

Volume 45 //

Acuity

The greatest wealth is **your peace of mind...**



Forecasting the investment weather

THE
PORTFOLIO
FORECAST



Forecasting the investment weather

“ Unfortunately, being ‘sure’ isn’t a major feature of our business, and anyone looking for it is going to have to learn to live with disappointment. ”

Cliff Asness, founder AQR

‘Expected’ returns on portfolios are a little like the ‘expected’ weather in the UK. We have a growing wealth of data, science, models and common sense on which to build forecasts in both areas. Yet despite generalisations - such as it’s usually sunny and warm in the summer and cold and frosty in the winter - we all know that the day-to-day, month-to-month and even year-to-year variation is high.

Investors should never believe that expected returns – like the weather – are accurate, single point, consistent outcomes. Generalisations, grounded in empirical data, sensible rules of thumb and common sense are immensely important starting points for useful, informed discussion and scenario modelling.

Come rain or shine...

At the time of writing, the summer of 2018 looks like having been one of the UK’s hottest on record¹. However, despite our deeply embedded childhood memories of everlasting warm and sunny summers, nothing is certain.

In fact, long-runs of unpredictable summer weather are the norm, not the exception. This year has seen wonderful weather in most of the country, but to make the point, we still hark back to the fact that the last time this happened was in the summer of 1976, 42 years ago!

Forecasting markets is as difficult as forecasting the weather

Parallels exist in investing, when it comes to trying to forecast future market outcomes. It is, perhaps, evident that if forecasts of future returns on asset classes used in portfolios could be made with a high degree of certainty, one would simply invest in the highest returning asset class and ignore all the others.

Yet it is that very uncertainty of outcomes for which investors are compensated. For example, holding a five-year index-linked gilt to maturity has a far more certain outcome – the UK government will pay you back at maturity and protect your income and capital from inflation – than owning shares in a small unlisted biotech company, struggling with another funding round.

In the same way that we broadly accept from the data, science and logic that summers are warmer than winters in the UK, we also know that investments with wider ranges of potential outcomes (more ‘risky’ investments), are likely to have higher returns than lower risk investments with narrower ranges of likely outcomes. Most of the time this works out, but not always.

“Prediction is very difficult... especially if it’s about the future.”

Nobel Prize-winning physicist Niels Bohr

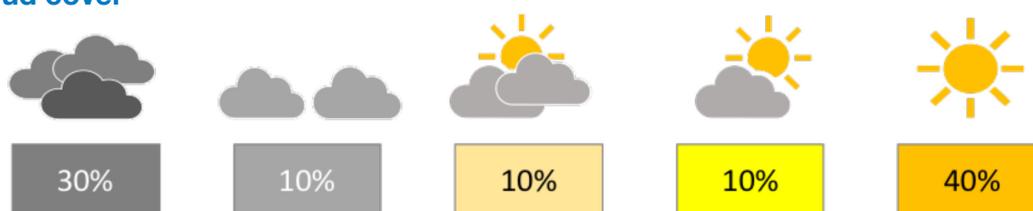
You can perhaps see the challenge that your financial planner faces; having established what your money means to you and your family, and how hard these assets will need to work to meet your financial goals, he or she needs to estimate the future returns for each asset class and, in turn, for your portfolio, in order to build your financial plan.

This ‘expected’ return should be used as a starting point to see how well your financial plan works out; but to think that the expected return is some sort of accurate point estimate of how your portfolio will consistently grow, is to entirely miss the point, as we will demonstrate in this volume of Acuity.

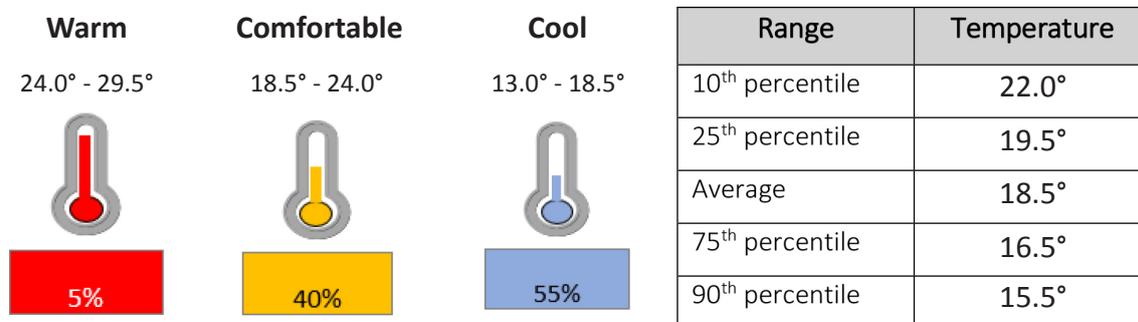
We’re all going on a summer holiday...

Let’s start by taking a look at the weather in Newquay, Cornwall for 1st August each year, to illustrate the point. We know that it is likely that August will be warmer than January, and if we had to describe an ‘average’ day it would probably be a few clouds, mainly sunny, warm, gentle breeze and no rain. The schematic below helps to illustrate the wide variation from the expectation that actually exists².

Cloud cover



Temperature (to nearest .5°C)



Other metrics

| Rain | Wind | Humidity |
|-----------------------|--------------------------------------|-------------------|
| 1-in-4 chance of rain | 22 mph (10 th percentile) | Dry - 40% |
| | 14 mph (average) | Comfortable - 40% |
| | 6 mph (90 th percentile) | Humid - 20% |

Table 1: The weather in Newquay, Cornwall on 1st August, on average each year at 3pm

Data source: www.weatherspark.com. Diagram: Albion Strategic Consulting

As you can see, the average day is more likely to be cool, cloudy and windy, with a lot of variation around the ‘average’ outcome!

Forecasting the investment weather – building asset class assumptions

When it comes to making estimates of future asset class returns, it is evident that there is no absolute certainty; only reasonable, informed estimates that relate to the long-term – often multi-decade – horizons being modelled in clients’ financial plans. Over these long time periods, current market valuation levels and initial yields are less influential than historical long-term data and economic logic.

‘We should humbly recognise the limits of our understanding. Realised returns are dominated by randomness, structural uncertainty, and rare events. Expected returns are unobservable, at best, estimated with noise.’

Antti Ilmanen³ - Ph.D., author and Principal at AQR

A rigorous approach helps ground the central case for assumptions within sensible and defensible parameters. Figure 1 below summarises our approach to constructing asset class assumptions. It does not set out to explain their derivation. What it aims to do is to demonstrate that they are not single point estimates of guaranteed returns; that is exactly what they are not. An expected asset class return is simply the most likely – i.e., probability adjusted – outcome from within a distribution of possible outcomes, as we will demonstrate.

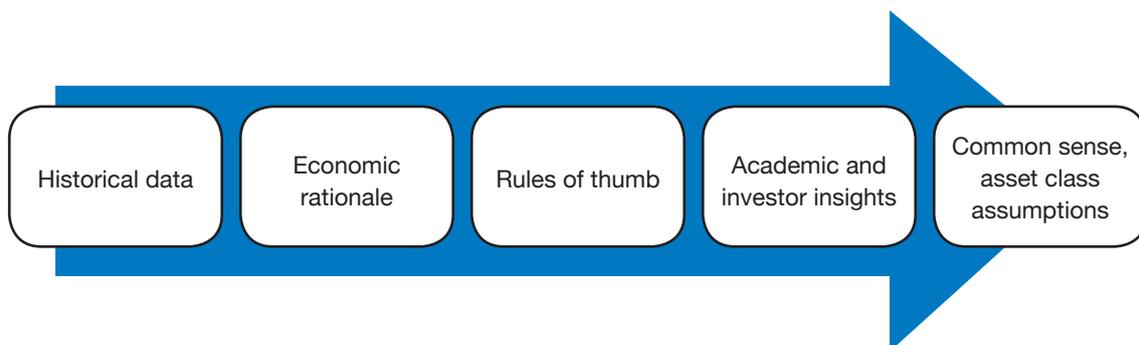


Figure 1: Making reasonable asset class assumptions

Source: Albion Strategic Consulting

It is worth noting that whilst long-term historical data is a useful starting point – even with data in the UK going back to 1900 – it is insufficient to deliver a level of precision with any great confidence. Although the annual average after-inflation (real) equity return in the UK has been around 7%⁴, giving a compound after-inflation return of 5% with a risk of 20%, statistically speaking we can be 95% confident that the true average annual equity return falls within the range of 3.3% to 10.5%⁵, but no more precise than that!

In turn, the average temperature in Newquay is 18.5° - on 1st August (at 3pm) based on annual data going back to 1980, with a standard deviation of around 1.7°. Therefore, statistically, we can only be 95% certain that the true average falls within a range of 18.0° to 19.0°⁶.

Returns are distributed around the expected average

Let's explore an example using expected return of 1.5% p.a. above inflation for short-dated high quality global bonds hedged back to Sterling and 4.5% p.a. above inflation for global developed market equities, with expected risk levels of 5% and 20% respectively. This means that two-thirds of the time, annual returns should fall within the range of the average return +/- the risk number⁷. These expected attributes are illustrated below.

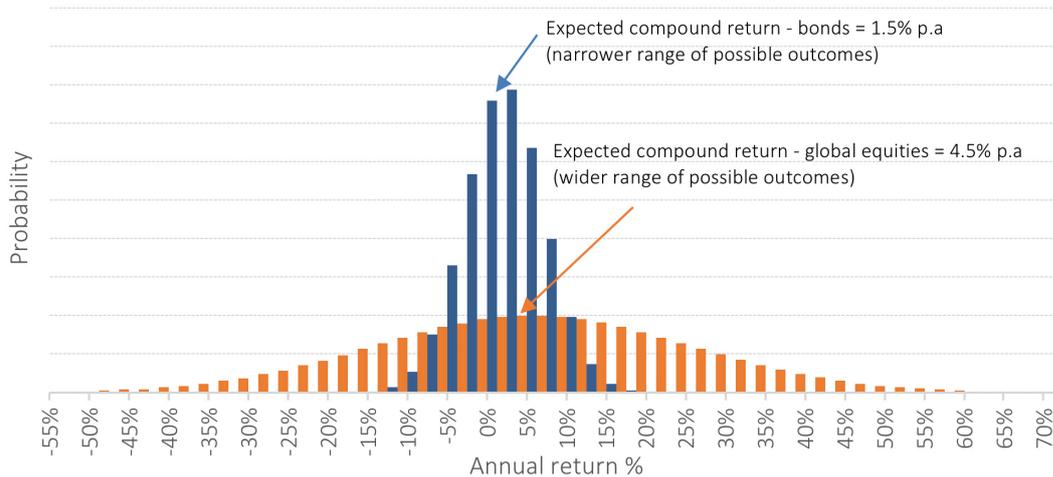


Figure 2: Expected after-inflation return distributions of short-dated bonds and global equities

Source: Albion Strategic Consulting

You can see that the 'expected' return⁸ sits within a distribution of other possible returns and the range of these potential outcomes is wider for equities than bonds. Summers are hotter than winters.

Building portfolio level expected returns

These individual asset class assumptions can then be built into portfolio level expected returns, which, in practice, is a bit more complicated than simply pro-rating the expected asset class returns by their allocation weights in the portfolio, as we need to take into account the diversification benefits of combining together different asset classes. Again, this is a topic above and beyond the scope of this volume.

The figure below illustrates the return distribution of a basic illustrative portfolio⁹ made up of 60% global equities and 40% short-dated bonds (as above).

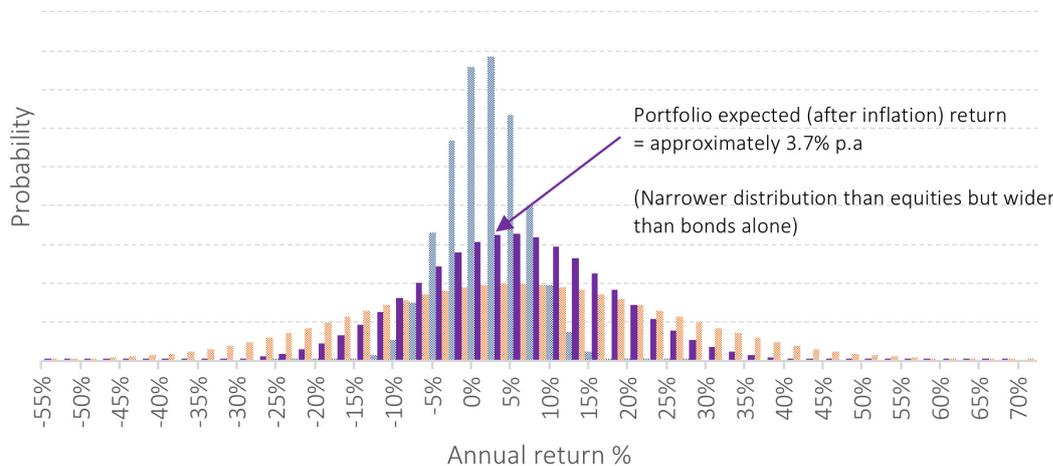


Figure 3: Expected portfolio returns - 60% global equities and 40% short-dated bonds

Source: Albion Strategic Consulting

Hopefully, it is evident that – like the weather in Cornwall – expected returns come with an average outcome that lacks certainty in its magnitude, and that around this average a wide range of alternative outcomes could occur.

It might be tempting to wonder why one bothers but, like knowing that summers are generally hotter than winters, we know that equities should return higher returns than bonds because they are riskier. This risk-return relationship provides a useful framework for suitable portfolio construction made up of multiple asset classes.

Despite these limitations, building a central case set of return and portfolio expected return (and risk) assumptions, provides a sensible starting point away from which other less favourable return scenarios can and should be run, for example, testing the outcome of a plan if returns are e.g. 1%, 2% or even 3% lower than anticipated. This will throw up areas of potential risks to the plan as it stands, help generate workable strategies for mitigating poor returns and initiate meaningful and informed discussions between adviser and client.

‘In an uncertain environment, rigour is not found in precise single-point predictions, but rather in precisely defined uncertainty estimates. It is not obtained by selecting one right vision for the future, but through rigorous process that will enable you to anticipate and prepare for multiple futures.

J. Russo and P Schoemaker¹⁰

Don't get fixated on 'expected' returns

If there is any message worth taking away from this, it is not to get fixated on the spurious precision of 'expected' returns, as none exists. As with any average, you have a 50% chance of getting higher than the average and 50% chance of getting lower than the average. Knowing and planning for 'what happens if...' is a really important part of the planning process and ongoing progress discussions with your adviser

It's always a good idea to pack a Gore-Tex® jacket when going on holiday (or investing), as the sun does not always shine, even though, on average, it might be expected to do so in Cornwall in August. Happy holidays!

End notes

1. <https://www.metoffice.gov.uk/news/releases/2018/a-record-breaking-summer>
2. www.weatherspark.com/m/149604/8/Average-Weather-in-August-at-Newquay-Cornwall-Airport-United-Kingdom (temperatures converted from fahrenheit)
3. Expected Returns: An Investor's Guide to Harvesting Market Rewards, by Antti Ilmanen, ISBN: 978-1-119-99072, John Wiley & Sons, NY: NY, February 2011.
4. Barclays Equity Gilt Study 2017
5. Based on confidence limit 95% $\approx 7\% \pm 2 \times (20\%/\sqrt{118}) = 7\% \pm 3.6\%$
6. Based on confidence limit 95% $\approx 18.5^\circ \pm 2 \times (1.7^\circ/\sqrt{36}) = 18.5^\circ \pm 0.6^\circ$
7. So for bonds one might expect the annual range of outcomes to fall within a range of (approximately) 1.5% +/- 5% - a range of -3.5% to +6.5% two thirds of the time.
8. To be precise the arithmetic return – not the compound or geometric return – sits in the middle of the distribution
9. This is not a recommendation, nor is it a strategy offered or provided by us, but is meant to provide educational insight for the reader.
10. J. E. Russo, P. J. H. Schoemaker, (2002), Winning Decisions, New York: NY Doubleday, p. 102.

Other notes and risk warnings

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