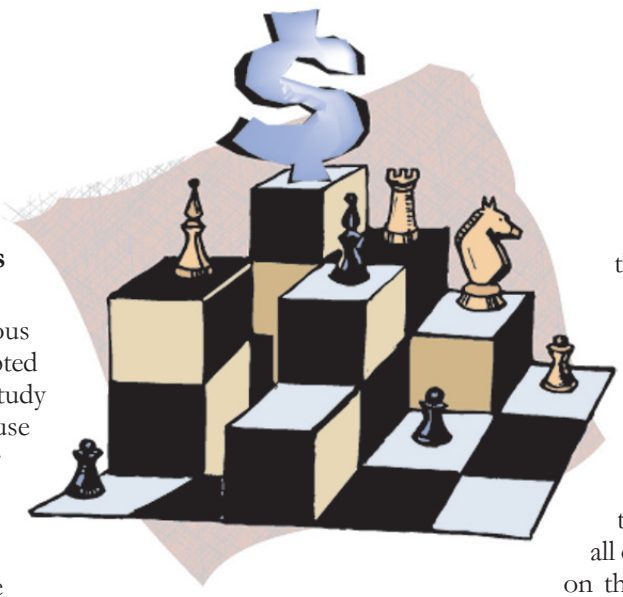
Will Your Savings Last? What the Withdrawal Rate Studies Show

By William Reichenstein



What is a safe withdrawal rate from a retiree's portfolio?

That's the question numerous withdrawal rate studies have attempted to answer, ever since the first study came out in 1994, to much applause by investors living off of their retirement savings.

Typically, these studies seek to determine the maximum "safe" withdrawal rate—the percentage of an investor's portfolio that can be withdrawn in the first year, assuming that in subsequent years that amount is increased by inflation, and that the investor wants to be reasonably confident that their portfolio will not run out of money within his or her lifetime.

Determining the withdrawal rate is a tricky balancing act. If withdrawals begin with an initial rate that is too large, the investor will have an unacceptably large shortfall risk, which is defined as the probability of running out of money within the investor's lifetime. However, if withdrawals are too little, the investor's lifestyle will be below where it could be.

For investors living off of their retirement savings, there may be no more important question in retirement planning. And most investors want a definitive answer—i.e., "you will be absolutely safe if you limit withdrawals to x% of the initial portfolio."

How much can investors rely on these studies for a truly definitive answer?

Withdrawal rate studies using four research methods reach similar conclusions, and that seems to suggest that a definitive answer is possible.

This article first reviews two of these studies as examples of what they show.

The article then outlines important lessons you can learn from the numerous withdrawal rate studies that have been conducted. It also discusses the implicit assumptions, as well as the limitations of all of these studies. If you are relying on the studies to help you determine your withdrawal rate, you need to set your initial withdrawal rate with an appreciation for the limitations and assumptions used in the studies.

Perhaps the major lesson is that nothing in life is guaranteed. In short, be prepared to adjust future withdrawals as necessary.

What Two Studies Show

The first study was "Retirement Savings: Choosing a Withdrawal Rate That Is Sustainable," by Philip L. Cooley, Carl M. Hubbard, and Daniel T. Walz, and it appeared in the February 1998 issue of the *AAII Journal* [available at AAII.com]. They relied on actual historical stock, bond and cash returns to guide their recommendations for an initial withdrawal rate.

The study considered withdrawal rates from 3% to 12%, payout periods of 15, 20, 25, and 30 years, and asset allocations of 100% stocks, 75% stocks and 25% bonds, 50% stocks and 50% bonds, 25% stocks and 75% bonds, and 100% bonds. S&P 500 returns were used for stocks and Ibbotson

Table 1. Portfolio Success Rates*: 1926 to 1995

Percent of simulations in which the portfolio was able to support all payouts and not run out of money prematurely.

	Annual Withdrawal Rate as (%) of Initial Portfolio Value						
	4%	5%	6%	7%	8%	9%	10%
Period	100% U.S. Stocks						
15 yrs	100	100	91	79	70	63	55
20 yrs	100	88	75	63	53	43	33
25 yrs	100	87	70	59	46	35	30
30 yrs	95	85	68	59	41	34	34
Period	75% U.S. Stocks/25% Bonds						
15 yrs	100	100	95	82	68	64	46
20 yrs	100	90	75	61	51	37	27
25 yrs	100	85	65	50	37	30	22
30 yrs	98	83	68	49	34	22	7
Period	50% U.S. Stocks/50% Bonds						
15 yrs	100	100	93	79	64	50	32
20 yrs	100	90	75	55	33	22	10
25 yrs	100	80	57	37	20	7	0
30 yrs	95	76	51	17	5	0	0
Period	25% U.S. Stocks/75% Bonds						
15 yrs	100	100	89	70	50	32	18
20 yrs	100	82	47	31	16	8	4
25 yrs	93	48	24	15	4	2	0
30 yrs	71	27	20	5	0	0	0
Period	100% Bonds						
15 yrs	100	100	71	39	21	18	16
20 yrs	90	47	20	14	12	10	2
25 yrs	46	17	15	11	2	0	0
30 yrs	20	17	12	0	0	0	0

** Assumes inflation-adjusted withdrawals in subsequent years.*
Source: "Retirement Savings: Choosing a Withdrawal Rate That Is Sustainable," by Philip L. Cooley, Carl M. Hubbard, and Daniel T. Walz, AAII Journal, *February 1998.*

Associates' high-grade corporate bond returns for bonds, and there were no adjustments for taxes, expense ratios or other transaction costs.

Table 1 is a summary of their results. Consider someone who maintained a 50% stocks and 50% bonds asset mix and withdrew 4% of the portfolio in the first year and an inflation-adjusted equivalent amount each year thereafter for 30 years. The study shows the percentage of historical 30-year periods that this withdrawal portfolio would have survived without running out of money, based on actual returns from 1926 to 1995.

Over this time period, there were 41 thirty-year periods, with the first being 1926–1955, the second 1927-1956, and the last 1966–1995. This particular portfolio (a 4% initial withdrawal and a 50/50 stock/bond allocation), survived 95% of the 30-year periods; that is, the shortfall risk was 5%. (Note, however, if the study was updated through 2007, this 30-year shortfall risk would be higher, probably closer to 10%.)

The second study, "Guidelines for Withdrawal Rates and Portfolio Safety During Retirement," by John J. Spitzer, Jeffrey C. Strieter, and Sandeep Singh, appeared in the October 2007 issue of the Journal of Financial Planning [www.fpanet.org].

This study used a different approach to determine shortfall risks. It considered 71 separate withdrawal rates including 2%, 2.1%, 2.2% and so on up to 9%; and 21 separate asset allocations from 100% stocks, 95% stocks and 5% bonds, and so on up to 100% bonds. The study only considered a 30-year payout period, and it used S&P 500 returns for stocks and Ibbotson Associates' intermediate-term government bond returns for bonds. There were no adjustments for taxes, expense ratios or other transaction costs.

The results are summarized in Figure 1.

Let's again consider someone who maintained a 50% stocks and 50% bonds asset mix and withdrew 4% of the portfolio in the first year and an inflation-adjusted equivalent amount each year thereafter for 30 years. Under this study, the shortfall risk was calculated by determining the percent of "simulated" 30-year return periods that this portfolio would have run out of funds. The simulated returns were determined by randomly selecting 30 one-year real returns from 1926–2005 for each 30-year period; a total of 10,000 separate 30-year sequences of returns were calculated. The shortfall risk (referred to as "runout risk" in the figure) is estimated as the percentage of the 10,000 simulated 30-year returns that the 50%/50% portfolio with the 4% initial withdrawal rate would have run out of money, which Figure 1 indicates is around 6%.

Lessons From the Studies

Let's first take a look at the often-used rule of thumb that is derived from withdrawal rate studies; then we'll move on to the wider lessons these studies provide.

Rule of Thumb

Based on withdrawal rate studies, including the two cited above, this rule of thumb is widely quoted: Assuming an asset allocation of at least 50% stocks, a retiree who withdraws 4% of the portfolio in the initial year and an inflation-adjusted equivalent amount each year thereafter has about a 90% to 95% probability that the portfolio will last at least 30 years.

In short, a 4% withdrawal rate is a rule of thumb reasonably "safe" withdrawal rate.

The Sequence of Returns Matters

One lesson from the studies is that it is not only the average return that matters, but also the sequence of returns. A portfolio will last much longer if returns are strong in the early years and poor in later years than vice versa.

When using historical rolling period returns, as in the first study, shortfall risk—that is, where a retiree's portfolio failed to last the given time period—occurred almost exclusively when the individual began withdrawals shortly before a period of particularly poor returns, such as around 1930 or 1973. Consequently, some studies test withdrawal strategies by examining how they would have performed if withdrawals began before the 1973–1974 bear market when real stock returns were similar to those in the 2000–2002 bear market. This implies that individuals who retired in early 2000 (and have not lowered their withdrawals) are at greater risk of depleting their portfolios during their lifetimes.

This sequence-of-returns risk can be good news for individuals who are fortunate enough to experience above-average returns in their early retirement years.

Suppose someone retires at age 65 with a $1 million portfolio and plans to withdraw an inflation-adjusted $40,000 per year for the rest of his life. After say five years, this original plan may suggest a $45,300 withdrawal. However, if returns have been strong and the portfolio is now worth $1.3 million then he might increase his withdrawal to $52,000, that is, 4% of $1.3 million. Ten years after retirement, the retiree might increase withdrawals to 5% of the portfolio's value.

Table 1 should help individuals estimate "safe" withdrawal rates for horizons shorter than 30 years. Obviously, retirees who aggressively increase withdrawals should be prepared to reduce real withdrawal amounts after a severe bear market.

Selection of Withdrawal Rate

The studies, as exemplified by Table 1 and Figure 1, contain a much richer array of information than is summarized by the rule of thumb.

The table and figure both provide an indication of the trade-offs among withdrawal rates, shortfall risk, and asset allocation.

For an investment horizon of 30 years, a 3% withdrawal rate seems "safe," while withdrawal rates of 7% and higher have unacceptably large levels of shortfall risk. For withdrawal rates between 3% and 7%, it is important to look at the relationship between the level of shortfall risk and target asset allocation.

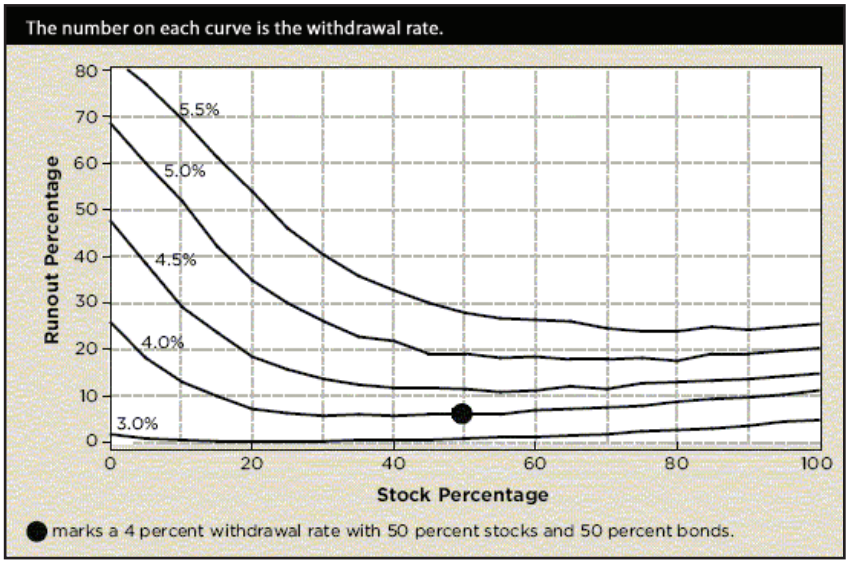
Selection of Shortfall Risk

Some individuals may select a withdrawal rate associated with a "low" level of shortfall risk such as 10%, while others may feel comfortable accepting a higher level of shortfall risk.

Let's assume you were comfortable choosing a withdrawal rate that has a 10% shortfall risk. To put a 10% shortfall risk in perspective, there is about a 20% chance that at least one member of a 65-year-old couple will be alive in 30 years (this is suggested by actuarial tables) and a 10% chance that the portfolio will be exhausted after 30 years (based on the withdrawal rate you selected). So, there is only about a 2% chance (0.20 × 0.10) that at least one partner will be alive and the portfolio exhausted in 30 years. Thus a 10% shortfall risk is not the same thing as a 10% chance that the individual or couple will run out of money during their lifetime.

Some individuals may be comfortable selecting a withdrawal rate and asset allocation that produces a 25% shortfall risk. That may be acceptable, especially

Figure 1. Shortfall Risk (Runout Percentage) at Various Withdrawal Rates



Source: "Guidelines for Withdrawal Rates and Portfolio Safety During Retirement," by John J. Spitzer, Jeffrey C. Strieter, and Sandeep Singh, Journal of Financial Planning, October 2007.

if they are willing to adjust spending if returns prove disappointing.

The selection of shortfall risk should vary with the retiree's ability and willingness to reduce withdrawals if returns prove disappointing.

Asset Allocation

There are three lessons related to the choice of asset allocation.

First, the withdrawal rate literature suggests that the target asset allocation should include no less than 50% stocks and perhaps should be as high as 75% stocks. For example, in Table 1 with a 30-year horizon and 4% withdrawal rate, the shortfall risk is lowest with a 75% stocks and 25% bonds portfolio.

Based on asset allocations of life cycle funds, professional investors encourage new retirees to have between 50% and 60% stock allocations, with this stock allocation decreasing reasonably quickly through retirement (see "Choosing the Right Mix: Lessons From Life Cycle Funds," by William W. Jennings and William Reichenstein in the January 2007 *AAII Journal*; available at AAII.com). In contrast, the withdrawal rate studies usually assume a constant asset allocation throughout retirement.

Many retirees may find it difficult to tolerate the risk associated with a 50% to 75% stock allocation throughout retirement. To understand why this literature suggests a heavy stock allocation, understand that shortfall risk is primarily a concern to the long-lived. Individuals who only live a few years in retirement have minimal risk of outliving their financial resources.

Based on historical returns, this literature indicates that portfolios with heavy stock exposures are more likely to survive a long retirement period than portfolios with heavy bond exposures. Retirees who select a heavy stock allocation to minimize shortfall risk will have to tolerate more volatile portfolio returns—that is, retirees who select a heavy stock allocation for the promise of stocks' higher long-run returns must be willing to bear higher short-term volatility.

Second, a few studies (not illustrated here) asked whether the sustainable withdrawal rate could be increased by adding other asset classes to the portfolio. These asset classes may include U.S. small-cap stocks, international stocks, and commodities.

My interpretation of the evidence is that it is wise to hold a portfolio that includes small-cap through large-cap U.S. stocks, international stocks, and U.S. bonds, and perhaps a small exposure to other asset classes such as commodities. However, sustainable withdrawal rates looking forward from portfolios that include more asset classes are not likely to be substantially higher than the sustainable withdrawal rates from portfolios containing only U.S. large-cap stocks and bonds. In short, don't look to asset allocation to help increase your withdrawal rate above the levels shown to be "safe" in the studies reviewed here.

The third lesson relating to the selection of the target asset allocation comes from the second study illustrated in Figure 1. The stock allocation that minimizes shortfall risk increases with the withdrawal rate. For example, you can see from the figure that at a 3% withdrawal rate, the minimum shortfall risk occurs at about 20% to 45% stock allocation; at a 4% withdrawal rate, the minimal shortfall risk occurs at about 30% to 55% stocks; at 5%, it occurs at about 55% to 80%; and at 5.5%, it occurs at about 70% to 85% stocks. Investors who select an aggressive withdrawal rate need a heavy stock exposure to provide the best chance of survival.

Remaining Balances

Although not shown in the excerpts of the studies in this article, withdrawal rate studies also examine the remaining balance, if any, after 30 years or some other investment horizon.

In general, the higher the stock allocation, the larger is the median remaining balance. If returns—especially those in the early years—prove poor, the portfolio will have little or no remaining balance. But if returns—again, especially in the early years—prove strong, then portfolios with higher stock allocations will tend to have larger remaining balances. Let's say a retiree selects a withdrawal rate of about 4.5%; Figure 1 suggests that at this withdrawal rate, she can keep her shortfall risk close to 10% at a stock allocation of between 40% to 70%. If she has a strong bequest motive and can tolerate the higher volatility, these studies suggest that if she selects the stock allocation near 70%, she may be able to leave a large amount to her heirs.

Beware: The Limitations

As with any type of study, there are implicit assumptions embedded in withdrawal rate research, as well as certain limitations.

Three of these assumptions include:

- Lack of adjustments for taxes,
- The assumption that retirees' future real returns on stocks and bonds will be similar to historical real returns, and
- The implicit assumption that retirees' have no non-financial assets to support their lifestyle, if needed.

Taxes

It is important to keep in mind that withdrawal rate studies make no adjustments for taxes. This would be appropriate for funds held in tax-deferred accounts like a 401(k) and accounts like a Roth IRA that have already been taxed, but it is not appropriate for funds held in taxable accounts, where interest, dividends and realized capital gains are taxed each year.

Many baby boomers have most of their retirement portfolios in tax-deferred accounts, so the lack of adjustments for taxes might be of relatively minor concern to these retirees.

Nevertheless, the lack of adjustments for taxes suggests that withdrawal rate studies are best interpreted as follows:

- For someone who has all his funds in tax-deferred accounts, such as 401(k)s, traditional IRAs, and Keoghs, the withdrawals you make would be in pretax funds that would

be fully taxable.

- If your funds were in a Roth account (for example, a Roth IRA or Roth 401(k)) in which taxes have already been paid, your withdrawals would be in aftertax dollars.
- If your funds were in a taxable account, taxes would be due each year on interest, dividends, and realized gains. After paying taxes each year, withdrawals would be largely, if not entirely, tax-free withdrawals of principal.

The bottom line is that the distribution of your funds across these different types of savings vehicles will affect the level of sustainable *aftertax* annual withdrawals from a portfolio. [This observation is not meant as criticism—I am well aware of the complexities generated from assuming that funds are held in other savings vehicles, especially taxable accounts.]

Table 2 is designed to provide some guidance on how the distribution of funds across savings vehicles would affect annual withdrawals by showing the amounts in aftertax dollars.

Table 2 compares withdrawals after all taxes have been paid for funds in tax-deferred accounts [such as tax-deductible IRAs, 401(k)s, etc.], Roth accounts, taxable accounts, and tax-deferred annuities, by investment horizon. It assumes the portfolio contains $100, pretax returns are a constant 6%, the tax rate is 25%, and a straight annuitization approach is used.

Let's first consider a 30-year horizon. If the $100 were in a tax-deferred account then, under a straight annuitization approach, the investor could withdraw $6.85 at the beginning of each year for 30 years, but after paying taxes at 25%, it would provide $5.14 after taxes each year.

If the $100 were in a Roth account, then the portfolio would also support an annual withdrawal of $6.85 for 30 years, and the $6.85 would be after taxes.

If the $100 were in a taxable account, then the 6% pretax return would be reduced to 4.5% aftertax return, and the $100 would support an annual aftertax withdrawal of $5.87.

Table 2. Aftertax Annual Withdrawal Amounts From $100 Portfolio in Various Tax Environments

Assumptions: Portfolio contains $100
Pretax return is 6%
Tax rate is 25%

	Withdrawal Period (years)					
	10	15	20	25	30	35
	Aftertax Annual Withdrawal Amounts ($)					
Tax-Deferred Account	9.61	7.29	6.17	5.53	5.14	4.88
Roth Account	12.82	9.71	8.22	7.38	6.85	6.51
Taxable Account	12.09	8.91	7.36	6.45	5.87	5.48
Tax-Deferred Annuity	11.65	8.42	6.83	5.90	5.29	4.87

Most tax-deferred annuities have higher expenses than other savings vehicles. Assuming a 4.75% pretax return to reflect these higher expenses, this $100 would be able to support an annual aftertax withdrawal of $5.29.

To put the implications of Table 2 in perspective, consider a new retiree who selects a 4% withdrawal rate and has a $1 million portfolio. If the portfolio only contained tax-deferred accounts, then he could plan to withdraw $40,000 of *pretax* funds in the first year and an inflation-adjusted equivalent *pretax* amount each year thereafter. Depending upon his tax situation, this might provide $34,000 annually after taxes.

The more of his portfolio that is in taxable accounts and Roth accounts the larger would be the aftertax value of the withdrawals.

Table 2 implies that the tax-deferred account provides 25% less after taxes than the Roth account (where 25% reflects the assumed tax rate). It also implies that the taxable account's advantage compared to tax-deferred accounts is larger for short horizons than for long horizons. For example, for a 30-year horizon the taxable account provides a 14% larger aftertax distribution—$5.87 versus $5.14. For a 10-year horizon, the taxable account provides a 26% larger aftertax distribution.

Future Returns

Withdrawal rate studies usually implicitly assume retirees' future net returns will be similar to gross historical returns, where net returns are returns after expenses and gross returns are returns before expenses.

There are two reasons why a retiree's net returns might be lower than historical gross returns:

- First, future gross real returns on stocks and bonds could be below historical gross returns;
- Second, due to investment expenses, the average retiree's future net returns will be below the future gross returns. Since withdrawal rate studies generally ignore investment expenses, they implicitly assume these expenses are zero. But some investors have total annual investment expenses of 2% or higher, where investment expenses include mutual funds' expense ratios, transaction costs, and adviser fees.

Table 3 presents some estimate of how much lower a retiree's sustainable withdrawal rate would be if investment expenses cause the retiree's future net returns to fall 2% below historical gross returns. For example, for a retiree with a 30-year withdrawal horizon, the sustainable withdrawal rate is estimated to be 0.99% lower; for a 20-year withdrawal horizon, the decrease is estimated at 0.79%; for a 10-year horizon, it is estimated at 0.54%.

To put these numbers in perspective, consider the new retiree who selects a 4% withdrawal rate for a 30-year horizon. If his investment expenses of

Table 3. Decrease in Sustainable Withdrawal Rates: 2% Annual Expense Rate

Withdrawal Period	10 yrs	15 yrs	20 yrs	25 yrs	30 yrs	35 yrs
Decrease in Withdrawal Rate	0.54%	0.67%	0.79%	0.89%	0.99%	1.08%

2% lower his returns by that amount annually, then he can only withdraw about 3% (a reduction of 0.99% annually), which represents a 25% reduction in annual withdrawal amount.

Although retirees have no control over market returns, they can control their investment expenses. Clearly, it is important to control investment expenses.

Other Resources

Withdrawal rate studies consider the sustainability of real withdrawals from financial portfolios. That is, they only consider financial assets but ignore non-financial assets.

Many retirees have non-financial assets that, if necessary, could be sold to finance their retirement. The most common non-financial asset is the personal residence. But others may include a vacation home, non-income producing real estate, art or other valuable collectible assets.

If a retiree would be willing to sell these assets, if necessary, then he or she may feel comfortable assuming a larger shortfall risk which would allow a larger withdrawal rate.

Planning Horizon

One other limitation to be aware of concerns your planning horizon.

Many of the studies cover limited time periods—for example, the study illustrated in Figure 1 only considers a 30-year investment horizon. This reflects the pattern in recent research that suggests 30 years is an appropriate planning horizon for many new retirees.

However, retirees must select a planning horizon that best fits their circumstances, including each individual's health and family history.

Actuarial tables suggest that, on average, 65-year-old males and females have life expectancies of about 17.6 and 20.1 years, respectively. Since an average 65-year-old woman has about a 50% probability of living beyond 20 years, she should plan for a longer horizon to provide reasonable assurance that she will not outlive her financial resources. Average 65-year-old males and females have about 5.8% and 13.4% probabilities, respectively, of living at least 30 years.

Everything else the same, the planning horizon should be longer for a couple since the relevant horizon is the life expectancy of the last to die. There is an 18.4% probability that at least one member of a 65-year-old couple will survive 30 years. If a wife is younger than her 65-year-old husband then the probability is higher yet that at least one partner will survive 30 years.

Summary and Conclusions

There may be no other retirement planning issue that is any more important than the estimate of a sustainable withdrawal rate.

Most investors want a definitive answer. This article explains why withdrawal rate studies should not be interpreted as providing such guarantees. Informed investors should understand the implicit and explicit assumptions embedded in withdrawal rate studies.

However, despite the inherent limitations of any study that relies on projections of long-run future returns, withdrawal rate studies should help individuals plan for their retirement.

The rule of thumb is a good place to start. It suggests that a new retiree who maintains at least a 50% stock allocation can withdraw 4% of the portfolio in the initial year and an inflation-adjusted equivalent amount each year thereafter and be about 90% to 95% confident that the portfolio will last at least 30 years.

If you are willing to assume lower success rates, or if you have a shorter investment horizon, you could make a larger initial withdrawal. If returns in the early years prove generous then the retiree may be able to increase her withdraws.

However, this rule of thumb should be interpreted with an appreciation of the limitations and implicit assumptions embedded in withdrawal rate research.

For investors with most of their funds in tax-deferred accounts such as a 401(k), it is best to view the sustainable withdrawal rate as determining the pretax withdrawals from these accounts. Thus, a new retiree with $1 million in a 401(k) might plan to withdraw $40,000 of pretax funds in the first year and an inflation-adjusted equivalent amount each year thereafter.

To the degree that the retiree's financial assets are held in taxable accounts, and especially Roth accounts, then the financial portfolio should support a larger aftertax withdrawal than suggested by the $40,000 of pretax funds.

Withdrawal rate studies usually implicitly assume that future gross stock and bond real returns will be similar to historical gross real returns. There are reasons to suspect that future gross returns may be below historical gross returns. Furthermore, investment expenses will cause a retiree's future net returns to fall short of future gross returns.

If lower gross returns and investment expenses cause the retiree's future net returns to fall 2% below historical gross returns, then the sustainable withdrawal rate for a retiree with a 30-year horizon is about 1% lower. The reduction in sustainable withdrawal rate is estimated at about 0.8% for a retiree with a 20-year horizon and 0.67% for a retiree with a 15-year horizon.

Perhaps the major lesson is that it is important to control investment expenses.

Finally, a retiree may have non-

financial assets such as a personal residence that she would be willing to use, if necessary, to support her retirement lifestyle. If so, then she might select a higher withdrawal rate, one that is associated with a higher level of shortfall risk.

Profs. Cooley, Hubbard and Walz may have said it best in the original study, "The word 'planning' is emphasized because of the great uncertainties in the stock and bond markets. Mid-course corrections likely will be required."

In short—stay flexible, but enjoy the journey! ▲

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"Bear Market Strategies: Watch the Spending, Hold the Stocks" by T. Rowe Price Associates, May 2003

"Retirement Savings: Choosing a Withdrawal Rate That Is Sustainable" by Philip L. Cooley, Carl M. Hubbard, and Daniel T. Walz, February 1998