1990s.

Lessons Learned

So what did we learn? Some of the "insights" below seem rather obvious once put down on paper. But they were not when we first approached the game design. And they now seem quite significant in the retirement planning process.

Extraordinary Variability of Investment Returns

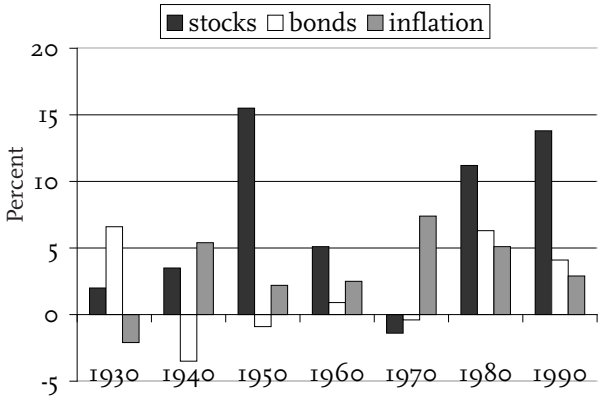
As mentioned above, we model investment returns by spinning "the wheel of fortune" and giving participants the investment experience of one of the seven complete historical decades for which we have annual data. We did this for educational purposes. We could not expect participants to comprehend the standard statistical measures of investment returns (means and variances, both geometric and arithmetic) and a Monte Carlo process. But they would know of the Depression of the 1930s, stagflation in the 1970s, and the booms of the 1950s, '80s, and '90s.

Download the game at:
www.bc.edu/crr/grs_game.cgi

* The authors are all with the Center for Retirement Research at Boston College. Steven Sass is Associate Director for Research. Francis Vitagliano is a visiting scholar. And Luke Delorme is a research associate. The game, Get Rich Slow, was developed with the Educational Technology Center at Northeastern University and funded with a grant from the NASD Investor Education Foundation.

Going into the game, we knew that the long-term real return on equities was about 6.5 percent and about 2 percent on bonds, and that the market had some pretty good and some pretty bad runs. But we were surprised to find that the real returns on stocks *and* bonds varied dramatically among the seven decades — even though each was a significant portion of the entire known investment experience (see Figure 1). Equity returns were dismal in the '30s, '40s and great in the '50s, '80s, and '90s; bond returns were bad in the '40s, '50s, and '70s and great in the '30s, '80s, and '90s. Only one decade approximated the long-term "normal" experience — the 1960s. The standard deviation of annual real equity returns approaches 20 percentage points. The variance of returns among the seven decades brought home the meaning of that statistic.

Figure 1. Real Investment Returns and Inflation by Decade, 1930s-1990s

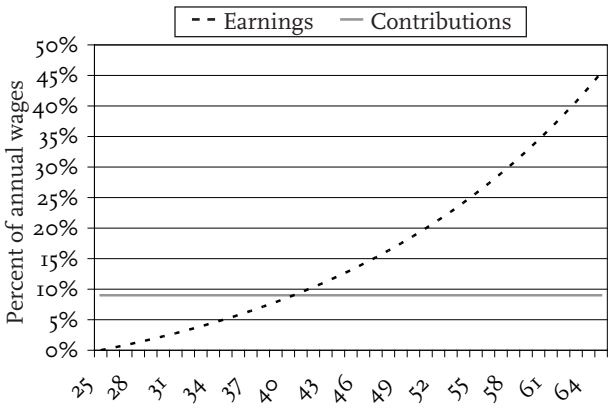


Source: Authors' calculations based on Ibbotson Associates (2003). Based on copyrighted works by Ibbotson and Sinquefield. All rights reserved. Used with permission.

Dominant Role of Contributions in Early Years of Accumulation Phase

In one pass through the game, we spun the wheel after making our age 45 allocations and got the 1930s. We expected disaster! But to our surprise, the balances at age 55 were not that far off from what was projected, at age 45, using long-run expected rates of return. Upon consideration, we realized what had happened. Because Sally and Norm had not accumulated that much wealth, the returns on that wealth were overshadowed — in terms of the growth of their 401(k) balances — by their annual contributions (see Figure 2).

Figure 2. Inflows to a Hypothetical 401(k) Plan, by Age



Source: Authors' calculations.
Note: This simple illustration uses the following assumptions: constant earnings, a 9 percent contribution rate, and a real return of 4.6 percent on a balanced portfolio. At age 65, the 401(k) asset in this hypothetical example is 10 times annual wages.

Critical Role of Work Decisions at End of Accumulation Phase

Norm and Sally had two (rational) options when they approached retirement with clearly insufficient 401(k) balances. They could increase their contributions (at age 55). Or they could choose to work longer (at age 55 and at "retirement"). Playing the game clearly showed that working longer had by far the greater impact. At this stage of the game, Norm and Sally's 401(k) balances were a multiple of their annual earnings. So even if Norm and Sally sharply increased their contributions, say by a full 10 percent of earnings, the effect on their retirement wealth would be modest. But working longer had three important effects. It shortened the period they would live off their assets, it allowed their assets to generate more investment income, and it increased the amount of their monthly Social Security benefit.

Importance of Taxes

When Sally and Norm were faced with paying for their son Michael's college expenses, in the age 45 module, they were given three choices. They could stop their 401(k) contributions for a few years, refinance their home mortgage and extend its duration, or require Michael to take out a loan. When we played the game, we typically extended the mortgage. We

were doting parents, and refinancing the mortgage was better than forgoing 401(k) contributions, as the latter gave up the employer match. And Norm and Sally were building up assets inside the 401(k) that could be used to pay off the mortgage. (Most participants in our focus groups, by contrast, had Michael go into debt!) To simplify the game, we wanted to pay off the mortgage when Sally retired using 401(k) assets. But not so fast! Taxes had to be paid on those assets when they left the 401(k), before they could be used to pay off the mortgage.[2] At age 64, Sally needed about $75,000 in 401(k) assets to pay off a mortgage balance of about $50,000. When comparing apples to apples, taxes add a few worms.

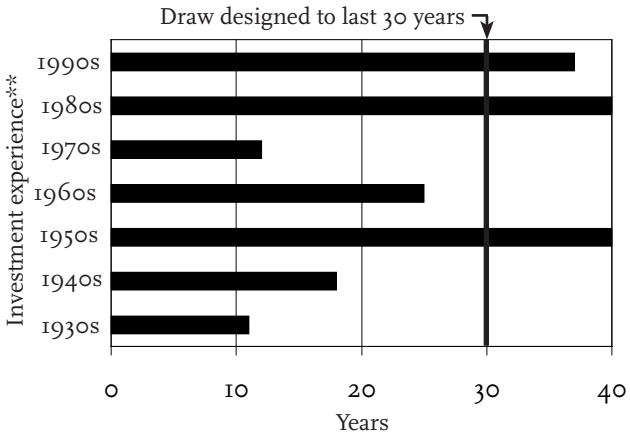
Importance of Administrative Expenses

We developed the game sequentially, building the module for age 45 before proceeding to the age 55 module, and so on. In the first two modules, we credited Norm and Sally's balances with the historical rates of return on equities and bonds, for whichever decade they got. When we reached retirement, we added an annuity option for the drawdown. And we used actual Internet quotes for the annuity payout. At some point we realized that there was something wrong here. Annuities have an expense charge, which we knew to be an important factor in their popularity (or lack thereof) in the marketplace. But securities investments also have administrative expenses. So we were comparing real-world annuity apples to fictional security oranges. So we reduced the investment returns on stocks and bonds by reasonable expense ratios of stock and bond mutual funds — 100 basis points for stocks and 50 basis points for bonds. This exercise taught us to use returns net of expenses when modeling 401(k) plans.

Riskiness of Equities in the Drawdown

The game requires Sally and Norm to keep some of their 401(k) assets in stocks when they make their drawdown decisions at retirement. The stock portfolio is then drawn down over thirty years, with the amount calculated as a 30-year drawdown using the expected rate of return on equities (6 percent after expenses). But given this steady drawdown, the spin of the wheel resulted in dramatically different balances at age 75. There are seven different decades, and two different retirement ages for Sally (62 or 64), resulting in fourteen potential outcomes. Of these fourteen outcomes, three completely exhaust the stock portfolio by age 75, and in another the portfolio would be gone by age 76 (see Figure 3). On the other hand, five outcomes actually give Norm and Sally a balance at age 75 so large that the projected returns (at 6 percent) exceed their annual withdrawal. If they realize those returns (without variation), they will never exhaust their assets! But with two-thirds of the outcomes flying off the page (one-third crash-and-burn and one-third in Nirvana), drawing down a stock portfolio in retirement is clearly risky business.

Figure 3. How Long a Steady Draw From an Equity Fund Would Last*



Source: Authors' calculations.
* The steady draw, equal to 7.2% of the initial value of the equity fund, is calculated using a steady 6 percent net return on equities — a 7% real return less 100 basis points in administrative expenses — and a 30 year drawdown period.
** In each illustration, investment returns are the historical returns on equities from the first year of each decade, less 100 basis points for administrative expenses, for the first 13 years and a steady 6 percent thereafter.

Implications of Delaying Social Security Receipt

When Sally retires, at 62 or 64, she has the option to work part-time to 68, delay claiming Social Security to that age, and then collect a higher benefit. As women have a longer life expectancy than men, and Social Security benefits are actuarially adjusted on a unisex basis, we instinctively assumed that such a delay would increase Sally's lifetime benefits. Not so. Like most married women, Sally is younger than her husband and has a lower earned benefit, even if she puts off claiming. So when Norm dies at the age of 80 — when Sally turns 78 — she gets Norm's higher benefit, in place of her own, as his survivor. For the

remainder of her life, her Social Security income is the same whether she claimed at 62, 64, or 68.[3] Norm's expected longevity, not Sally's, is thus the key in evaluating the effect of a delay on Sally's lifetime benefits.

It is important to note that working longer significantly increases Norm and Sally's income. While Sally is working they get her earnings, which are about the same as her early retirement benefit. And from age 68 until Norm dies they get a Social Security benefit which is 35 to 55 percent higher than that early retirement benefit.

Importance of Home Equity at End of Retirement

Before developing the game, we knew that home equity was an important part of retirement assets.[4] But the game taught us exactly how important home equity could be, especially for women who outlive their husbands. When Norm dies, Sally gets his Social Security benefit, which is somewhat greater than her own, but forfeits her own. So the *household's* Social Security benefits are nearly cut in half. The standard rule of thumb, however, says that Sally needs about seventy percent to live as well alone as she did when Norm was alive. Norm also had a small defined benefit pension. But inflation has eroded its value; and Sally now only gets half as a survivor benefit. Sally's financial assets are already committed. So she has only her house in reserve.

Norm and Sally could have accessed their home equity when she is 75, either by downsizing or by taking out a reverse mortgage. If they stood pat, we have Sally selling her house and buying a condominium when Norm dies, at age 78, releasing $120,000 to be invested in the same manner as her current asset allocation and drawn down over the remaining drawdown period. This adds about $10,000 per year to Sally's income, a substantial portion of the amount she needs to maintain her pre-retirement standard of living — about $60,000.

Challenge of Widowhood

We knew before we developed the game that older widows face a substantial risk of outliving their assets and ending their lives with little more than their Social Security benefits. Indeed, we designed the game to mitigate this risk. In drawing down the couple's assets, we offered only an annuity (with a 100 percent survivor benefit) or a drawdown of stocks or bonds based on a thirty year period of projected asset returns. We also took inflation off the table, by using real returns and eliminating inflation risk. And we made sure that Sally accessed her home equity at the end of her life. Nevertheless, she generally could not maintain her pre-retirement standard of living. And she was not assured a "modestly comfortable" income should she live into her 90s. The lesson driven home is the importance of long-term planning and the difficulty, even then, of avoiding significant financial risks at the end of one's life — when one is least able to respond to those risks.

Conclusion

Developing Get Rich Slow highlighted aspects of retirement planning that are often submerged in standard analytical approaches. Risk becomes palpable when the game draws you down just *one* Monte Carlo path — and a path has just a handful of rolls of the dice. The importance of sequence also emerges. Not just the sequence that draws us down a particular Monte Carlo path, but how the significance of decisions and events changes as we age. Early on, saving decisions dominate. At the work-retirement divide, work and drawdown decisions are critical. External events — specifically investment returns and health — also become far more significant as we age.

The importance of risk and sequence underlines the need for some degree of active retirement planning. Decisions made when young are ineffective when old; decisions appropriate in good times are inappropriate in bad times. So the passive inertia that researchers find typifies retirement "planning" is fraught with danger. The recognition of this inertia has led to the current vogue for defaults, such as life-cycle funds and opt-out 401(k)s. But there won't be defaults that address all our important decisions. The game underlines the need for people to make important decisions themselves. In the age of 401(k)s and diminished Social Security, financial education cannot be limited to facts, figures, and spreadsheet models. It must also prepare people to *take* the decisions needed to provide for a secure and comfortable retirement.

Endnotes

1 For a full discussion of taxation and the valuation of retirement assets, see Poterba (2004).

2 For further details on the impact of claiming Social Security benefits at specific ages, see Munnell and Soto (2005a).

3 For an analysis of how much housing contributes to retirement resources, see Munnell and Soto (2005b).

References

Ibbotson Associates. 2003. *Stocks, Bonds, Bills, and Inflation*. 2003 Yearbook. Chicago: Ibbotson Associates.

Munnell, Alicia H. and Mauricio Soto. 2005a. "Why Do Women Claim Social Security Benefits So Early?" *Issue in Brief* #35. Chestnut Hill, MA: Center for Retirement Research at Boston College.

Munnell, Alicia H. and Mauricio Soto. 2005b. "The House and Living Standards in Retirement" *Issue in Brief* #39. Chestnut Hill, MA: Center for Retirement Research at Boston College.

Poterba, James. 2004. "Saving for Retirement: Taxes Matter." *Issue in Brief* #17. Chestnut Hill, MA: Center for Retirement Research at Boston College.

AN ISSUE IN BRIEF
CENTER FOR
RETIREMENT
RESEARCH
AT BOSTON COLLEGE

About the Center

The Center for Retirement Research at Boston College was established in 1998 through a grant from the Social Security Administration. The Center's mission is to produce first-class research and forge a strong link between the academic community and decision makers in the public and private sectors around an issue of critical importance to the nation's future. To achieve this mission, the Center sponsors a wide variety of research projects, transmits new findings to a broad audience, trains new scholars, and broadens access to valuable data sources. Since its inception, the Center has established a reputation as an authoritative source of information on all major aspects of the retirement income debate.

Affiliated Institutions

American Enterprise Institute
The Brookings Institution
Center for Strategic and International Studies
Massachusetts Institute of Technology
Syracuse University
Urban Institute

Contact Information

Center for Retirement Research
Boston College
Fulton Hall 550
Chestnut Hill, MA 02467-3808
Phone: (617) 552-1762
Fax: (617) 552-0191
E-mail: crr@bc.edu
Website: http://www.bc.edu/crr

GET RICH SLOW *was developed by the Center for Retirement Research at Boston College and the Educational Technology Center at Northeastern University and funded with a grant from the NASD Investor Education Foundation.*

The research reported herein was pursuant to a grant from the NASD Investor Education Foundation. The findings and conclusions expressed are solely those of the authors and do not represent the views of the NASD Investor Education Foundation or the Center for Retirement Research at Boston College.