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## Invited Editorial

# GHAUS asset allocation

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**ABSTRACT** Asset allocation is widely viewed as one the most important investment decisions, but there is little consensus on how investors should make this choice. This article proposes a simple and intuitive three-step process, referred to as GHAUS, that accounts for all the relevant variables, including (and with particular emphasis on) the individual's ability to tolerate losses, that omits the use of black boxes and that any individual can easily implement.

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## INTRODUCTION

Practitioners and academics widely regard asset allocation as one of the most important decisions investors make; there is no debate on this point. There are, however, many and varied opinions on two related issues. The first is the impact of asset allocation, relative to that of security selection and market timing, on portfolio performance; the second is the best way for an investor to determine an appropriate asset allocation. Of these two issues, the second is the focus of this article.

There exist a wide variety of approaches to determine an appropriate asset allocation, ranging all the way from portfolio optimization to rules of thumb, with many alternatives in between. The three-step approach proposed here puts the investor in the driver's seat, in the sense that he chooses directly the asset allocation ideal for him. The investor does this after performing an evaluation, according to his preferences, of the trade-off between the upside potential

and the downside potential of a set of portfolios.

Needless to say, there is neither a perfect way to determine an asset allocation nor a perfect asset allocation for any given investor. Determining the optimal combination of stocks, bonds, and other assets for any individual is a mix of art and science. For that reason, the approach proposed here, or any other approach for that matter, cannot be defended as the best; rather, it is proposed as a simple, plausible, and effective way for an investor to determine a reasonable asset allocation. The approach proposed is labeled GHAUS, which follows from the variables considered in the analysis: **G**oal, **H**olding period, **A**bility to tolerate losses, **U**pside and downside potential, and **S**horter holding periods.

The rest of the article is organized as follows. The next section discusses in more detail the issue at stake; the section after that discusses the approach proposed, illustrating it

with evidence from the United States; and the last section provides an assessment.

## THE ISSUE

There is a long-running debate, both in practice and in academia, regarding the relative importance of asset allocation, security selection, and market timing. Beginning with Brinson *et al* (1986), who argued that investment policy (asset allocation) is far more important than investment strategy (security selection and market timing), a vast literature has been discussing the relative merits of these three stages of portfolio construction.<sup>1</sup>

This debate notwithstanding, both practitioners and academics do agree that asset allocation is one of the most important decisions investors make. There are, however, a wide variety of opinions regarding *how* to make this decision. Of the many approaches proposed, some are technical, some simplistic and many others are in between.

On the technical side, portfolio optimization techniques enable an investor to find the best portfolio for the stated goal. This technique, however, is limited by the GIGO (garbage in, garbage out) rule, in the sense that inaccurate inputs will lead to flawed asset allocations. Moreover, it is beyond the capability of most individual investors.

On the simplistic side, there are several rules of thumb, such as the ‘age in bonds’ rule, which suggests that the proportion of bonds (stocks) in an investor’s portfolio should be approximately equal to his age (100 minus his age). This rule links an asset allocation exclusively to the investor’s age, thus ignoring many other important variables such as the investor’s risk tolerance and level of wealth.

Between the technical and the simplistic there are many other approaches. The recent rise of robo-advisors has increased the popularity of an alternative that was popular to begin with, namely, investor questionnaires. Although they vary widely in

their structure, they all suggest an asset allocation based on the answer to several questions that typically explore an investor’s holding period, tolerance for risk and investing experience, among other variables. One of the shortcomings of these questionnaires is that, from the investor’s perspective, there is a black box between his answers and the suggested allocation.

Another alternative is the goals-based approach pioneered by Brunel (2003), Nevins (2004), and Chhabra (2005). In this approach, a portfolio is viewed as a pyramid of different layers, with each layer being a sub-portfolio that aims to fulfill a different goal, from downside protection at the bottom all the way through upside potential at the top.

Yet another alternative is to devise an asset allocation appropriate to all investors and circumstances, such as the permanent portfolio proposed by Browne (1999). This portfolio consists of equal proportions of stocks, bonds, cash and gold, and aims to have at least one asset performing well regardless of the economic environment. Anderson *et al* (2014) find empirical support for this portfolio in several developed markets.

The approach proposed here has several desirable features. First, it is simple and intuitive, not requiring the investor to have any financial expertise. Second, it accounts for the most relevant variables, considering both the upside potential and the downside potential of a range of portfolios. Third, it captures downside potential through the probability and magnitude of expected losses, which to most investors are more meaningful than volatility as a measure of risk. Fourth, it accounts directly for the investor’s tolerance for risk, requiring that he explicitly considers his ability to tolerate losses. And last but not least, the suggested asset allocation does not arise from a black box but rather is chosen by the investor himself after a careful evaluation of the relevant trade-offs.<sup>2</sup>

As already mentioned, the approach proposed is referred to as GHAUS, which summarizes the main variables used in the

**Table 1:** GHAUS asset allocation

S	GM	SD	12 Months			36 Months			60 Months		
			PL	AL	AG	PL	AL	AG	PL	AL	AG
0	5.8	1.9	0.0	N/A	5.9	0.0	N/A	19.7	0.0	N/A	36.4
5	6.1	2.0	0.0	N/A	6.2	0.0	N/A	20.6	0.0	N/A	38.0
10	6.3	2.4	0.8	-1.2	6.5	0.0	N/A	21.4	0.0	N/A	39.6
15	6.6	2.9	2.7	-1.7	7.0	0.0	N/A	22.3	0.0	N/A	41.1
20	6.9	3.5	4.2	-2.4	7.4	0.0	N/A	23.2	0.0	N/A	42.7
25	7.1	4.1	6.3	-2.8	7.9	0.2	-0.6	24.1	0.0	N/A	44.3
30	7.3	4.8	8.5	-3.3	8.5	1.2	-1.5	25.2	0.0	N/A	45.9
35	7.6	5.5	10.7	-3.8	9.2	3.4	-2.4	26.7	0.0	N/A	47.5
40	7.8	6.2	12.6	-4.4	9.9	4.8	-3.7	28.1	0.0	N/A	49.1
45	8.0	6.9	14.1	-5.0	10.5	6.2	-4.7	29.6	0.2	-2.2	50.9
50	8.2	7.6	15.1	-5.8	11.1	6.9	-6.2	30.9	0.2	-4.6	52.5
55	8.4	8.3	16.0	-6.5	11.8	8.7	-6.7	32.6	0.6	-3.2	54.3
60	8.6	9.1	17.1	-7.1	12.5	9.2	-8.3	33.9	0.7	-4.1	56.1
65	8.8	9.8	19.0	-7.5	13.3	10.3	-9.2	35.5	1.3	-4.2	58.1
70	9.0	10.5	19.7	-8.2	14.0	11.9	-9.7	37.3	2.6	-3.6	60.6
75	9.1	11.3	20.4	-9.0	14.7	12.7	-10.8	39.0	4.6	-3.6	63.7
80	9.3	12.0	21.4	-9.5	15.5	13.6	-11.9	40.6	6.1	-4.3	66.5
85	9.5	12.8	21.7	-10.4	16.2	14.7	-12.7	42.4	7.6	-5.2	69.5
90	9.6	13.5	21.9	-11.3	16.8	15.0	-14.2	44.0	8.7	-6.3	72.4
95	9.7	14.3	22.6	-11.9	17.6	15.4	-15.6	45.5	9.4	-7.7	75.0
100	9.9	15.0	23.1	-12.6	18.4	15.8	-17.1	47.0	11.1	-8.3	78.5

This exhibit shows several characteristics of portfolios with allocation to stocks (S) ranging between 0 and 100%, including the geometric mean annual return (GM), annualized volatility (SD), proportion of periods with losses (PL), average loss in those periods (AL), and average gains in periods with gains (AG). The slice of the portfolio not allocated to stocks (S&P 500) is allocated to bonds (1-year US Treasury Bills). Returns are monthly, nominal, account for capital gains/losses and cash flows paid, and for the January/1965–December/2014 period. All figures in %.

analysis, in the same order as they are considered by the investor. These variables are the **G**oal of the portfolio, the portfolio's **H**olding period, the investor's **A**bility to tolerate losses, an analysis of **U**pside and downside potential, and the consideration of **S**horter holding periods than that expected for the portfolio.

## THE APPROACH PROPOSED

The first part of this section describes the data, variables and exhibits used in the example discussed. The second part discusses the approach proposed following the steps of a hypothetical investor. And the third part discusses some additional considerations.

### Data and relevant variables

The best way to discuss the approach proposed is through a concrete example. Table 1 reports some relevant characteristics

of 21 asset allocations containing different proportions of stocks (S) and bonds ranging, as the first column indicates, from a portfolio fully invested in bonds to one fully invested in stocks. Stocks are represented by the S&P 500 and bonds by 1-year US Treasury Bills. Returns are monthly, nominal, account for capital gains/losses and cash flows paid, and for the 50-year period between January/1965 and December/2014.

Three holding periods are considered in Table 1, ranging from 1 year (12 months) to 5 years (60 months). The summary statistics reported consider all possible overlapping periods with a rolling window moving in 1-month steps. To illustrate, the first 36-month period considered is January/1965–December/1967, the second is February/1965–January/1968, and so forth. Obviously, any other holding period could be considered, the main reason for focusing on 'short' holding periods of 1, 3 and 5 years is that most investors cannot help evaluating the

portfolio in the short term even if they invest for the long term.

The portfolios in Table 1 vary from the most conservative, fully invested in bonds and with an annualized return of 5.8 per cent, to the most aggressive, fully invested in stocks and with an annualized return of 9.9 per cent. If history is any guide, the returns shown in the second column (GM) are those an investor should expect from the asset allocations considered. An argument could be made, and lately has been made, that expected returns going forward are likely to be lower than what history indicates, but it is not necessary to get into that controversy here for the purpose of illustrating the approach proposed.

In order to further assess upside potential, besides the annualized return in the second column, Table 1 also reports the average gain in periods with gains (AG), calculated as the average gain across all the periods of a given length in which the portfolio increased in value. This figure is based on total (not annualized) returns between the beginning and the end of each period. To illustrate, considering all the 36-month periods in which a portfolio fully invested in stocks increased in value, the average gain between the beginning and the end of those periods was 47.0 per cent (which is equivalent to an annualized gain of 13.7 per cent, not reported in the exhibit).

The third column of Table 1 is there mostly for completeness, or for those individuals with some financial background, but to the vast majority of individual investors volatility (SD) figures mean very little. Most individuals relate risk to losses and are ultimately concerned with how frequently they may lose money and how much they may lose. These two variables are considered in Table 1 through the probability of suffering a loss (PL) and the average loss in periods with losses (AL).

The probability of suffering a loss is measured by the number of periods of a given length in which the portfolio decreased in

value, relative to the total number of periods of the same length. The average loss in periods with losses is measured by the average loss across all the periods of a given length in which the portfolio decreased in value; as is the case with the average gain, the average loss is expressed in terms of total (not annualized) returns. To illustrate, a portfolio fully invested in stocks decreased in value in 15.8 per cent of all the 36-month periods considered, and in those periods the average loss was 17.1 per cent (which is equivalent to an annualized loss of 6.0 per cent, not reported in the exhibit).<sup>3</sup>

Figures A1 and A2 in the Appendix, focusing on 12- and 60-month holding periods, are based on and complement Table 1 and could be used as visual aids. These exhibits summarize the upside potential with GM (in the horizontal axis) and AG (the upper bars) and the downside potential with AL (the lower bars) and PL (the figures above the horizontal axis).

## A hypothetical investor

Having introduced the data and variables to be discussed, we will illustrate the three-step approach proposed following the asset allocation decision of a hypothetical investor. An investor's first step, which we will refer to here as *Step 1*, is to determine both the goal of his portfolio and the implied holding period.

The approach proposed offers no special insight on this first step. That said, it is important to keep in mind, first, that it is simply not possible to build an appropriate portfolio without having first determined its goal and implied holding period; and second, keeping these two variables in mind at all times critically helps the investor endure the bad times he will likely have to go through during the portfolio's life. For the purpose of our discussion, we will assume that the investor has decided to hold the portfolio for 5 years.

The next logical step, which we will refer to as *Step 2*, is to evaluate the risk-return

trade-off of a set of asset allocations. This is, in fact, the main focus of the approach proposed here. For the purpose of our discussion, we will assume that the allocations to be considered are those in Table 1. Obviously, any other portfolio, consisting of any mix of asset classes, can be evaluated in the same way we will discuss in what follows.

The annualized return of the allocations considered in Table 1 ranges between 5.8 per cent for the most conservative portfolio and 9.9 per cent for the most aggressive. Most investors are likely to direct their attention to the portfolio with the highest expected return, and that is perhaps the best place to start. As Table 1 and Figure A2 show, over the last 50 years a portfolio fully invested in stocks delivered an annualized return of 9.9 per cent, and across all the 5-year periods in which the portfolio increased in value, it gained an average of 78.5 per cent (12.3 per cent annualized). This information summarizes the upside potential of this allocation.

The critical part, however, is to consider the portfolio's downside potential and the investor's ability to bear it. A portfolio fully invested in stocks decreased in value over 5 years in 11.1 per cent of the periods considered; in those periods, the average loss was 8.3 per cent (-1.7 per cent annualized). Can the investor see himself losing that much with that probability? Is he able to invest \$100 000 in a portfolio and find himself, 5 years down the road, with \$91 674?

If the investor finds the downside potential of this allocation acceptable, he can move on to Step 3. If he finds this portfolio too risky instead, then he needs to move to the left in Figure A2 (or upwards in Table 1) until he finds a probability of loss and average loss that he is able to bear over 5-year periods; once he finds it, he can move on to Step 3. For the purpose of our discussion, we will assume that the investor views the portfolio fully invested in stocks as too risky, and that upon further analysis he determines he will be able to bear the downside potential of a 60-40 stock-bond allocation.

It is important to stress that the focus of the analysis should be on the probability and magnitude of potential losses, and not on the expected return, of the feasible set of allocations. If the investor focuses on the latter and pays only residual attention to the downside potential, he is likely to bail out of the portfolio if losses become more frequent or higher than he was prepared to bear. Obviously, it is possible (in fact, likely) that the investor finds the asset allocation that results from a focus on downside potential disappointing in terms of expected return. Unfortunately, markets do not necessarily offer the trade-offs we would like. But an investor is far more likely to bail out of a portfolio if the losses are more frequent or higher than he is able to bear than if the return is not as high as he would like it to be.

The final step in the asset allocation process, which we will refer to as *Step 3*, is to consider the downside potential of the asset allocation found acceptable in Step 2 but this time over a shorter holding period. The reason for this step is that, as already mentioned, an individual may be investing for the long term but cannot help reacting to short-term events; hence, it is important for the individual to explore and understand what may happen over holding periods shorter than that intended for the portfolio.

Continuing with our example, because when focusing on 5 year periods our investor had found the downside potential of a 60-40 allocation acceptable, he now needs to explore the downside potential of this portfolio over a shorter holding period. For the purpose of our discussion, we will assume he now considers a 1-year period.

As shown in Table 1 and Figure A1, a 60-40 allocation decreased in value over 1 year in 17.1 per cent of the periods considered; in those periods, the average loss was 7.1 per cent. Can the investor see himself losing that much with that probability? Is he able to invest \$100 000 in a portfolio and find himself, 1 year down the road, with \$92 853? If the investor finds this downside potential

acceptable, then he has found his ideal asset allocation; if he does not, then he needs to move to the left in Figure A1 (or upwards in Table 1) until he finds an allocation with a downside potential he is able to bear over 1-year periods.

*Step 3* could obviously be repeated over increasingly shorter holding periods. This may be particularly useful to investors that cannot help focusing on short-term fluctuations, and less useful to investors that are able to take the long view. One way or another, after first considering the upside and downside potential of a set of allocations over the portfolio's intended holding period, and doing the same over one or more shorter holding periods, the investor should have found an appropriate asset allocation.

### Some further thoughts

First, a brief recap of the three-step approach proposed, which is summarized in Figure A3 in the Appendix. In *Step 1*, an investor determines the portfolio's goal and intended holding period. In *Step 2*, starting from the allocation with the highest expected return of those considered, the investor selects the allocation with the highest upside potential, from those with an acceptable downside potential, over the portfolio's intended holding period. In *Step 3*, starting from the allocation chosen in *Step 2*, the investor again selects the allocation with the highest upside potential, from those with an acceptable downside potential, over a holding period shorter than that intended for the portfolio. As already mentioned, *Step 3* can be repeated as many times as necessary.

Second, it may be argued that the approach proposed puts more emphasis on the downside potential than on the upside potential of the allocations considered. This is indeed and by design the case. As is well established since the pioneering work of Kahneman and Tversky (1979), individuals weigh losses more heavily than gains of equal magnitude. Moreover, as already mentioned,

an investor is far more likely to bail out of a portfolio if its losses are more frequent or higher than he was prepared to bear than if the return is not as high as he would like it to be.

Third, only for illustrative purposes the approach proposed was discussed for an intended holding period of 5 years, and a shorter holding period of 1 year. However, for a long-term investor, it may be useful to focus on more than two holding periods. If an investor planned to hold a portfolio for 20 years, after considering the upside and downside potential of the feasible allocations for that holding period, it may be useful to also consider holding periods of 10 years, 5 years and 1 year, and may be even 1 month if the investor cannot help focusing on (and reacting to) short-term events.

Fourth, note that it was somewhat implicitly assumed in the discussion that the allocation finally chosen in *Step 3* will be no more aggressive than that tentatively selected in *Step 2*. This is for two reasons. First, because when contemplating shorter holding periods, losses tend to loom larger (compare the orange bars of Figures A1 and A2) and may push the investor toward more conservative, rather than more aggressive, allocations. And second, even if it were the case that an investor may be able to bear the downside potential of a more aggressive allocation than that selected in *Step 2* in the short term, what ultimately matters is the downside potential he is able to bear during the portfolio's actual holding period.<sup>4</sup>

Finally, some investors may want to consider the worst-case scenarios of the relevant allocations and the analysis could easily be extended to incorporate them as one more variable to assess downside potential. An obvious way to do it would be by adding to Table 1 the lowest (historical) return for each asset allocation and holding period. Needless to say, as is the case with the rest of the analysis, the investor needs to understand that what has happened historically may or may not represent accurately his future experience

over his intended holding period. In other words, the investor may obviously experience over his holding period a worse (or better) return than the worst that has been observed for the chosen allocation.

## ASSESSMENT

There is wide agreement both in practice and in academia that the asset allocation decision is one of the most important decisions investors make, but there is far less agreement on the best way to make this choice. Many approaches have been proposed, and certainly many others will follow.

This article proposes a three-step GHAUS approach that is simple and intuitive; requires no financial expertise; accounts for all the relevant variables including the portfolio's goal and intended holding period, the investor's ability to tolerate losses, and the trade-off between upside and downside potential; quantifies downside potential in a meaningful way that investors can relate to; and omits the use of any black boxes. As already mentioned, finding an appropriate asset allocation is a mix of art and science; the approach proposed here intends to combine both in order to help investors make this critical decision in a sound and simple way.

## ACKNOWLEDGEMENTS

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## NOTES

1. Ibbotson and Kaplan (2000) argue that it all depends on the exact question being asked. In fact, they find that asset allocation explains 40 per cent of the variation of returns among funds, 90 per cent of the variability of a typical fund's returns over time, and 100 per cent of a typical fund's level of

returns. Tokat *et al* (2006) review and assess the literature and conclude that, unless investors strongly believe in their ability to identify successful active managers, they should stay away from market timing, focus on selecting an appropriate asset allocation, and implement it using low-cost, broadly-diversified funds.

2. Importantly, note that the ultimate issue discussed in this article is portfolio *construction*, not portfolio rebalancing. The latter deals with the evolution of the asset allocation over time (rather than with how to choose an asset allocation at a specific point in time) and is discussed in detail in Estrada (2014, Forthcoming).
3. The probability of obtaining a gain, not reported in the exhibit, is simply 1 minus the probability of suffering a loss. Continuing with the illustrative example, a portfolio fully invested in stocks increased in value in 84.2 per cent (= 1–15.8 per cent) of all the 36-month periods considered.
4. Put differently, for an investor that can take the long view, what ultimately matters is the downside potential he is able to bear over the intended holding period, and therefore the allocation selected in Step 2. For an investor that cannot help focusing on short-term fluctuations, what ultimately matters is the downside potential he is able to bear in the short term; hence the allocation selected in Step 3 is likely to be more conservative than that selected in Step 2.

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## APPENDIX

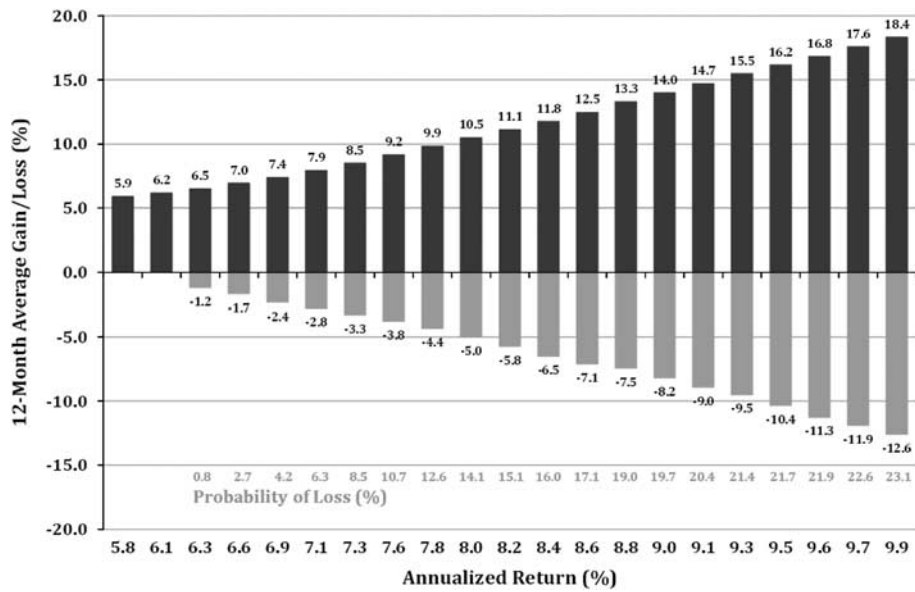


Figure A1: Focus on 1-year periods.

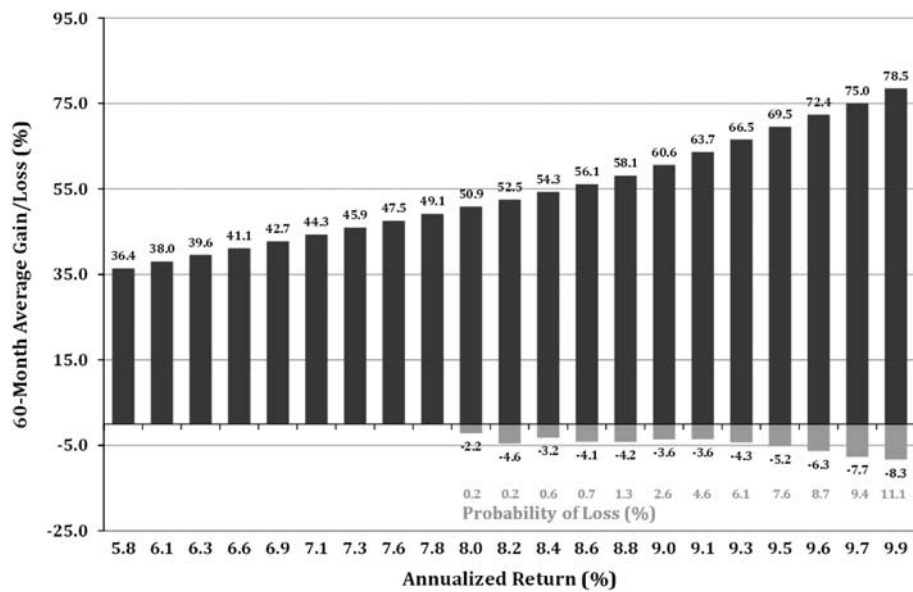
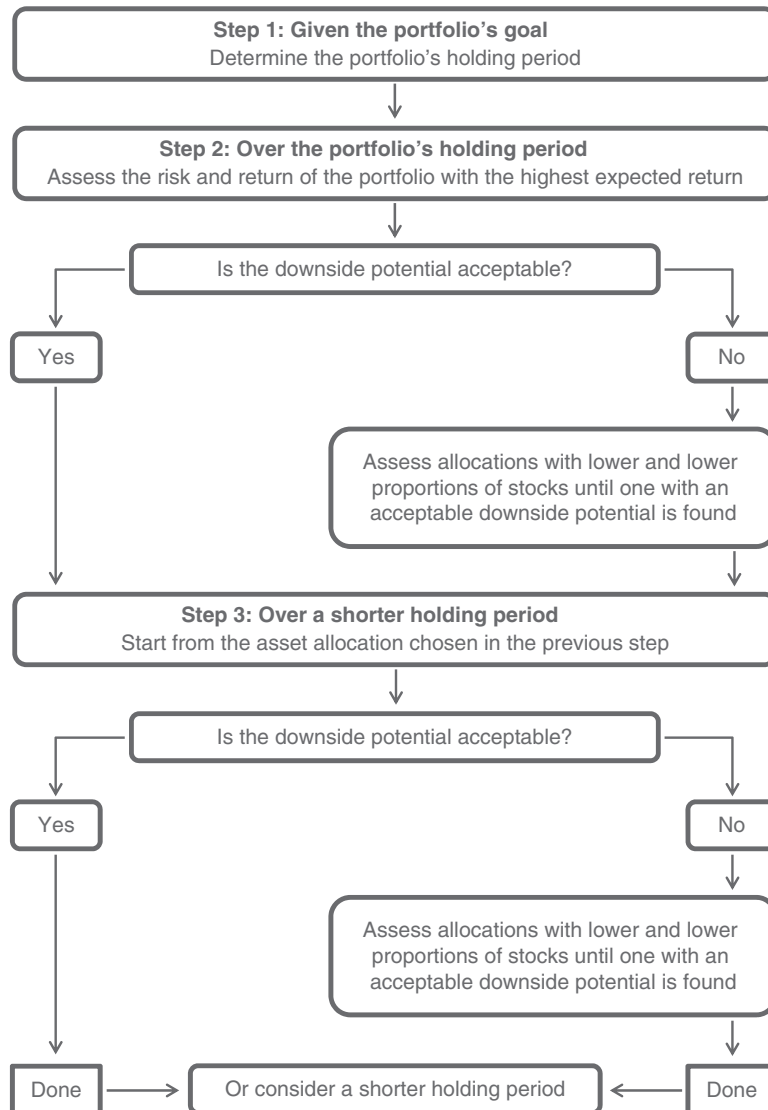


Figure A2: Focus on 5-year periods.





**Figure A3:** Asset allocation flowchart.