

By David M. Stein, Ph.D.



Death, Taxes and Diversification

MODERN PORTFOLIO THEORY IS clear. A diversified portfolio is preferable to a risky one. When the decision to diversify requires selling equities and paying taxes, however, the solution may not be as clear. Consider this case: if your capital gain is large and you must pay taxes when you sell, should you pay up now or later? How much of your portfolio should you sell in order to diversify?*

To sort through the taxable investor's diversification dilemma, consider a very simplified case in which there are two assets: an initial risky portfolio and a diversified benchmark portfolio. Our analysis contrasts the probable returns, after taxes, for these two holdings.

Consider Portfolio 1 (see page 97), which consists of \$1 million worth of a single risky stock that the investor acquired with a zero cost basis. It has a volatility (the standard deviation of the annual rate of return), or risk, of 40%. The 40% number corresponds to the risk of a medium- to large-sized, but not too risky, company. Microsoft, Intel, and AT&T all have volatilities around 40%.

Compare this with Portfolio 2 (see page 99), which starts with \$1 million as well, but the investor decides to diversify. He sells his risky \$1 million portfolio and sets aside 20%, \$200,000, to pay his long-term capital gains tax. He reinvests the balance, \$800,000, in a portfolio of diversified equities. This new portfolio has a volatility of 15%, the average volatility lately of a diversified, indexed portfolio.

In our study, both portfolios share a set of benefits and costs:

- They appreciate (i.e., yield total return) at an average rate of 10% per year.
- They pay 3% in dividends; the investor pays dividend taxes at a 39.6% rate.
- The investor pays a 20% capital gains tax.



- The investment horizon is 20 years. At the end of this period, both portfolios are sold and unrealized capital gains are taxed.

If the return is known to be 10% per year, Portfolio 1 will appreciate to \$4.5 million after taxes by the end of the period. Portfolio 2 will appreciate to \$3.8 million. It would appear that the investor would do better to hold off paying taxes rather than to diversify. He gains a benefit from having his unpaid taxes appreciate in his favor.

However, we cannot be sure what the stocks will return. And we know that the concentrated investment is more risky. How does this change the decision?

The Concept of Risk

While we cannot be certain which portfolio will have more wealth at the end of the term, we know the risk of each, and we have the mathematical tools to determine the probability of outcomes. Our analysis derives the probable results using Monte Carlo simulation.

Portfolio 1, with 40% volatility, can be expected to grow from \$1 million to \$4.5 million after taxes. However, there is a 50% probability that this portfolio will grow to only \$1.3 million after taxes (the median value). That's less than 20 years

We know the taxman cometh. The question remains, however: Should you pay him now, or later?

worth of inflation at 3.5%. Six out of 10 times, the portfolio will grow to less than \$2 million. The risky portfolio has a sizable probability—43%—that it will shrink in value.

There's another valuable piece of information for the investor: at the end of the term the most likely value for the risky portfolio is about \$500,000.

When Less Can Be More

Portfolio 2, our diversified portfolio, does not have the same upside potential. Here, the investor bit the capital gains tax bullet early on. He sold his risky portfolio, paid his 20% capital gains tax, and purchased a diversified basket of equities worth \$800,000.

Starting with less, this diversified portfolio can be expected to appreciate to only \$3.8 million after taxes. However, there is a 50% probability that it will be worth \$3.2 million (the median value) after taxes. Compare this to the \$1.3 million median value of the risky portfolio after 20 years.

Note, also, that the chance the diversified portfolio will go down in value is only

*Parametric Portfolio Associates' study of these questions, *Diversification in the Presence of Taxes*, is available to advisors by calling 206-694-5575, or by visiting our Web site, www.parametricportfolio.com.

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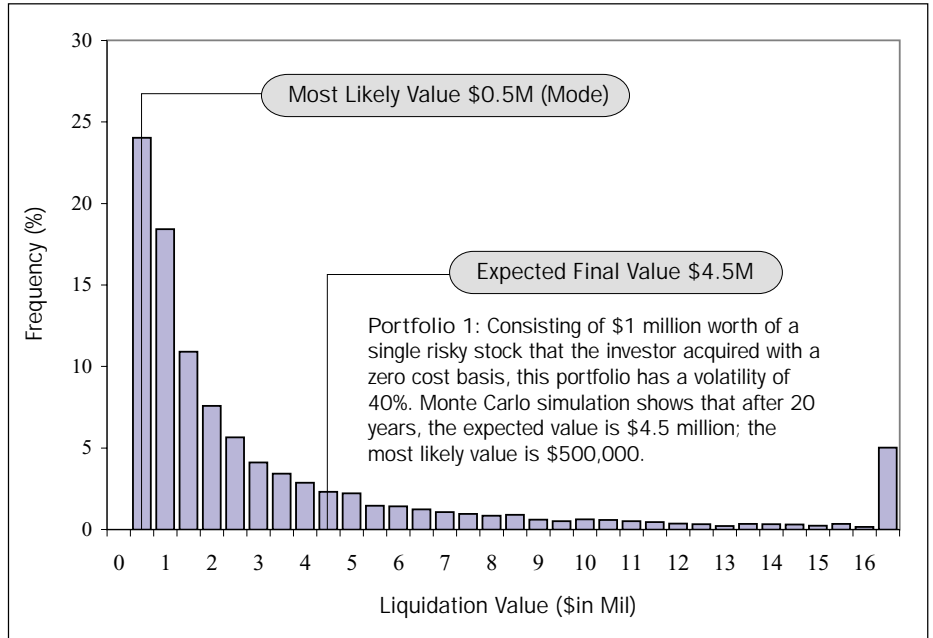
2%. The risky portfolio had a 42% probability of going down in value. The most likely value of the \$800,000 diversified portfolio after 20 years is \$2.5 million. Recall that the \$1 million risky portfolio was in all likelihood worth only \$500,000 at the end of the term.

In this case, after taxes and after all, the investor does pretty well.

The distributions of final wealth are both skewed. The single-mindedness of the risky investor is somewhat like that of the roulette player who puts \$100 on red five times in a row. His expected final value is \$100, but he does not have much chance of achieving this. If he hits red every time, he will have \$3,200. Alas, the chance of his doing this is only one in 32. There is an important difference between what you can expect to achieve on average and what you are likely to achieve.

Clearly, the lesson is to diversify, even if you have to pay taxes to do so.

Many of our investors own sizable, non-retirement portfolios made up of a single stock or of a few risky stocks. In many cases, their companies have rewarded these



men and women with shares of company stock. Their tax basis is low or nil. These are clear-thinking individuals. They are aware of the studies that underscore the advantages of diversification. So why do so many hold on to their risky portfolios?

Some hold because they started the company or invented the technology on which it is based. Some feel company pressure not to sell. But the most common hurdle is the sure knowledge that they're going to have to pay capital gains taxes, and when they



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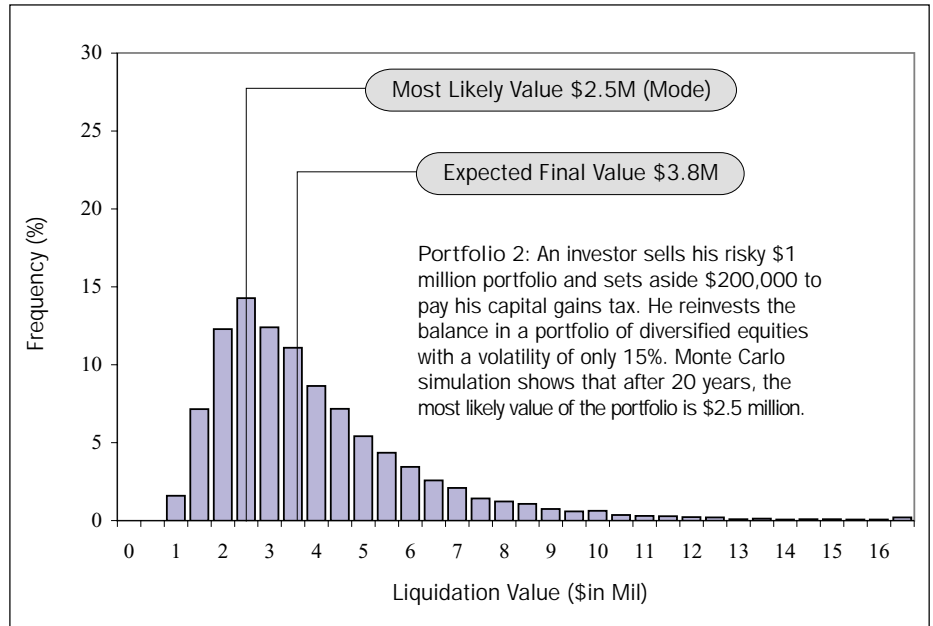
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do, their portfolio will immediately be worth less.

Yes, the new, diversified portfolio can be expected to be worth less after taxes. But, as our study shows, the diversified portfolio is likely to be worth a lot more over time because it avoids the risk of the concentration. This lesson applies to portfolios of any size.

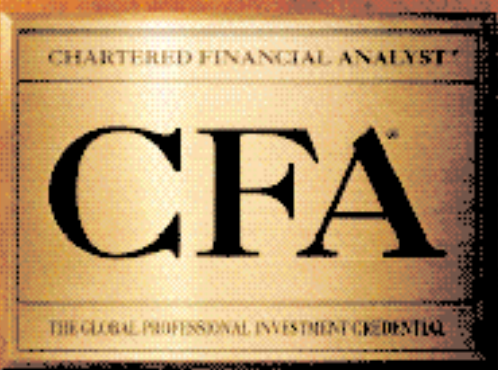
Do you need to sell all of the equities in the risky portfolio? Not necessarily. For the example discussed above, where the concentrated stock has a volatility of 40%, our work suggests that if you sell and reinvest 85% of your portfolio, your new portfolio will still have an attractive risk-and-return tradeoff. Depending on your tax exposure, you can stage this diversification over a period of a few years. When selling the entire asset is not possible, you can sometimes offset risk by diverting some of the risk into equities with a negative or low correlation to the initial holding.

It may not be necessary to diversify as much if you bequeath your assets to heirs and receive a step-up in basis at the hori-



zon. However, when the holding is even more risky than the case above, our results recommend almost complete and immediate diversification. Greater diversification is required when there is a longer investment horizon, a lower cost basis, and a lower risk-free interest rate.

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