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Financial Advisers and Fuzzy Math

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Next time your financial adviser makes a prediction for an average rate of return during an investment pitch, you might want to doublecheck the math.

Some financial advisers rely too heavily on a formula known as arithmetic average, which can be misleading when investing for the long term. Financial advisers who use this formula may be overstating your potential profit and leading you to take risks you might otherwise avoid, academics and other financial professionals say. Errors tend to widen when it comes to very volatile securities like emerging-markets stocks.

Arithmetic math involves a very simple formula, which is probably why so many people rely on it. To decide an average return, you add up all the return percentages and divide the results by the number of percentages.

It's a perfectly valid way to determine an average, as long as it's used to frame a stand-alone one-year return, said Knut Larsen, a partner with Brigus Group, a Toronto education service for financial advisers.

The classic example to illustrate the flaws with arithmetic math goes like this: You start with an investment of \$100 and it grows 100% the first year and loses 50% the next year. To calculate the total return using arithmetic math, you would add the returns from both years—in this case 100 minus 50—and divide them by two, or the number of returns.

That leaves you with the illusion of a 25% profit, when in reality you're right back where you started—with \$100. After rising 100% the first year, you had \$200; but a drop of 50% cut that in half, back down to \$100.

The alternative is known as geometric average, or compound annual return. This takes compounding and volatility into consideration.

Unfortunately, geometric average is a complicated formula, involving cube roots, so it may not be possible to figure out the results without a spreadsheet. But the point is to educate yourself on the issue, not to memorize complex formulas, Mr. Larsen said. Simply understanding when one formula should be used over the other, and knowing the flaws of arithmetic math is a good start, he said.

S&P 500 index annual returns from 1927 until now are lower using geometric math.

When comparing the two results, the arithmetic average generally ends up being higher than the geometric average, said Campbell Harvey, a finance professor with Duke University's Fuqua School of Business. For example, annual returns on the S&P 500 index from 1927 until now are about 12% using arithmetic math, and 10% using geometric math. That's a two percentage point difference.

The deviation isn't always enough to get worked up about, but it depends on factors such as volatility, and even fees and interest. For example, the greater the volatility of the security in question, the greater the spread will be between the two results, Mr. Harvey said.

He recalls feeling struck once by an advertisement touting Brazilian stocks at-

tached to data showing "incredible returns" of about 50% a year. Knowing Brazil is a volatile market, Mr. Harvey went back and applied geometric math to the returns. His findings produced an average return closer to zero.

Volatility can affect the portfolio in negative ways because a severe drop makes it that much harder to catch up on the reduced amount, even if returns are phenomenal thereafter. But when using arithmetic average, all that is known is the one-year average return, not total results.

Misleading return projections using arithmetic math are common in the insurance world, said Peter Katt, an insurance analyst in Mattawan, Mich. Some products require high return-forecasts to make the products work, and this is one way to get around that, he said, adding that consumers need to educate themselves.

"I deal with very bright clients and advisers, and they have no idea what I'm talking about" when referring to the different formulas for calculating results, he said.

It may seem like a lot of financial hocus-pocus, but sometimes the misrepresentations aren't intentional, Mr. Larsen said. He published a primer on the subject this summer after bumping into a financial adviser who legitimately didn't know the effects arithmetic math was having on his planning. The adviser had a client who suffered a portfolio loss of 45%, and the adviser believed the client would need an annual return of 15% a year to get back to the original investment in three years. In reality, he would have to prepare for a return of more like 22% a year, according to Mr. Larsen's calculations.