

Retirement Income Basics

It is better to have a permanent income than to be fascinating.
—Oscar Wilde, Irish dramatist

A GAME

At a carnival, you're presented with the game shown in Figure 1.1. Sixty-four balls will be dropped from a chute one at a time. They bounce off the pins—with equal chance of bouncing right or left—as gravity pulls them down until they land in one of seven bins. There are 63 white balls and one gray ball. You win a prize if you correctly guess where the gray ball will land. You win another prize if you guess the shape the balls will form across the bins once all balls have been dropped.

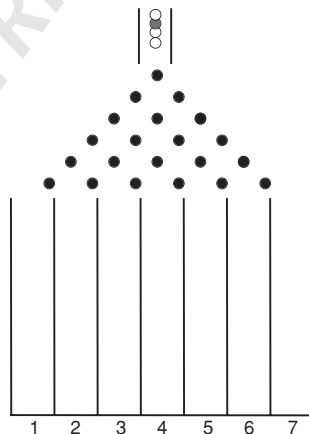


FIGURE 1.1 Carnival Game

Where do you guess the gray ball will land? What shape do you believe the balls will form across the bins once they have all dropped?

We'll come back to these two questions later. As you'll see, the answers to these two questions have a profound effect on your financial security during retirement. In fact, the game you just played may be analogous to the most important decision you'll need to make regarding your retirement savings—a decision that could well influence your quality of life, especially during advanced years.

YOUR RETIREMENT

You save for decades toward your retirement. You want the freedom and the peace of mind that come from knowing you're financially secure. Yet even if you've achieved your retirement savings goal at the point you retire, you still need to ensure that this will provide sufficient income regardless of how long you live.

There are a number of ways to try to make your nest egg sustain you for the rest of your life. Some of these ways require active investment management on your part. Some require you to estimate how long you may live, and they prove inadequate if you live longer. Some programs lack flexibility. Others can fail to adequately protect you against inflation.

To further complicate matters, you may have a variety of individual investments, such as individual stocks and bonds. You may have a variety of investments where your money is pooled with others, such as mutual funds and variable annuities. You may have money in tax-qualified plans, such as 401(k)s and individual retirement accounts (IRAs).

There are solutions to the challenge of meeting your retirement income needs. Some date back centuries, while variations on the basic approach are so new or novel as to have U.S. patents or patents pending on them. The important thing is to understand the basic rationale of each approach and the related factors as to why each approach might be right or wrong for you.

Before one can truly appreciate the quantum leap such solutions provide, it's helpful to understand more conventional retirement income approaches.

SELF-MANAGEMENT

One option to provide yourself with retirement income is to create a plan where you select a retirement period you wish to cover, such as 20 or 30

years. You then determine how you want to allocate your assets across different investment classes, such as large cap stocks, international stocks, and corporate bonds. Finally, you determine the monthly income you'd like and choose a rate of inflation that you expect so your monthly income can give you constant purchasing power. Computer software exists that will then tell you the probability that your plan will work; that is, it tells you the likelihood that your plan will provide you with the desired periodic (generally monthly) income over the retirement period and that you will not run out of money.

There are shortfalls with such a program. First, it involves active management on your part, which you may or may not enjoy doing during your retirement years. For example, you might need to structure your portfolio so it generates income uniformly throughout the year rather than irregularly, such as with semiannual bond coupons. Second, you may outlive the selected retirement period. Third, the assumptions you make, such as inflation rate, may prove inadequate.

There are additional challenges you face. For example, a software program that simply assumes a constant rate of return for any asset class, such as large-cap U.S. stocks, over your retirement period can be misleading—when the equity market is down, you will need to sell a greater number of shares at depressed prices to produce your desired income. If this scenario is not contemplated by the planning model, you could exhaust your retirement income well in advance of your target retirement period, in contrast to what the model showed.

To date, many individuals have chosen this self-management approach because it offers one enormously appealing feature: *control*. Nonetheless, the do-it-yourself approach can carry many risks.

FIXED ANNUITIES

Dictionaries define *annuity* as "...a sum of money payable yearly or at other regular intervals."¹ A "fixed annuity" can provide guaranteed lifetime income for you or for you and another person,² typically a spouse. It is called a "fixed annuity" because the monthly³ income benefits are totally known at the time you start your annuity. These benefits can be level, such as \$4,000 per month; or they can increase by a fixed percentage each year, such as \$4,000 initially, increasing by 5% per year. Either way, the amount of every future income benefit is fully known at the outset.

In essence, a fixed annuity is *longevity insurance*. It provides lifetime income *no matter how long you live*. Unlike automobile insurance, home-

owner's insurance, health insurance, life insurance, and disability insurance, longevity insurance is the one form of insurance you actually *hope* to use!

Because undue longevity is a risk, not a certainty, it is an event that should be insured against rather than saved for. Exactly as one does not accumulate a side fund equal in amount to a new house in the event of fire, one does not totally self-finance the risk of undue longevity. Because the proper perspective on financing retirement income is so important, it will be repeated here: Extraordinary longevity is not a *certainty* for which one *saves*; it is a *risk* against which one *insures*.

This is the critical difference between a self-management program described earlier and a fixed annuity. In the self-management program, you can run out of money and be left destitute.⁴ With a fixed annuity, you can't run out of money because you receive guaranteed lifetime income.⁵

THE GAME REVISITED

Remember the carnival game? In which bin did you predict the gray ball would land? What shape did you predict the balls would form across the bins once they had all dropped?

Figure 1.2 shows how one trial of the game looked after it was played.

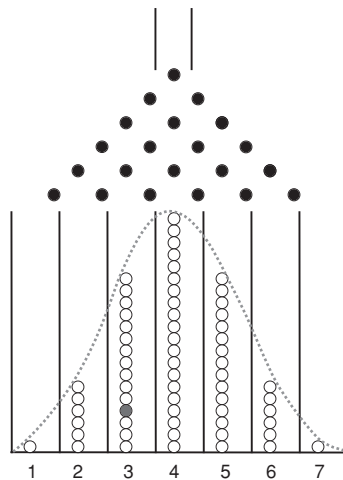


FIGURE 1.2 One Carnival Game Outcome

Did you guess the gray ball would fall into Bin 3? If you did, you were just lucky. While any ball, including the gray ball, has a tendency to end up somewhere among the middle bins, it could have landed in any of the seven bins on any trial of the game.⁶

Did you guess the shape the balls would form across all bins after they had dropped? You can predict this in advance with a much higher degree of certainty than the behavior of any single ball.⁷

What does this game have to do with your retirement security? Plenty. While we can't predict exactly where the single gray ball will land in any trial of the game, we can predict with greater certainty the collective shape all balls will make. Similarly, while we can't predict how long one individual will survive, we can predict the survival pattern for a large group of people.

As a result, by pooling a large number of people with retirement income needs together, providing each with lifetime income is safely achievable because the pattern of survival for the group as a whole is known. In contrast, the survival of a single individual is unknown. He or she could survive only a short time, an average time, or a very long time—just as the gray ball could on any trial land in any of the seven bins.

It is this very element of predictability that allows a person with retirement income needs who participates with a group of similar people to enjoy retirement security unachievable on his or her own. This is why an annuity can provide retirement security superior to a self-management program.

While any group of people—a church group, a neighborhood association, a club—could pool its longevity risk in this way, it would still need someone to calculate the monthly benefits each person could receive and still be sure enough money would remain in the pool to pay annuity benefits to the last surviving annuitant. The group would need to manage the investments. It would need to administer the monthly benefit payments and tax reporting and to draft the contracts that spell out the terms of the arrangement for each member, and so on.

Annuity companies perform this same mortality risk pooling function. They make it easy for retirees to shed themselves of longevity risk by performing all the aforementioned functions. They make it less expensive because by operating in many geographic territories they achieve economies of scale. They make it safer because they operate under a regulatory framework that ensures adequate reserves to fund all future annuity benefits. They make the longevity risk transfer process more efficient because of the greater number of annuitants that form the annuitant pool, which results in actual experience being closer and closer to that expected with less chance for year-to-year deviations in mortality experience that can occur with a smaller group; and they can therefore work with smaller margins built into pricing to cope with adverse deviations. They make it easier since like-minded individ-

uals wishing to free themselves from longevity risk do not have to find one another, belong to some common organization, or live in close proximity.

FIXED ANNUITIES REVISITED

Fixed annuities can cover one or more lives. They can provide level benefits or benefits that increase by a predetermined dollar amount or predetermined percentage each year.⁸

With the simplest type, a single premium is exchanged for a series of contractually guaranteed lifetime payments, which cease at death. This form provides maximum monthly income.

Some people prefer to know that they or their beneficiaries will receive at least a certain amount of income from their fixed annuity. One option is to elect a lifetime annuity that guarantees that at least a certain number of years of income benefits will be paid (typically 5 to 30 years). Another lifetime income option guarantees that at least as much will be paid out in monthly income benefits as was applied to purchase the annuity.⁹ As would be expected, these forms of lifetime annuities with additional guarantees provide lower monthly income than annuities without them.

All forms of annuities offer the same present value of benefits; that is, there are no annuity options that are more valuable than any other for a given amount of premium. It is merely a matter of personal preference.

As we will quantify later, the actual return on investment experienced by any single annuitant in the pool of annuitants will depend on how long he or she survives. The important point is that at the time an annuitant applies the premium to the purchase of an annuity, he or she has purchased the contractual right to a stream of retirement income identical in present value to every other similarly situated person participating in the program. In that sense, every annuitant derives equal protective value. Each annuitant is assured of lifetime income and has transferred mortality risk that he or she was less suited to absorb on an individual basis to a program that pools mortality risk and is thereby better suited to absorb on a group basis.

Fixed annuities offer one enormously appealing feature: *guaranteed lifetime income*. Enjoying an income you can't outlive may make fixed annuities superior to a self-managed retirement program where you can run out of money.

Nonetheless, in order to achieve an income you can't outlive, with fixed annuities you (1) may not be adequately protected against *inflation*; and (2) you have to give up *access*—the premium used to purchase the fixed annuity is no longer accessible by you,¹⁰ and you have no say over how your money is invested.

VARIABLE ANNUITIES

Like fixed annuities, variable annuities can cover one or more lives. Also like fixed annuities, many benefit choices are available, including the *inexhaustible* lifetime income option, which provides the maximum monthly income, and options that also include payments guaranteed to be made for a certain period of time or include various refund options.

What chiefly distinguishes variable annuities from fixed annuities is that with variable annuities the annuity contract owner (1) determines how the money will be invested and (2) bears the risks and rewards of those investments via changes in the amounts of the monthly retirement income checks, which fluctuate with fund performance.

In contrast, the entity underwriting a *fixed* annuity (typically an insurer) controls how those funds will be invested and bears the risks and rewards of those investments, since the dollar amount of benefit payments to the annuitant is guaranteed.

With variable annuities, the single premium is invested in one or more “subaccounts”¹¹ chosen by the contract owner. These may include domestic and international common stock funds, bond funds, money market funds, and specialty funds (e.g., real estate investment trusts, sector funds).

In contrast to fixed annuities with level (i.e., nonincreasing) benefits, variable annuities offer contract owners the prospect of a retirement income that protects purchasing power. For example, common stock fund returns, while not moving in lockstep with inflation, offer the possibility of returns over the course of one’s retirement that may offset or more than offset the corrosive effects of inflation.

To see just how sinister that nemesis inflation can be, Figure 1.3 shows that a 60-year-old with \$50,000 of annual living expenses will become a

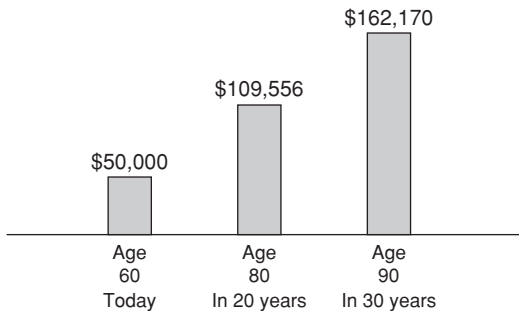


FIGURE 1.3 Annual Living Expenses at 4% Inflation Rate

90-year-old with over \$162,000 of annual living expenses at a 4% inflation rate.

Another way to view inflation is to contrast a fixed amount of income, such as might be generated by a fixed annuity, with the real purchasing power it provides in each future year. Figure 1.4 illustrates how a fixed income of \$50,000 at age 60 decreases in real purchasing power at a 4% inflation rate. While a fixed income annuity with level benefit payments provides a stable amount of income, it virtually assures a progressively deteriorating standard of living.

Monthly retirement income benefits fluctuate with the performance of the underlying subaccount(s) chosen by the contract owner. In more modern contracts, the contract owner at any time may reallocate the percentage each subaccount contributes toward a 100% total, where the weighted performance determines income benefits.¹²

Chapter 4 shows how the progression of monthly benefits is calculated. In short, the contract owner picks a benchmark rate of return (often 3%, 4%, or 5%). If subaccount performance for the period equals that benchmark rate of return, the benefit payment remains level. To the extent subaccount performance for the period exceeds the benchmark return, benefits rise. As a result, the lower the level of benchmark return chosen, the lower the initial benefit but the steeper the rise of future benefits. Similarly, if subaccount performance for the period is less than the benchmark return, benefits decrease.

As with a fixed annuity, all forms of a variable annuity offer the same present value of benefits; that is, there are no annuity options that are more valuable than any other for a given amount of premium. It is merely a matter of personal preference. Given that one objective of a variable annuity is

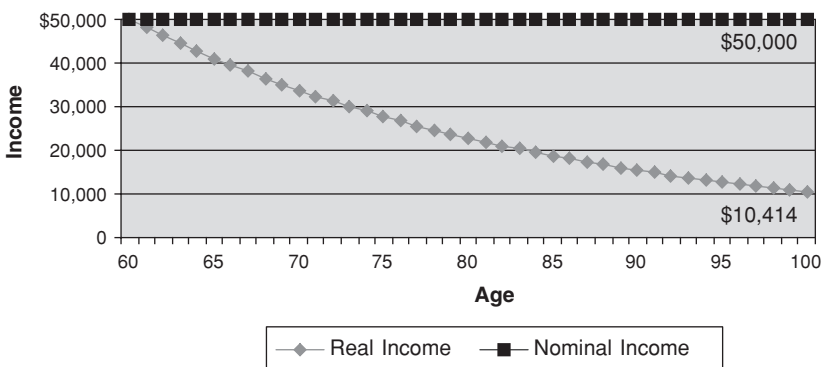


FIGURE 1.4 Fixed Annuity Income

to provide increasing benefit payments to offset or more than offset inflation, the variable annuity stands the better chance of achieving this objective the lower the benchmark return chosen.

Note that while the level of monthly benefits fluctuates with subaccount performance, the annuitant is still guaranteed lifetime income. While the variable annuity contract owner assumes investment risk, the insurer assumes mortality risk; that is, the insurer guarantees that even if it has adverse mortality experience and annuitants survive longer than expected (e.g., due to unforeseen medical advances), this will have no effect on the benefits of any annuitants. Just as with fixed annuities, with variable annuities contract owners transfer mortality risk from themselves to the insurer. This often provides enormous peace of mind because, as was shown earlier, mortality is uncertain for any one individual who is thus ill-equipped to manage this risk, but it is much more certain for a large pool of individuals.

In the United States private sector (i.e., outside the Social Security system), there are only two ways to receive guaranteed lifetime income: through an annuity and through a defined benefit pension plan. Many people don't participate in a defined benefit pension plan.¹³ For those who do, the benefits tend to be fixed in amount rather than being able to increase as with a variable annuity. Traditional defined benefit pension plan benefits are governed by a formula based on salary and years of service.

Even for those who participate in a defined benefit pension plan, the retirement income benefits may prove inadequate. For example, an individual may have only a few years of service with the employer sponsoring the plan. An individual may have worked with three different employers over the course of a career—say, for 15 years each, from age 20 to age 65—each with a defined benefit plan. Unfortunately, benefits are based on final average salary with *each* employer; so, at retirement, one of the individual's three pensions is based on a salary from 30 years ago and another from a salary 15 years ago. Such job mobility reduces defined benefit pension plan income to a small fraction of what would have been provided for the same number of years of service with a single employer.

Even those lucky few who did participate in defined benefit plans and have some level of guaranteed lifetime income—at a level established by a plan formula beyond their control—may still have a need for supplemental lifetime income to maintain their standard of living. This can only be achieved through an annuity.

Certain tax-qualified plans, such as IRAs and 401(k)s, have “required minimum distribution” rules that govern how money is distributed back to you. In contrast, non-tax-qualified annuities give you control over how and when you take retirement income. More important, the progression of

income benefits from an annuity tends to correspond with retirement income needs in a manner superior to that of Internal Revenue Service (IRS) required minimum distribution arrangements.

For example, Figure 1.5 compares the progression of retirement income benefits of a generic immediate variable annuity (IVA) lifetime income option with those under an IRS required minimum distribution (RMD) program. The same fund is used for both cases and is assumed to return 8% each year. This is based on a \$100,000 account value for a male, age 70. The IRS RMD program illustrated uses the age recalculation method.

In this example, note that while the variable annuity lifetime income option provides benefits that tend to increase over time—more in line with what one’s actual retirement needs might be—the IRS RMD option produces benefits that increase initially but then decline. While a variety of investment arrangements (e.g., mutual funds, certificates of deposit, individual stocks in a self-directed IRA) can be used in conjunction with the IRS RMD option, only an annuity can provide the more desirable benefit pattern on a basis guaranteed to last a lifetime.

Note that this illustration assumes a constant 8% rate of return for both distribution options. In reality, returns will fluctuate from period to period, making for a less smooth benefit progression. Nonetheless, this illustrates the critical point: While IRS RMD options or other options from alternative investment vehicles may produce retirement income that “lasts a lifetime” in some fashion—albeit perhaps in a declining fashion, leaving critically reduced income in advanced years—only annuities can provide the more attractive (and appropriate) benefit progression of the nature shown in Figure 1.5.

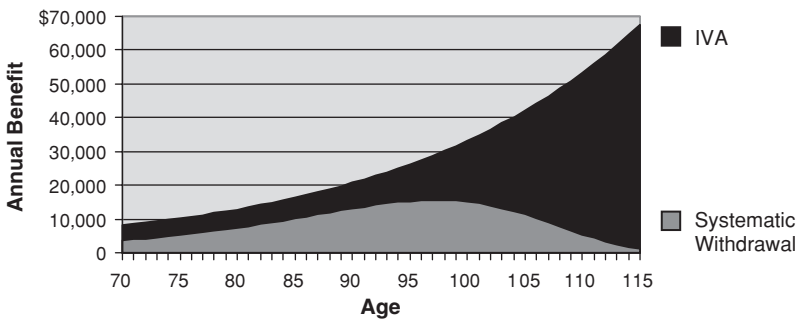


FIGURE 1.5 Immediate Variable Annuity versus Systematic Withdrawal
(Based on Annuity 2000 Basic Mortality Table, 3% AIR, 8% fund performance.)

To date, variable annuities have been the superior private sector retirement income option. They provide:

- Income guaranteed to last a lifetime (for one or more individuals).
- Potential inflation hedge.
- Ability to reallocate among subaccounts, the performance of which determines monthly income benefits.
- Variety of optional guarantee and refund features (e.g., 10 years of guaranteed benefits regardless of survivorship, refund to beneficiary at death of annuitant of excess of annuity units used to purchase annuity over those paid out in monthly income benefits, etc.).

While perhaps ranking below certain colossal events in human history, such as the shift from barbarism to civilization, the invention of the variable income annuity is epochal in that it genuinely offers billions of people around the globe the opportunity to enjoy a more financially secure, more worry-free experience during the final decades of life.

Equally important, the timing of the introduction of the variable income annuity is fortuitous. The current generation of lives truly differs from predecessors. In *Future Shock*,¹⁴ Alvin Toffler suggests dividing the last 50,000 years of man's existence into lifetimes of approximately 62 years each. There have been about 800 such lifetimes. The first 650 were spent in caves. Only during the most recent 70 did writing even exist. Only during the last 6 lifetimes did masses of mankind see a printed word. Only during the last 4 lifetimes has it been possible to measure time with any precision. Only in the last 2 lifetimes has anyone anywhere used an electric motor. Only during the present lifetime has the vast majority of all goods used in daily life been developed. Truly, the current generation differs vastly from its predecessors in terms of opportunities and technologies of which it can avail itself if it has the financial resources during the final decades of life to access these.

SHORTCOMING OF SIMPLIFIED RETIREMENT INCOME PROJECTIONS

Retirement income projections premised on a single rate of return are oversimplified, misleading, and dangerous. Let's look at an example that covers a fixed period of 10 years. The same inadequacy that appears here extends to lifetime annuities.

Suppose you have \$100,000, are looking to invest it yourself in a variety of asset classes, plan to take equal annual withdrawals at the end of each year, and want to fully dissipate the account at the end of 10 years. You invest pri-

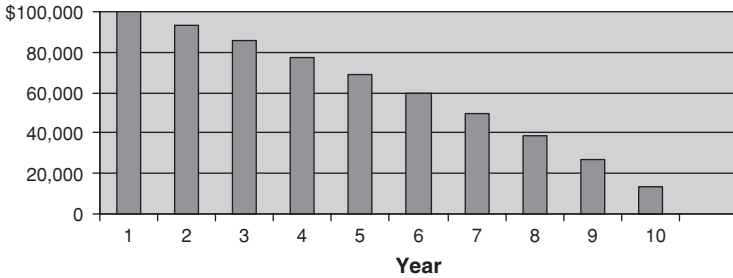


FIGURE 1.6 Beginning-of-Year Values

marily in stock and bond funds that historically have together averaged an 8% return per year. Figure 1.6 shows the beginning-of-year (BOY) values.

As a result, you assume an 8% return. An amortization table like that in Table 1.1 proves that annual end-of-year (EOY) withdrawals of \$14,902.95 fully liquidate your original \$100,000 over 10 years.

If your investments uniformly return the 8% you assumed each year, everything works out perfectly. Suppose, however, that while your investments return 8% *on average*¹⁵ over the 10-year period, they happen to earn 10% less than this during the first five years and 10% more than this during the second five years. In this case, if you take the same \$14,902.95 annual withdrawal, you run out of money after seven years. In fact, in year seven, you only get a year-end payment of \$8,590.11. See Figure 1.7.

What went wrong? The model that assumed a static 8% rate of return was fallible. Even though 8% may have been an average rate of return over

TABLE 1.1 Amortization

Year	BOY Value	Appreciation	Payment	EOY Value
1	\$100,000.00	\$8,000.00	\$14,902.95	\$93,097.05
2	93,097.05	7,447.76	14,902.95	85,641.87
3	85,641.87	6,851.35	14,902.95	77,590.27
4	77,590.27	6,207.22	14,902.95	68,894.54
5	68,894.54	5,511.56	14,902.95	59,503.15
6	59,503.15	4,760.25	14,902.95	49,360.46
7	49,360.46	3,948.84	14,902.95	38,406.34
8	38,406.34	3,072.51	14,902.95	26,575.90
9	26,575.90	2,126.07	14,902.95	13,799.03
10	13,799.03	1,103.92	14,902.95	0.00

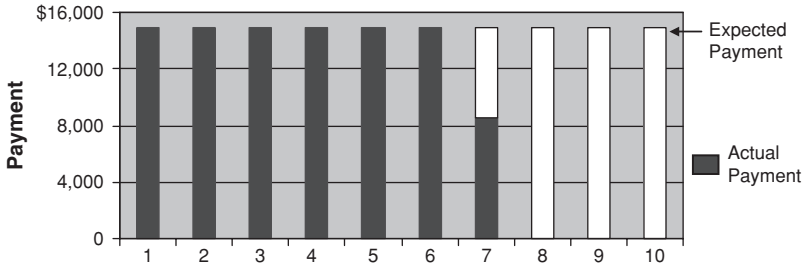


FIGURE 1.7 Actual versus Expected Payments

your 10-year holding period, your portfolio earned less than 8% during the early years when it applied to the higher account value you still had remaining and earned more than 8% during the later years when it applied to the much smaller account value remaining. As a result, your intended withdrawal program produced insufficient appreciation in the early years to keep it solvent.

Had the good investment experience occurred first—annual returns 10% more than you assumed during the first five years and annual returns 10% less than you assumed during the second five years—you would have successfully been able to receive your \$14,902.95 payment every year for 10 years and still have a positive ending balance of \$38,827.03.

A more credible approach is to use *stochastic*¹⁶ simulations based on historical means, variances, and covariances of asset class returns. The distribution of results of, say, 1,000 scenarios modeled presents a more realistic picture of results you might expect. By its very nature of producing a variety of possible future scenarios predicated on historical information, it conveys that a specific dollar level of withdrawal will leave a residual balance at the end of the 10-year period in some cases, might exactly deplete the balance at the end of 10 years, and will prematurely deplete the fund in some cases.

Mathematicians speak of the “probability of ruin.”¹⁷ This is the percentage chance that your funds will be exhausted prior to the end of your target period. “Probability of ruin” and its complement, “probability of success,” are based on assumptions input into the mathematical model as to mean returns per asset class, tendencies for returns to deviate from the mean, and interactions between asset classes.

While the preceding illustration covers a 10-year period, retirement horizons typically cover several decades. The chance of experiencing multiple economic downturns is greater over this longer horizon. As a result, retirement projections using static rates of return increasingly fail to reflect probability of ruin over longer periods relative to stochastic simulations.

SHORTCOMINGS OF TRADITIONAL RETIREMENT INCOME APPROACH

A traditional approach to applying retirement savings to the generation of retirement income is to use a chart similar to the one shown in Table 1.2. A new retiree selects a rate of investment return that he feels is reasonable and selects a time horizon over which he wishes the initial amount of retirement assets to sustain him. He then determines from the chart how much he can withdraw at the beginning of each month so that his initial amount will be exactly dissipated at the end of the chosen time period.

Shortcomings of this traditional approach include:

- The retiree still runs out of income if he survives beyond the time horizon he selects, unnecessarily subjecting himself to longevity risk.
- The retiree suffers less purchasing power every year, as long as the inflation rate is anywhere above zero.
- The retiree totally self-finances the risk of undue longevity, whereas because undue longevity is not a *certainty* for which one saves but rather a *risk* against which one insures, his approach to financing retirement income both unnecessarily leaves him exposed to the possibility of outliving his income and having less income in retirement than was otherwise possible.

The approach in Table 1.2 reveals a picture of retirement income planning of . . . yesteryear.

TABLE 1.2 Amount You Can Receive Monthly from a \$100,000 Initial Sum

Investment Return*	Amount to Withdraw at Beginning of Each Month to Exactly Dissipate Principal and Interest at End of Time Horizon							
0%	\$1,667	\$ 833	\$ 556	\$ 417	\$ 333	\$ 278	\$ 238	\$ 208
2	1,749	918	642	504	422	368	330	301
4	1,832	1,006	734	600	522	472	437	412
6	1,917	1,097	831	704	632	587	557	537
8	2,001	1,191	934	814	749	710	686	670
10	2,087	1,287	1,040	929	872	839	820	809
12	2,173	1,386	1,150	1,049	999	972	958	950
14	2,259	1,487	1,263	1,171	1,129	1,108	1,097	1,092
Time Horizon	5 years	10 years	15 years	20 years	25 years	30 years	35 years	40 years

*Annual effective rate of interest.

RETIREMENT INCOME BASICS SUMMARY

Structuring a retirement income program requires consideration of many factors. Many individuals do not participate in any retirement program that offers them lifetime income. For those individuals who do, such a program may provide inadequate income, requiring supplementation.

Due to mortality unpredictability for any given individual, it is challenging to create and self-manage one's own retirement income program. If an individual survives longer than expected, she may exhaust her financial resources and be left destitute or dependent on family or government safety net programs. If an individual chooses to avoid this situation by spending only the interest on her retirement savings and leaving principal intact, she will have a lower income and commensurately lower standard of living than could otherwise be had.

Due to mortality predictability for a large group of individuals, a well-designed process exists that overcomes these obstacles. It guarantees lifetime income and lets the retiree/annuitant spend all of her interest and safely spend down her principal, resulting in a higher standard of living. Indeed, as we shall see in Chapter 6 on the mechanics of such a program, it is even better than this. In addition to income derived from one's own principal and interest or appreciation thereon, the annuitant population—especially the subpopulation surviving to more advanced ages—also enjoys something called “survivorship benefits.”

Fixed annuities provide lifetime income with benefits fully known at time of entry into the annuity program. Retirement income benefits may be level in amount or increase (typically annually) by a constant dollar amount or constant percentage.

Variable annuities provide lifetime income with benefits that fluctuate based on performance of the investment subaccounts chosen by the annuity contract owner relative to a benchmark rate of return chosen by the annuity contract owner.

Benefit amounts for both fixed and variable annuities are *definitely determinable* at point of entry into the program. For fixed annuities, they are determinable as to exact dollar amount. For variable annuities, they are determinable as to the exact number of annuity units payable on each benefit date.

