



ELLEVEST

The Ellevest Difference

THE FINE PRINT ON EXPECTED RETURNS

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We've received a tremendous amount of feedback from women as we've introduced Ellevest. Some of our mathematically inclined users put themselves through the paces of trying to calculate what we are projecting for portfolio returns based upon our forecasts; some have then asked why our numbers might appear lower than they may have expected. After all, investment professionals are forecasting global equities to return 6-8% in the medium to long term,¹ and our forecasts appear to project returns closer to 3-4% over a long horizon. So that begs the question:

How are Ellevest's forecasts different from other advisors and what investment professionals are predicting in the press?

No, it's not because we are pessimists, or claim to know where markets are headed. And it's certainly not because we think our recommended portfolios will underperform other low-cost portfolios with similar asset allocations.

Yes, our forecasts *are* different. That's because, unlike other advisors, we account for realities such as taxes and fees, and build layers of conservatism into the projections we provide to you. Specifically, our forecasts:

- Show a higher likelihood of achievement. We shoot to get you to your goals in 70% of markets, while others shoot for 50%
- Include more poor market scenarios that are more consistent with what has been seen historically
- Account for real world realities such as taxes, fees, and inflation
- Account for the sequence and magnitude of investment returns, known as compounding (averages published in the press aren't usually compounded.)
- Account for regular cash flows, such as monthly deposits
- Account for our customized glide paths, which are intended to reduce the risk of your portfolio as you reach your goal

¹ From 2016 global economic and investment outlook publications from The Vanguard Group and JP Morgan Asset

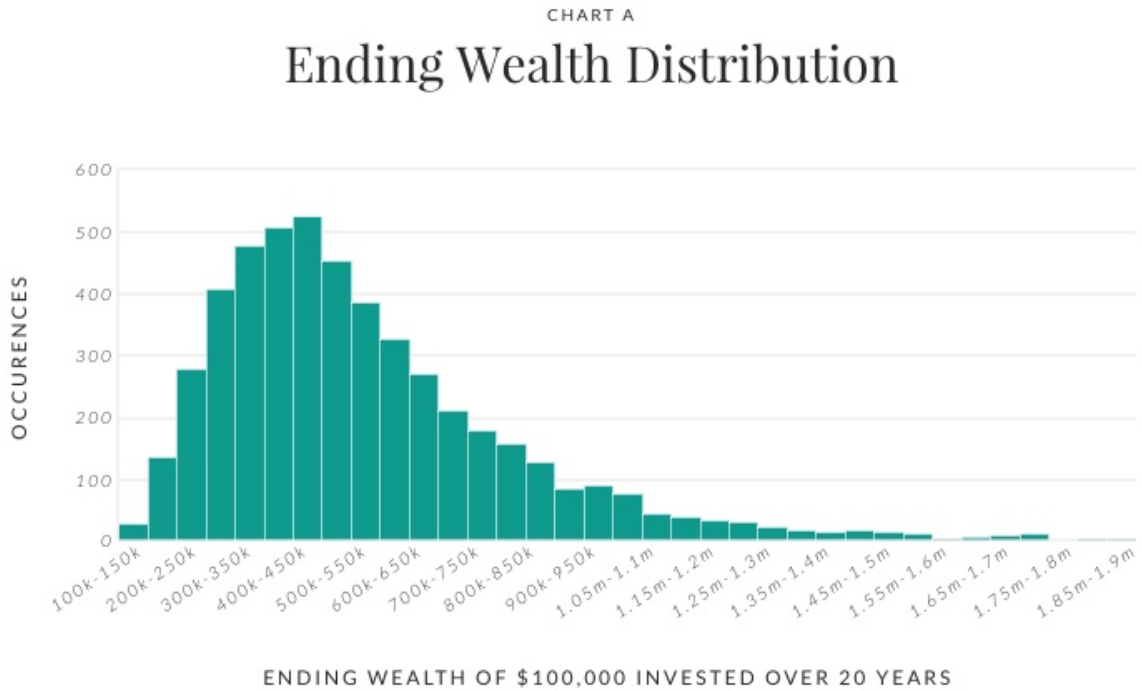
Rather than follow what other advisors do, we acted on the feedback and insights from hundreds of hours of interviews with women. The result? Forecasts that are more representative of what we believe investors may experience, and forecasts that have a *higher* likelihood of achievement. While we could simply do what everyone else is doing, we prefer to bring a high level of transparency to what we do at Ellevest, even if the news isn't as rosy. We believe that our clients make important savings and investment decisions based upon the outcomes that we show in our Ellevest plans. Showing outcomes that may be more optimistic by ignoring taxes and/or compounding may lead our clients to make decisions that could result in a shortfall under realistic market conditions. Rather, we believe our clients should understand what they could realistically expect when investing under uncertainty. This paper explains why our forecasts are intended to more realistically reflect investing in a world where taxes and fees are certain, but future outcomes not so much.

A higher likelihood of achievement

At Ellevest, our recommendations are intended to help you reach your financial goals in the majority of market scenarios --- specifically, in 70% of market scenarios. Most advisors who provide forecasts show outcomes with just a 50% likelihood of achievement; they might argue that, after all, that's what you are likely to achieve *on average*. But *on average* doesn't cut it for us. Our forecasts show you outcomes with a *higher than average* likelihood so you can plan with greater confidence to reach the financial goals that we project for you.

Charts A, B, and C below illustrate this difference. Chart A shows the distribution of possible outcomes for a \$100,000 investment in a high equity portfolio at the end of 20 years². The far left column shows a small number of instances where you may end up close to where you started if markets perform well below average. Over towards the far right, you can see a few instances where your \$100,000 could grow to \$1.5M or more, although the frequency of those outcomes is very low, as illustrated by the very short height of those columns. The tallest columns are where your portfolio is most likely to end up, from \$300,000 to \$500,000.

² These results were provided by Morningstar, Inc., using a Monte Carlo simulation— a forward looking, computer-based calculation in which we run portfolios through a thousand different economic scenarios to determine a range of possible outcomes.



As illustrated above, the final outcome of a 20-year investment of \$100,000 (in a high equity portfolio) can vary widely, depending upon stock market performance.

Chart B below is the same chart, showing that you may have \$464,672 at the 50% likelihood or “on average.” That means that your portfolio is equally likely to be above \$464,672 (light green columns) or below \$464,672 (dark green columns). Hence, you have a 50-50 chance of ending up somewhere in the light green regions or dark green regions. This 50% forecast, \$464,572, is the projection that most advisors use.

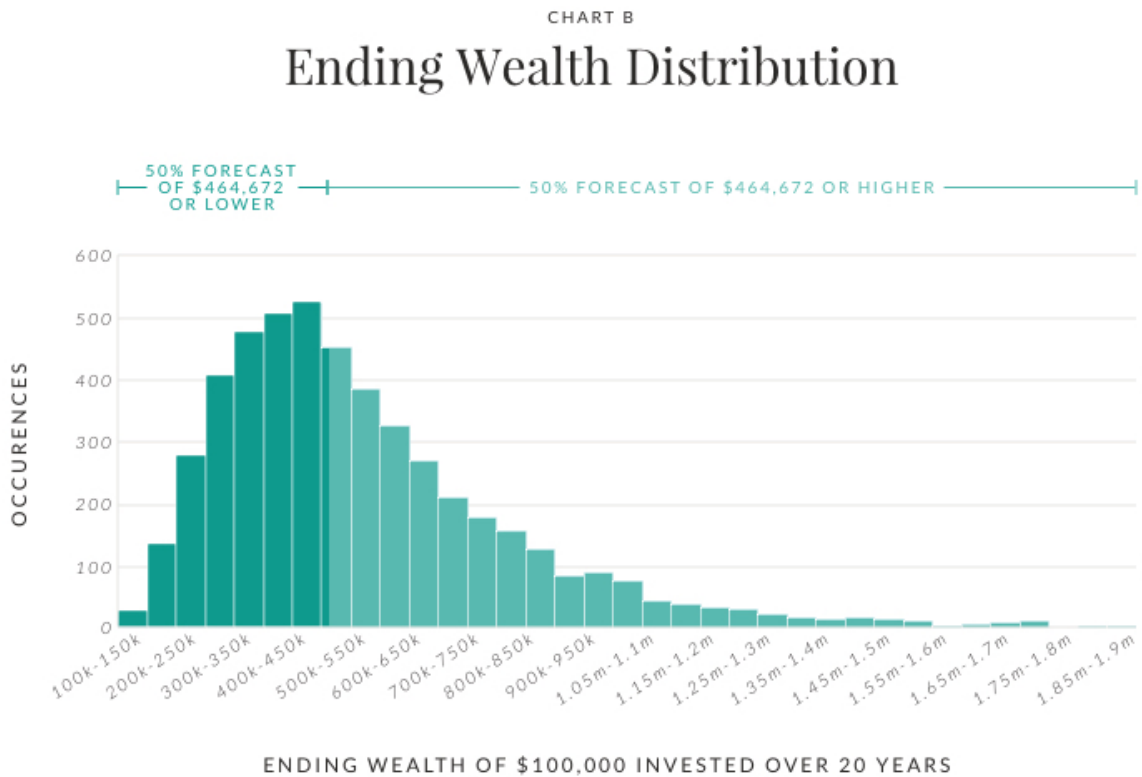


Chart C illustrates the forecast that we show in your Ellevest plan. The forecast that we show has a 70% likelihood of being in the light green columns, and a 30% likelihood of ending up in the dark green columns. The 70% likelihood forecast, \$350,652, is clearly lower than the forecast at the 50% likelihood, but carries a higher likelihood of achievement (or better). Because our clients prefer greater likelihood to less, we developed our recommendations to maximize the chances of your portfolio ending up in the light green region. Note that although we show you a forecast of \$350,652, there is a 70% chance it could be higher, and in some cases, very much higher.



At Ellevest, we choose to project a lower forecast with a higher probability of achievement over a higher forecast with a lower probability, even if that’s bad marketing on our part.

The algorithms that drive our portfolio and savings recommendations seek to help you achieve your goal with a 70% likelihood. In practical terms, that means that our Ellevest plans are more likely to recommend that you save more as compared to other advisors that

aim for achievement at only a 50% likelihood. We believe our recommendations give you a higher prospect of reaching your goal, and seek to mitigate the potential for falling short.

Simple averages versus the impact of compounding

Many reputable investment firms publish forecasts for US and global equities based upon extensive analyses and modeling of economic data. We are no exception. At Ellevest, we partner with global investment research firm, Morningstar³, to estimate economic assumptions such as expected returns on global equities and the rate of long term inflation. These assumptions, which we call “valuation implied returns”, are important because they drive the forecasting and advice algorithms that underlie the recommendations in your Ellevest plan. Our return expectations over a 20-year period are: 7-9% for global equities, depending upon market capitalization and geographic region.

That all sounds pretty good. That must mean that if these estimates come to fruition, we can all expect our global equity portfolios to return 7-9% annually over the next 10 to 20 years, right? The answer is well...not exactly. That’s because of the differences between how these figures are determined, and how your personal investment returns are calculated. Neither is right nor wrong, but it’s important to understand the differences between what’s commonly published and what is included in our forecasts of your portfolio and the likelihood of achieving your goals.

Most estimated annual returns you read about in the paper, the 7, 8, or 9%, are simple *arithmetic* averages; they are commonly used to help facilitate apples to apples comparisons among different types of investments. Arithmetic averages are calculated by adding up each year’s expected returns and dividing by the number of years. They don’t include any cash flows, like regular savings or withdrawals, taxes, or account for the compounding of returns. Many investors erroneously assume that on average, over their investment horizon, they can expect to earn these average returns annually. However, the returns an investor will actually experience can be very different from these average annual returns. A portfolio that went up 20% one year and down 20% the next has an average annual arithmetic return of 0%, but in

³ Morningstar Investment Management, LLC

reality, you would actually be *down* 4%. This is due to the impact of compounding, or more specifically, how each individual year's return is tied to the return of the prior year.

Here's an example to illustrate the difference:

Each of the 4 scenarios below is a hypothetical scenario of market returns over 5 years. The simple arithmetic average return for all 4 scenarios is 10%.

	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
SCENARIO 1	10.00%	10.00%	10.00%	10.00%	10.00%
SCENARIO 2	20.00%	20.00%	-10.00%	10.00%	10.00%
SCENARIO 3	40.00%	20.00%	30.00%	10.00%	-50.00%
SCENARIO 4	70.00%	20.00%	20.00%	30.00%	-90.00%

AVERAGE ARITHMETIC RETURN CALCULATION:

SCENARIO 1: $(10\% + 10\% + 10\% + 10\% + 10\%) / 5 = 10\%$

SCENARIO 2: $(20\% + 20\% - 10\% + 10\% + 10\%) / 5 = 10\%$

SCENARIO 3: $(40\% + 20\% + 30\% + 10\% - 50\%) / 5 = 10\%$

SCENARIO 4: $(70\% + 20\% + 20\% + 30\% - 90\%) / 5 = 10\%$

However, the scenarios differ with respect to the order and the magnitude of returns from year to year. Scenario 1 has no volatility, whereas scenario 4 has very high volatility from year to year.

Here's how \$100 invested at the beginning of each scenario would turn out at the end of 5 years:

	GROWTH OF \$100	COMPOUNDED ANNUAL RETURN
SCENARIO 1	\$161.05	10%
SCENARIO 2	\$156.82	9%
SCENARIO 3	\$120.12	4%
SCENARIO 4	\$31.82	-20%

Most investors will do the math using the estimated 10% average annual return, and happily assume they'll see \$161 at the end of 5 years. But 4%? And *negative 20%*? How is that possible? How can these 4 scenarios, each with a 10% average arithmetic return, have such wide-ranging outcomes? The answer is the power of *compounding*. In other words, the order and magnitude of how you experience your returns year to year is a large determinant of your personal rate of return.

There are also cash flows to consider. The arithmetic averages assume you buy and hold your investment each year. However, investing over time - each month, once a quarter, or even annually - impacts your personal rate of return. For example, if you invested \$100 and received a return of -20% in year one, and then +10% in year two, you would end up with \$88. However, if you invested \$20 in year one and \$80 in year two, you would end up with \$105.60. That's because only \$20 of your total \$100 investment experienced the down year, and more of your investment (e.g. \$80) received the benefit of the up year. Investing over time, like over 70% of Ellevest clients do, will impact your personal rate of return, and cause it to differ from arithmetic average returns.

At Ellevest, although our underlying models assume a 7% - 9% arithmetic (pre-tax) return for equities, the sequence of returns you experience, as well as any cash flows, will impact your personal rate of return. To get a realistic estimate of what you can expect, we run your portfolio and your cash flows through many, many different market scenarios - good, bad, high volatility, low volatility, etc. And the forecast that we show you in your Ellevest plan projects achieving your goal in 70% of those market scenarios.

Models that include more downside scenarios.

Every forecasting model, including ours, uses not only economic assumptions and estimates of investment returns, but also models of how markets behave. No model is perfect, but we strive to develop and use models of expected market returns that produce results matching (as closely as possible) the returns we have seen historically. Many advisors use models that assume that stock returns are normally distributed, meaning that equity returns resemble a bell curve, as seen below in Chart D. These models are reasonably good predictors in the middle part of the curve, but not so much at the tails. They predict very few extremely low or extremely high returns, when historically, we've seen more of these types of returns, especially on the downside, than a normal bell curve might predict.

Normal distribution models assume that very poor market scenarios⁴ have a probability of occurring only one out of every 1000 instances (in this case, months), or 0.13%. However, history shows that these scenarios actually occur 10 times out of 1000 instances, or closer to 1%.

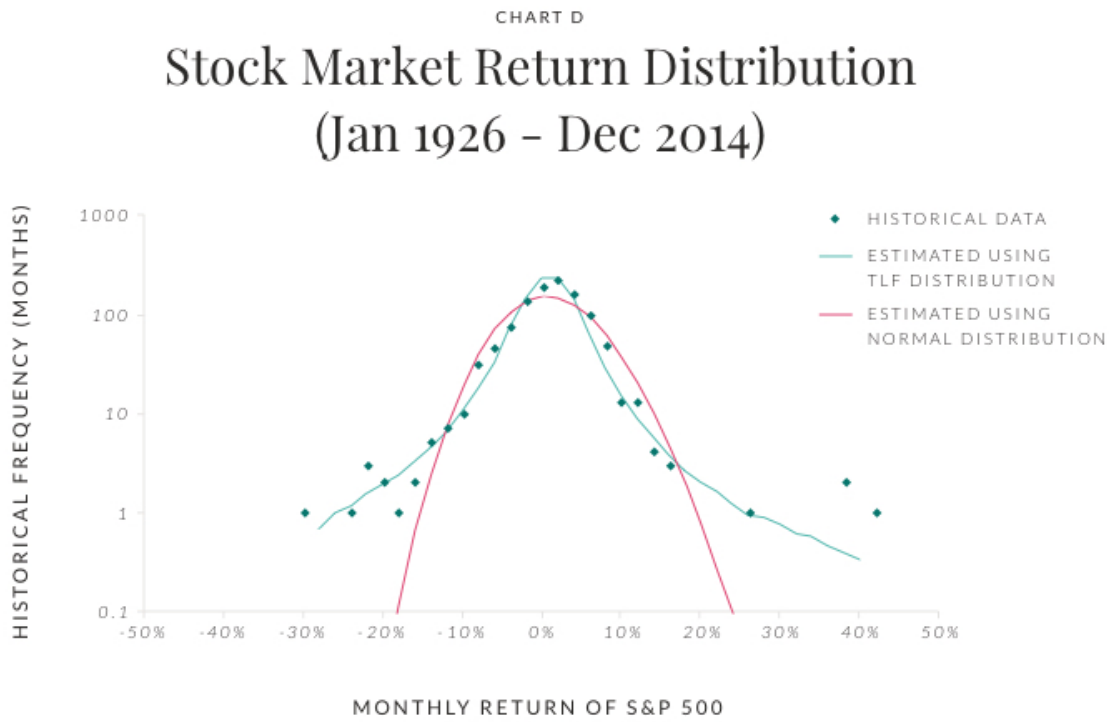
Remember October of 1987? The S&P 500 fell more than 21.5% that month. And October of 2008? Down 16.79% for the month. Those are 2 out of the 10 occurrences where equity returns returned lower than -15.0% for the month from 1926 through 2014. Most of us would prefer to forget those episodes, but unfortunately, such events are part of the risks of investing. We can prepare for them by forecasting how our portfolios would perform under such conditions, and then invest and save appropriately so that our goals may be achieved if poor market scenarios occur like they have in the past. Using a normal distribution model, or any model that downplays or ignores the frequency of these poor market scenarios result in forecasts that may be too optimistic. We hope for great market returns yet prepare for bad markets, rather than hope for the best only to be unpleasantly surprised.

In partnership with Morningstar we use a model of returns behavior called truncated Lévy flight (TLF)⁵. We believe this model describes stock market returns that more accurately reflect how markets have behaved historically, especially on the downside. Chart D below illustrates the difference between using a normal and TLF distribution and how well the models would have predicted market returns historically.

⁴ We define very poor market scenarios as those that are 3 standard deviations below the mean.

⁵ For more information:

<https://corporate.morningstar.com/ib/documents/MethodologyDocuments/IBBAssociates/UsingTruncatedLevyFlightToEstimateDownsideRisk.pdf>



Source: Morningstar Investment Management LLC. Used with Permission.

As the chart illustrates, using a normal distribution model (red curve) fails to capture the frequency of poor returns that we have seen historically and likely results in forecasts that are more optimistic. The TLF model (green curve) more closely matches the historical data (green diamonds) for this period. At Ellevest, our models include these bad market scenarios at a frequency that reflects what we've historically experienced: about three October 2008-like events over a horizon of 30 years. Correspondingly, our forecasts may be lower than those of other advisors that use models reflecting fewer bad market scenarios.

Taxes matter.

The forecasts that we read about in the papers – the 7, 8, or 9% for global equities are estimated annual *pre-tax* returns. Generally, most estimated returns you hear from advisors are pre-tax, to help facilitate an apples to apples comparison between different types of investments. Our 7-9% estimated arithmetic annual returns on global equities mentioned

earlier are also pre-tax. However, our forecasts of your portfolio in a taxable account includes the estimated taxes you may pay in the course of investing, based upon an estimate of *your personal* tax rates. For taxable accounts, the impact of including or ignoring taxes incurred from investing can have a significant impact on your forecast and the achievement of your goals. For most of us, paying taxes on dividends and interest earned, as well as realized capital gains, is an annual affair. In a taxable account, these tax liabilities can't be ignored or deferred indefinitely.⁶ Ellevest's forecasts include estimates of your personal tax impact, and over long horizons, the amounts can add up.

Here's an example. Let's suppose you start with \$20,000 and invest it for 11 years in a low-cost diversified portfolio of about 80% equities, 20% bonds⁷. Chart E below shows the estimated taxes that would be due each year, based upon an estimate of the interest and dividends received, and any realized capital gains from rebalancing the portfolio.

⁶ Unless you have losses that offset all gains, and/or if the account is passed onto heirs and receives a step up in basis.

⁷ These results were provided by Morningstar, Inc., using a Monte Carlo simulation— a forward looking, computer-based calculation in which we run portfolios through hundreds of different economic scenarios to determine a range of possible outcomes.

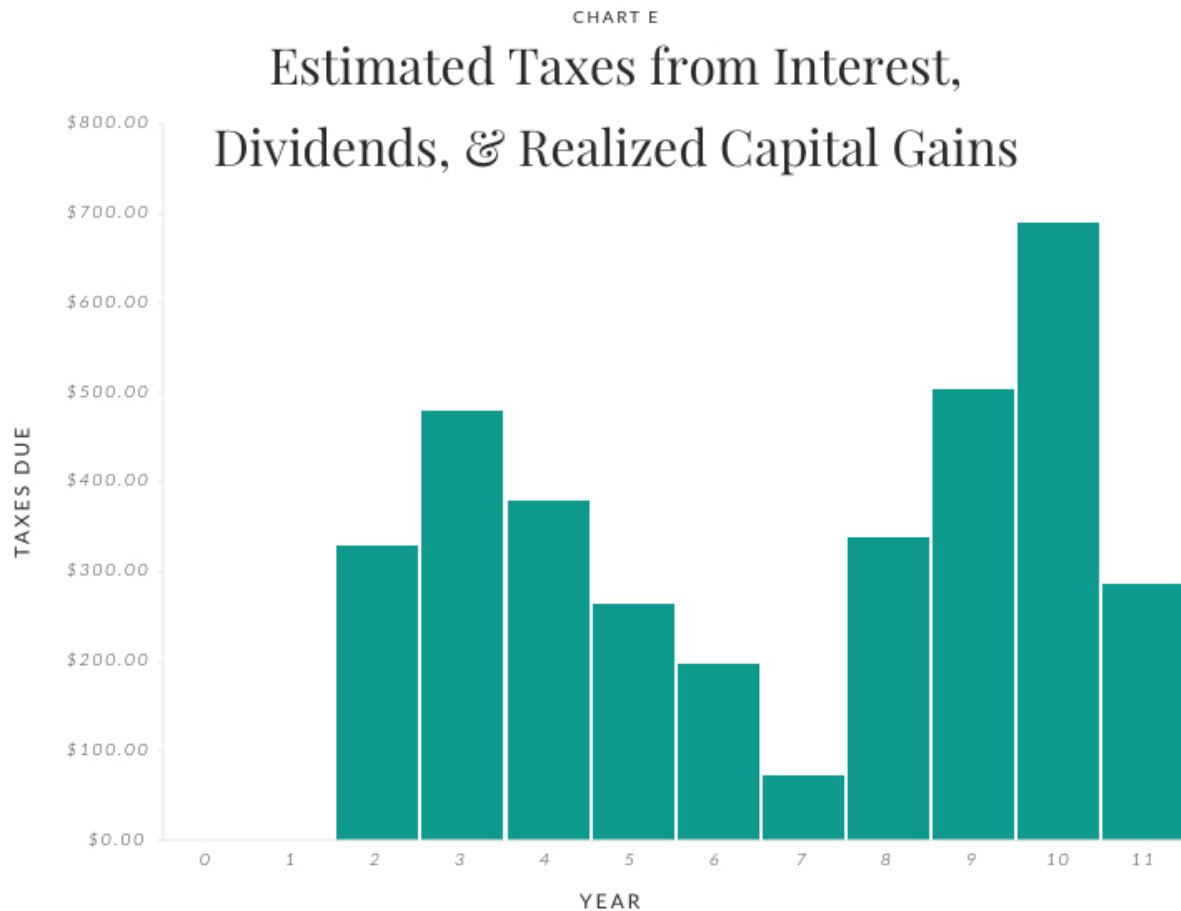
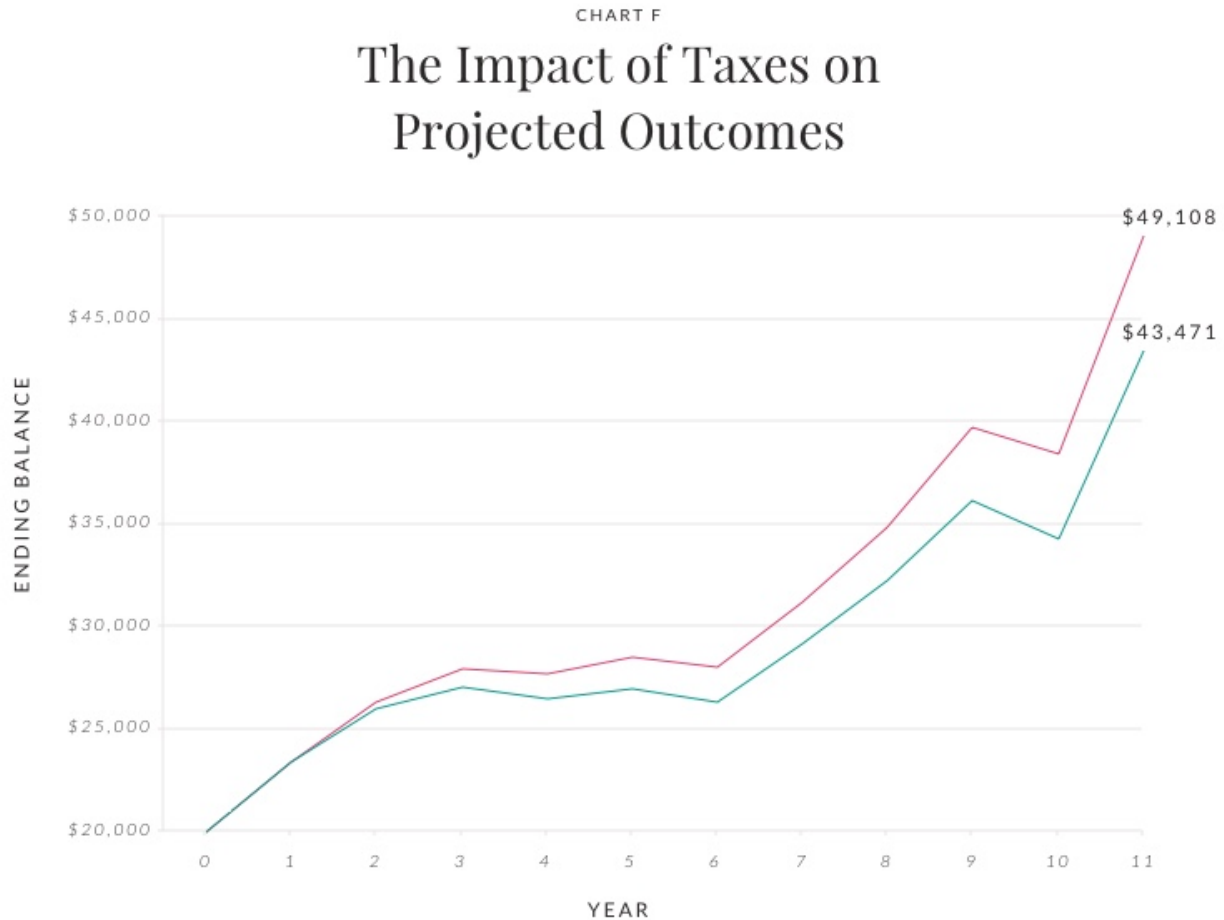


Chart F illustrates the difference in outcomes. The red line shows the simulated growth of the diversified portfolio assuming no taxes. The green line shows the simulated growth under the same assumed market conditions, but including estimated taxes and assuming those taxes are paid out of the account each year, as they are due (amounts shown in Chart E). In this case, the taxes are estimated based upon a single woman earning \$80,000 and living in Texas. Both projections reflect a 70% likelihood of achievement or better, and both accounts assume an advisory fee of 0.50% of assets, which is paid out of the account each year. The forecast without taxes is 13% greater than the forecast that includes taxes.

If your financial goal was to save and invest for a \$48,000 down payment on a home, you would probably feel pretty confident if your forecast showed you were on track to receive \$49,108, as shown in the chart above. However, if you account for the taxes you owe each year for dividends, interest income, and realized capital gains, you would fall short of your goal, netting less than \$43,500 after tax. If you reside in a high tax state (like New York or

California) and have income placing you in a high marginal tax bracket, the impact of ignoring taxes will be even more significant.



Many advisors' forecasts are pre-tax, but you'll need to read the fine print to know this. And yes, with disclosure, showing pre-tax forecasts may not be wrong. However, taxes are a real world reality, and we believe that not accounting for them in our forecasts would not benefit our clients in helping them achieve their financial goals. This means that our forecasts, which incorporate taxes, will be lower than those of other advisors that show pre-tax forecasts. But we'd rather make it real (and personal to you) than risk having you fall short of your goals.

Glide paths: reducing portfolio risk as you reach your goal.

The portfolios that we recommend at Ellevest begin at a specified equity level, which decreases as you reach your goal, commonly called a “glide path”. Reducing portfolio risk over time helps preserve principal and mitigate large losses as you near your target goal. Each goal has its unique glide path specifically designed to reduce the chance of loss, as you get closer to your goal. Forecasts offered by other advisors usually do not incorporate a glide path, but instead assume your current or target portfolio is maintained for your entire investment horizon. Some advisors will use a glide path in practice, but show forecasts that assume a constant target portfolio. This may potentially lead to a mismatch between how your portfolio is managed over time, and the forecasted outcome. At Ellevest, our forecasts reflect the glide paths that we use to manage your portfolio over time.

A HINT FOR YOU MATH GEEKS:

Because our forecasts are at the 70% likelihood, you can’t determine an implied average expected return by dividing our forecast by your initial wealth and then annualizing. The usual calculation for compounded returns doesn’t hold at the 70% likelihood! For example, suppose you start with \$10,000 to fund a YesMe! Goal. (That’s what we call our build wealth goal.) Over 20 years, we forecast an outcome of \$19,928 or better with a 70% likelihood. Dividing this outcome by the original investment of \$10,000 and annualizing the return over 20 years results in an implied expected annual return of about 3.51%. Not terribly compelling, right? Read on....

Remember that the forecast we show is at the 70% likelihood – that’s not the same as average, it’s better than average. To determine the expected average annual return, the 70% forecast needs to be adjusted using a volatility correction. Doing so yields an expected average annual return of about 5.03%. This estimate is an *after-tax* estimate that includes the taxes that you incur (and pay) each year, the glide path towards less risky portfolios, and the simulation of compounded returns with many market scenarios, including bad ones that are modeled at a frequency consistent with history. For context, the after tax arithmetic expected returns we use in our underlying model for the YesMe! goal range from 6.40% at the beginning of the investment period to 4.83%, as the portfolio’s risk glides down.

A Final Note: Separating Portfolio Performance from Projected Outcomes

Well-documented research has shown that a portfolio's asset allocation (stock and bond weightings) determines more than 93% of the variability in a portfolio's returns⁸. That means that portfolios with like asset allocations and fees will perform similarly, regardless of an advisor's belief (or best guess) of how equities and bonds will perform in the future. Whether your forecast is low or high, a low cost, diversified portfolio of 80% equities and 20% bonds will perform about the same over time, regardless of whether you invest in this portfolio with Ellevest, another advisor, or create and manage the portfolio yourself⁹. This is *portfolio performance*, which we won't know until after the fact.

On the other hand, projected outcomes are exactly that...a projection or estimate that is made before the fact. It's important to remember that one doesn't necessarily imply the other. At Ellevest, we choose to show more realistic forecasts with higher likelihoods of achievement, but our portfolios will perform similarly to other portfolios with similar asset allocations, fees, and rebalancing policies.

IMPORTANT DISCLOSURES

The statements contained herein are the opinions of Ellevest. All opinions and views constitute our judgments as of the date of writing and are subject to change at any time without notice.

The projections of various investment outcomes are hypothetical in nature, do not reflect actual investment results, and are not guarantees of future results.

Information was obtained from third party sources, which we believe to be reliable but not guaranteed for accuracy or completeness.

⁸ Brinson, Gary P., L. Randolph Hood, and Gilbert L. Beebower. 1986. "Determinants of Portfolio Performance." *Financial Analysts Journal*, vol. 42, no. 4 (July/August):39-44.

⁹ Excluding the deduction of advisory fees.

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