

Sequence of Returns Risk, Basic Math

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Understanding sequence of returns risk is one of the core concepts that affects retirement theory, yet it is so rarely talked about. We talk about how retirees should diversify their portfolios, adopt the 4% rule, have non-correlating asset classes, or just have a plan for when the market goes down. But why we suggest these strategies is talked about a lot less. This often relates to sequence of returns risk. This article illustrates the basic math of how withdrawals could affect a portfolio in a down market. The second article demonstrates how this could affect the 4% rule.

Let's start with a simple math problem:

Beginning Balance \$100

Year 1 withdrawal of \$4 taken at the beginning of the year

Year 1 loss of 10% by the end of the year

Ending Balance \$86.40

Your portfolio is down 13.60% from your original \$100 due to market losses and your beginning of the year withdrawal. How much does the market have to grow next year for your account to be whole?

Beginning Balance of \$86.40

Year 2 withdrawal of \$4 taken at the beginning of the year

Ending Balance of \$100

Rate of Return to make you whole is around 21.36%

If you consider you took out 4% of your original balance twice (8% total) and had a 10% loss, in theory you are only down around 18%. Yet you must earn 21.356% to make you whole again. That means you need to make an additional extra 3.356% of additional returns just to make you whole.

If we did the exact same example and didn't take withdrawals, we would find the market goes down 10% and the next year it needs to recover 11.11% to make you whole. I refer to this as slippage, the idea that you need greater upswings to fix a downswing- in this case an extra 1.11. The first thing you should note is withdrawals are causing greater slippage of your portfolio.

Now, let's do the exact same equation but talk about a 20% loss.



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Beginning Balance \$100

Year 1 withdrawal of \$4 taken at the beginning of the year

Year 1 loss of 20% by the end of the year

Ending Balance \$76.80

Year 2

Beginning Balance of \$76.80

Year 2 withdrawal of \$4 taken at the beginning of the year

Ending Balance of \$100

Rate of Return to make you whole around 37.3626%

As in the first example, you took 8% of the original balance over two years in withdrawals, and now you need to account for your portfolio being down 20% (a total of 28%). Yet the difference between 37.3626% and 28% is 9.3626% of slippage. In the previous example with a 10% loss, the slippage was 3.356%. You should notice that greater losses cause subsequently greater slippage.

What if you didn't take withdrawals- in that case to recover a 20% loss it takes around 25% future returns.

This presents an interesting issue. Retirees are usually more likely to need to spend their savings than say someone who is working. However not only does spending money in retirement potentially cause greater slippage of your assets, but greater market swings on your investments can compound that issue. This is why retirees are often told to limit their volatility in retirement.

Some initial rules of thumb to consider:

1. Are you creating a diversified portfolio taking into account all of your assets?
2. Do you have the ability to not touch your investments for a period of time to let them recover utilizing:
 - a. Social Security
 - b. Pensions
 - c. Other non-correlated assets such as a CD or Annuity?
3. Are you modeling appropriate withdrawal percentages from your portfolio?
4. Are you factoring in the effect of inflation?



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