LESSON 11:

Feast or Famine First?

The ancient biblical story of Joseph and King Pharaoh tells of a famous dream of the king in which the land of Egypt was prophesized to experience seven years of plentiful harvest and seven years of horrible drought. And, as the book Genesis goes on to tell, this scenario actually played itself out over an agriculturally volatile 14-year period. In fact, some biblical commentators claim that in this story, King Pharaoh was actually given a choice of which sequence he wanted to experience first: the seven good years or the seven bad years. Like any good decision maker he decided to go with the good years first. And with the able assistance of Joseph — who was now promoted to the status of viceroy as his reward for figuring this all out — Egypt's ruler managed to store enough grain during the seven good years to withstand the devastation of the years that followed.

This might be a good analogy for what is in store for baby boomers over the next few years. As these 75 million people approach their retirement years, we need to understand precisely how important it is to get the "good" seven years before the "bad" seven years.

I find it puzzling that although most people I talk to appreciate that good-first is better than bad-first, and many say it is obvious, they apply this gut instinct too broadly and often get the implications wrong. Let me explain with a simple thought experiment.

Assume for a moment that you (or your client) have $10,000 to invest for a few years. They place this sum in a basic mutual fund that goes on to earn 27 percent in the first year of ownership so that your investment is worth $12,700 at the end of the first year. Now assume that you hold on to the fund — you don't sell any units or buy any more — and in the second year the same fund increases by a mere 7 percent. At the end of the second year your investment is now worth $12,700 plus an additional 7 percent, which is $13,589. Finally — and bear with me here — in the third year the fund has a very bad year and to your dismay loses 13 percent of its value. Your investment after three years is now worth 87 percent of its previous year's value, $11,822. Out of despair and fear you decide to get out. At least, you say to yourself, you made a total of 18.2 percent on your original $10,000.

Now what happens if I reverse the order of your investment returns and you happen to lose 13 percent in the first (not third) year, you earn 7 percent in the second year and you get the 27 percent only in the third year? Will you end up with more or less than the above mentioned $11,822?

Many people I ask this question say it is worse to experience the loss first. But the indisputable truth is that you will have the *exact* same amount of money, namely $11,822. If you don't believe me, work out the arithmetic. Notice that $10,000 times (1.27) times (1.07) times (0.87) is exactly the same as $10,000 times (0.87) times (1.07) times (1.27). The order is not important when you are buying and holding; no cash flow goes in or out. Indeed, the only thing that matters is the compound average of 5.7 percent. This is exactly why mutual funds tout their 5-, 10- and 20-year compound returns. The year-by-year numbers don't really matter when all you do is buy and hold.

But if you are *withdrawing* money from this investment, the order does become relevant, and the earlier the losses, the greater their impact. This is the so-called sequence-of-returns effect. You, like King Pharaoh, want the famine returns pushed off as long as possible since you are eating the grain in the silos.

Ideally the way to measure the exact impact of an investment famine on the sustainability of your retirement income is to analyze many sample retirees who experienced good and bad returns at different points in their retirement, and then see who fared better. We don't have this luxury of data, and it might take a while to see things play out with the baby boomers.

The next best thing to a natural experiment is a diligent research associate with a powerful computer at her disposal. This I have. With Anna Abaimova's able assistance we were able to generate thousands of possible sample paths for the economic future of a theoretical retirement. We used Monte Carlo techniques to simulate sample paths for inflation, investments returns, health and longevity. In some of these simulation paths the retiree was "killed" (by the computer algorithm) while still having plenty of

money in his or her retirement account. In other simulation paths, the retiree "starved" and had to tap other sources of wealth (housing, kids, welfare) in order to continue spending. The summary results of this analysis are displayed in the table below.

First notice how all of the correlation coefficients in the table are negative. As you might expect, this means that if you experience worse-than-average portfolio investment returns at *any* time during your retirement, your income sustainability will be lower than expected. The same goes for increased longevity — as well as higher inflation during retirement. They are all risk factors and will have a negative impact. Think of this as the reasons your retirement might be ruined.

Notice, for example, that the correlation coefficient for the first seven years is -56.3 percent while the correlation for the second seven years is only -27.5 percent. The way to interpret this number is as follows. In the many simulations we generated, some resulted in better than expected sustainability and others were worse. In fact, half of the time things were better than expected and half of the time they were obviously worse. In the cases for which the first seven years (from age 65 to age 72) were lousy, more often than not (roughly 56 percent of the time) the desired income was not sustainable and the retirees had to reduce their standard of living. In the second seven year's return — think of this as the market's behavior between your 73rd and 79th birthdays — the impact was a much smaller 27 percent of the time.

You and your client must somehow protect yourselves against the risk that you get the seven-year famine before the feast.

Just as interesting is the impact of longevity risk. Notice that its correlation coefficient is -53.9 percent in the table below, which is almost as high and important as the impact of the first seven years with its coefficient of -56.3 percent. In other words, if someone were to ask me, "What is worse in terms of income sustainability? Is it underestimating my life expectancy or getting unlucky in the first few years of retirement?" my answer would be that they are roughly on the same order of magnitude. Be fearful of them both.

Technically speaking — for the benefit of the growing legion of quants out there — we simulated 10,000 Monte Carlo paths assuming people retired at the age of 65, then lived for a random number of years, with an average of 19 years and a standard deviation of 9 years. Their investment portfolio earned an arithmetic nominal average of 11 percent per year with a standard deviation of 18 percent. Inflation was generated assuming an average of 3 percent and standard deviation of 2 percent. Finally, we assumed retirees withdrew money from the portfolio at a neutral spending consumption rate (NSCR), which leads to even odds of sustainability. Of course, we are definitely not advocating that 50 percent success is an acceptable Monte Carlo number (it isn't), but rather we are using this neutral 50/50 simulation as the basis for the correlation analysis.

The technical details of these regressions can get somewhat numbing but the bottom line here is that the sequence-of-investment-returns effect is real. You and your clients must somehow protect yourselves against this unique hazard — i.e., the risk that you get the seven-year famine before the feast.

In my opinion, the simplest and easiest way to protect against this risk is to spend a fraction of your retirement nest egg on a variable annuity that contains some sort of guaranteed living benefit — if you don't have an adequate amount of guaranteed pension income for life. This way you kill two risk-birds with one product-stone. You hedge both longevity risk and sequence-of-returns risk. And yes, you will pay for this; insurance is never free.

Alas, this lesson is my last column for *Research*. Among other things, I will be taking a hiatus to focus on completing my next book, titled: *Are You a Stock or a Bond? How to Risk-Manage Your Financial and Human Capital to Generate a Sustainable Retirement Income*. Keep an eye open for it in mid-2008. ®

Impact of Various "Risk Factors" on Retirement Income Sustainability

	Worse than Expected Returns During 1st 7 yrs.	Worse than Expected Returns During 2nd 7 yrs	Worse than Expected Returns During 3rd 7 yrs	Greater than Expected Longevity & Lifespan	Higher Retiree Inflation
Correlation: Factor and Sustainability	**-56.3%**	**-27.5%**	**-11.0%**	**-53.9%**	**-5.8%**