# nebo GMO Dear Allocator: Is it OK to white Paper own 100% stocks?

## **Executive Summary**

We recently polled our Nebo clients: "What one investment question would you want to ask Ben Inker, Co-Head of GMO Asset Allocation, today?" We got some classic reactions, like "Ooh! Ooh! This is like walking me into the Eccles Building and saying, 'If you could ask Chair Powell one question, what would it be?'" and "Interesting. Kind of like a 'Dear Abby' advice column...I like it."

We also received a lot of interesting questions to this "Ask an Allocator" opportunity, and we will try to answer all of them in time. Provided in this edition is Ben's answer to one of our favorites from Rich Toscano, Investment Manager at Pacific Capital Associates and selfproclaimed "value investing nerd." Ben Inker | July 2023

## Question

If a client has no volatility limit and is sufficiently early in their glidepath, Nebo will often recommend a 100% allocation to stocks. But while this makes sense given math, past returns, etc., a little paranoid voice inside my head questions whether it's prudent to be 100% allocated to a single asset class. What would Ben say to that paranoid voice?

# Ben's Answer

As Rich points out, Nebo will "often" recommend a 100% allocation to stocks for a young client, but it doesn't universally do so. In order for Nebo to recommend a 100% stock portfolio for a client who has a long time period until they really care about shortfall (e.g., 20+ years until retirement), two things are necessary. You would need to specify that, first, the client is looking for a fairly high return from their portfolio and, second, that Nebo should assume stock returns are mean reverting. If you do not believe stock returns are mean reverting or that your client doesn't desire a high target compound rate (TCR) of return, Nebo will recommend holding some long-term bonds as well. But I'd submit that it probably doesn't make a lot of sense to assume either that the client does not have a high TCR or that stock returns are not mean reverting.

First, let's think about what it would mean to have a long horizon investment portfolio investing with a low TCR. As a quick refresher, Nebo is a multi-period shortfall minimization optimizer. It only cares about minimizing the likelihood and extent of shortfall relative to the target wealth starting in the year you specify, generally specified as "retirement." Inputting a low TCR or target wealth relative to the initial portfolio suggests the client really doesn't have any interest in generating much return in the years before they will start relying on the assets in their investment portfolio. I suppose it's possible there is a use case in which you'd make that assumption, but it's hard to fathom it. Even if the circumstances today suggest returns don't matter much for the portfolio, 30 years is a very long time and circumstances might well change. The vast majority of potential changes to your client's goals would suggest a more "normal" return goal for the portfolio, and the excess expected shortfall of having run too aggressive a portfolio for such a client is quite low.

Given an assumption of mean reversion in stock returns, Chart 1 shows what Nebo would recommend for a 5% real TCR versus a 2.5% real TCR, for a 33-year-old looking to retire at 65.

# Chart 1: Optimal Portfolios given 5% and 2.5% real TCRs



With a 2.5% real TCR, the portfolio wants "only" 91% in equities instead of 100%, but there is little obvious benefit to the change as both portfolios have the same (low) odds of seeing the client run out of money in retirement and the expected wealth outcome of the 2.5% TCR portfolio is meaningfully lower, as we can see in Chart 2. Honestly, the return difference is not night and day, since the difference in equity weight between the two portfolios is only 8.5% on average in the preretirement period. Judging from these results, there isn't a lot of reason to prefer the 2.5% TCR portfolio for our hypothetical young investor.

# Chart 2: Simulated Outcomes from 5% TCR (GP1) and 2.5% TCR (GP2) glidepaths

Long Term	GP1 (MSF)	GP2 (MSF)
Prob of success (Wealth > 0) at age 95	90%	90%
Median Wealth at age 95 (current dollars)	6,948,492	6,189,490
95th percentile at age 95 (current dollars)	35,590,664	29,807,799
5th percentile at age 95 (current dollars)	-1,017,080	-858,639
Avg. Median Wealth in Retirement (current dollars)	3,279,266	3,026,025

But there is a second reason why Nebo would suggest a portfolio with less than 100% in stocks. If you truly believe that stock and bond returns follow a random walk,<sup>1</sup> stocks remain a very highrisk investment even for investors with a long time horizon. But the historic evidence for mean reversion in stock returns is extremely strong, as is the evidence for mean aversion in bond returns, as we can see in Chart 3.

# Chart 3: Volatility of The Real Return on Stocks and Bonds as a Function of Return Horizon



### Data from 1926-2019 | Source: Online Data - Robert Shiller (yale.edu)

Solid lines are calculated using historical returns (i.e., volatility for a 5-year horizon is the standard deviation of all 5-year returns, including overlapping returns). Dashed lines are calculated by taking the 1-year return volatility and multiplying it by the square root of the return horizon. Horizontal axis is return horizon in years.

As time horizons lengthen, historic real stock volatility grows less quickly than a random walk would suggest, and historic real bond volatility grows more quickly. Given a 15-year time horizon, the chart shows that the random walk assumption would suggest that stocks should be 2.3 times more volatile than bonds, whereas historically they have only been 1.5 times more volatile. While this chart shows the U.S. experience, other markets where we have good long-term stock and bond return data show the same basic pattern. The economic explanation for what is going on with bonds where volatility rises faster than a random walk gets a little complicated, but Martin Tarlie and James Montier explain it in Investing for Retirement II: Modeling Your Assets.

If you choose to assume stock and bond returns follow a random walk, the optimal Nebo portfolio will contain quite a lot of bonds, as we can see in Chart 4.

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The key problem with the random walk hypothesis ...is that it ignores the role of valuations...

- <u>Investing for Retirement II:</u> <u>Modelling Your Assets</u>

If returns follow a random walk, asset returns have no memory. In other words, the performance of the stocks and bonds in your portfolio will be unrelated to what has gone before. Like flipping a coin, the next result will be unconnected to the last one.

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...if you are using a Monte Carlo simulation ...that is based on a random walk, you will be overestimating the uncertainty around real equity returns and underestimating the uncertainty around real bond returns.

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# ...the real price of stocks has been 16 times more volatile than the clairvoyant fair value.

- Investing for Retirement II: Modelling Your Assets

# Chart 4: Optimal Glidepath assuming no mean reversion



As you can see, this assumption is an even bigger deal than having a low TCR, and our 33-yearold client would have an initial portfolio with 20.4% in long-term bonds. So, why should we be so confident that stock returns are mean reverting? The first reason is that stocks are way too volatile in the short term. Stocks are worth the present value of their future cash flows. Those cash flows are uncertain, which means that their fair value is uncertain as well. But Robert Shiller pointed out in the 1980s that while the *current* fair value of the stock market is unknowable, we do know the true historical fair value of stocks, since we know the past. He built a "clairvoyant" fair value for the stock market based on discounting the next 50 years of dividends. That fair value has been profoundly less volatile than the actual stock market, as we can see in chart 5.



# Chart 5: Investors Continually Misprice Asset Classes

\*Clairvoyant fair value based on next 50 years of dividends and earnings. Green series is approximation of clairvoyant value given shorter history. Gold series is our estimate as to what fair value has been over the past 20 years.

As of 3/31/2023 | Source: Robert Shiller, GMO

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As the time horizon lengthens, those periods of fear and greed cancel out... The stock market has had an annualized volatility of almost 18% since the 1880s, but the volatility of its fair value has been about 1%. While there isn't a one-to-one correspondence between the volatility of the cash flows of an asset and its justifiable price volatility (after all the cash flows of a bond are actually fixed), this 18:1 ratio of price volatility to cash flow volatility is far higher than makes rational sense. While some price volatility in stocks is inevitable, an awful lot of it is investors manically transitioning between feelings of fear and greed. As the time horizon lengthens, those periods of fear and greed cancel out and the importance of the underlying stable cash flows grows. Consequently, volatility grows considerably more slowly than standard statistical modeling – and the overwhelming majority of monte carlo analyses available to investment advisors – assume it will.

Of course, this explanation also leans on historical data, and it is possible that the history we have experienced is not a good guide for the future. But even a small thought experiment would suggest that stock market returns are overwhelmingly likely to exhibit either mean reversion or lower volatility in the future. In order for the stock market to be both a random walk and highly volatile, it would have to be the case that the future volatility of dividends will be hugely higher than it has been in the past. That implies a hugely more volatile real economy, which is precisely the opposite of what we have seen over time. Chart 6 shows the 10-year trailing volatility for the U.S. economy.



## Chart 6: 10-Year Volatility of U.S. GDP

#### Source: NBER, BEA, GMO

While economic volatility did get quite high in the 1930s and 1940s, it is worth pointing out that the historical clairvoyant fair value for the stock market has had a volatility of only 1% despite containing that very economically volatile period. High "fundamental" volatility for the stock market would almost certainly require economic volatility far higher than we have seen on average over the last 120 years, whereas the history since the 1950s has shown a pronounced decrease in volatility, as should be expected in an economy that is increasingly service-oriented and has large automatic stabilizers in government spending. Even if economic volatility were to double or triple from recent levels, that would be far too stable to generate the kind of volatility in dividends that would make for a volatile stock market that doesn't mean revert. And behaviorally, a non-mean-reverting stock market requires that investors do not react to bad economic times by insisting on a larger equity risk premium to drift lower. In my three decades as a professional investor, I can count the investors I have come across who do not fall afoul of that behavioral tendency on the fingers of no hands.<sup>2</sup>

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Even those of us who are of a naturally contrarian disposition are not immune to the pressure. While the GMO asset class forecasts were noted for their bearishness in 1999 and 2000 and their bullishness in early 2009, in both cases we shaded our assumptions towards optimism and pessimism relative to historical evidence in an implicit Bayesian adjustment toward the market's current views. Our forecasts for the S&P 500 today show a similar tendency. We are trying not to make knee-jerk responses to market activity, but we have a tendency to shade our fundamental forecasts optimistically for assets that have had relatively strong performance and pessimistically for those that have been weak, to ensure we aren't missing some paradigm shift that will take time to be obvious in the data. While in our case these movements are relatively tame, we are frankly famous for our stubbornness in the face of markets moving against our idea of economic rationality. Most investors are far, far more reactive to good and bad economic and market circumstances



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in 1992 following the completion of his B.A. in Economics from Yale University. In his years at GMO, Mr. Inker has served as an analyst for the Quantitative Equity and Asset Allocation teams, as a portfolio manager of several equity and asset allocation portfolios, as co-head of International Quantitative Equities, and as CIO of Quantitative Developed Equities. He is a CFA charterholder.

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For what it is worth, the countries that performed worst in the period 1990-2022 were generally countries that were either invaded or suffered a civil war during that period. Such events were very bad for stock investors, but investors in bonds or cash were not spared losses either. Even the worst stock performer in this period (Austria with a dismal real return of about 1% real from stocks over the 122-year period) saw a larger than average equity return premium over bonds and cash as both of those asset classes gave strongly negative real returns. The Dimson Marsh Staunton results can be found here: <u>Studies & publications – Credit</u> <u>Suisse (credit-suisse.com)</u> as the Global Investment Returns Yearbook 2023 Summary Edition.

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In principle, 100% equities need not be a hard limit. A young investor might arguably be made even better off by leveraging up their portfolio beyond 100% in equities, and a portfolio with significant diversifying assets available to it might have a higher Sharpe ratio suggesting overall leverage even if the equity weight remained below 100%. Such leverage makes life more complicated and much harder to accurately simulate, however, as the leverage introduces financing risk into the mix - the risk that your financing terms will change or your financing will be pulled away from you at a time not of your choosing. The existence of levered ETFs may make such risks seem remote, but you would still be faced with the risk that your levered ETFs were unable to continuously run their intended strategies, which we have seen befall such strategies on a number of occasions over their relatively short history.

A broader look at history shows that it is quite possible for equities to do meaningfully worse than the U.S. experience. The Dimson, Marsh, and Staunton data from their comprehensive *Triumph of the Optimists* shows us that the U.S. was notably luckier than the average country over the period 1900-2022, performing a full 2% per year better than the world excluding the U.S. on average – a 6.4% compound real versus 4.3% real for the rest of the world. But in not one of the 21 countries where they could gather data was the long-term equity premium over bonds less than 2%, and on average it was over 3%, only a little lower than the default equilibrium assumption in Nebo. A German or Italian might call into question an assumption that stocks return 6% real in the long run based on their own history.<sup>3</sup> But plugging in their history instead of U.S. data to Nebo would not alter the recommendation for a long-term investor who cares about generating returns.

## Conclusion

For my part, I have a really hard time wanting to build portfolios that assume stock returns will not be mean reverting, since both history and human psychology strongly argue mean reversion will continue. That suggests that a client with decades to go before retirement should be 100% in equities.<sup>4</sup> But putting in an upper limit for equity weight that is reasonably close to but not exactly at 100% for a risk-averse client isn't a crazy idea. While the math says a young client would be better off with an all-equity portfolio for a number of years, the difference in expected return between a portfolio allowing a 100% weight in equities and one that limits the portfolio to no more than 90% equities is only about 0.25% per year in the years leading up to retirement. A 0.25% annualized return difference isn't nothing, and if your client is hiring you to build them the right investment portfolio, choosing an inferior one seems an odd choice. But if that client will sleep a lot better at night knowing that they don't have absolutely everything on the line in the stock market, the portfolio with a little less in equities might be a reasonable trade-off for them, as long as they understand that their peace of mind will likely cost them some money in the long run.

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