

Risk Tolerance

Essential, behavioural and misunderstood

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ABSTRACT

An understanding of an investor's risk tolerance is essential to determining investment suitability and yet there is no universally agreed definition of what risk tolerance is. We discuss the need for a holistic approach to measuring risk tolerance that provides a consistent framework for constructing efficient multi-asset allocation and ensuring a suitable aggregate level of risk and return, given the investor's personality and financial circumstances. Risk tolerance is only stable when considered as a personality trait, which can be measured effectively using holistic psychometric scales. Attempts to measure risk tolerance at lower levels of granularity are unstable; accentuate, rather than mitigate short-term behavioural distortions; and cannot be meaningfully aggregated to provide an overall level of risk that is appropriate given the investor's risk capacity. This implies that the recent move towards mental accounting, goal-based, assessments of risk tolerance is misguided and exposes institutions to risks associated with providing unsuitable advice.

Keywords: holistic risk tolerance, investment suitability, portfolio construction, investing behaviour

ARTICLE

Whether you are a financial advisor, compliance officer, or regulator, you probably agree that understanding the risk tolerance of an individual investor is essential to providing good advice. It is startling, however, that there is no universally agreed definition of what risk tolerance is; let alone any consensus on how to measure it. This exposes banks to considerable risks: without a sound assessment of a client's risk tolerance it is impossible to adequately ensure that investment advice is suitable to the client, a key regulatory requirement in many jurisdictions globally. Offering advice that is not suitable for the client's needs opens the institution to regulatory risk, reputational risk, and increasingly, conduct risk.

This leads to the very natural question: what are we measuring the investor's risk tolerance of? Are we looking at it from the point of view of a single goal or product? Is it being measured at individual portfolio level (e.g., pension vs. dealing account)? In our view, all of these starting points are incorrect.

Risk tolerance is essentially the degree to which someone is prepared to trade the chance of failing to achieve some additional but less-important goals, for the risk of not achieving some more-important ones. That is, individuals' willingness to take on additional risk that could reduce their future wealth (and thus ability to fund important future cash flows), in the pursuit of greater wealth, which would permit them to both meet these cash flow, but also to engage in more aspirational, discretionary spending in addition. Risk tolerance is thus about investors' holistic, broadly framed, thoughtful, and long-term willingness to trade-off potential future

outcomes, not about their immediate inclination to take risk (which we can term *risk appetite*) or their *perceptions* of risk¹. These latter two certainly affect observed risk taking, but are heavily influenced by a whole raft of behavioural biases and short-term, reference-, framing- and context-dependent considerations that should be *excluded* from assessments of the investor's degree of long-term risk tolerance, not pandered to, and optimized for.

Risk tolerance, thus defined, is a broad psychological trait which inheres in the individual as a whole, considering the trade-offs they're called to make over their whole wealth, considering all their future goals. Attempting to measure risk tolerance, or indeed any psychological trait, at lower levels of portfolio construction, or for a *part* of an individual, is meaningless: it cannot be achieved in a stable way and leads to inflexible portfolio construction, which may not aggregate to an appropriate level of risk.

In addition, examining components of wealth at a lower level also forces investors into *narrow* framing, which accentuates behavioural distortions of risk attitudes due to loss aversion, because narrower frames increase the proportion of perceived losses (Thaler^[1]). For example, Rabin^[2] shows that observed levels of risk aversion over small gambles, imply absurd levels of risk aversion for larger amounts. An advisor attempting to assess risk tolerance for multiple portfolio components simultaneously (often using the same risk questionnaire) is asking too much of clients, with inadequate tools. This is neither good advice nor efficient portfolio construction; the result is a muddled construct that can lead to issues of risk capacity being ignored.

A further concern is that suitability can only be truly determined by considering the combined effects of risk tolerance and risk capacity. It is not our goal here to clarify the equally misunderstood notion of risk capacity, but it is crucial to note that it is an inherently holistic notion. For the sake of context, a simple description might be: *if you are likely to need to dip into capital, or sell investments, to fund any liabilities (current, ongoing or anticipated future expenditure), then your capacity to take risk is constrained*. When all planned expenditures can be met from anticipated income, we may say that risk capacity is neutral, or high (in cases where individuals expect to be able to fund all anticipated future expenditure and still accumulate wealth).

Where risk capacity is neutral, the appropriate level of risk is determined solely by risk tolerance. Where risk capacity is constrained (for example, by large near term expenditures, or where the investor has little future income to rely as retirement approaches) investment risk should be commensurately reduced, and where it is high (e.g., early in life where investors have many years of anticipated net saving ahead) the investor may comfortably take on more risk. Since risk capacity considers the totality of *all* anticipated expenditure, we require a holistic measure of risk tolerance to match to risk capacity, or else we're inconsistently combining two incomparable concepts measured at different levels.

Crucially, the measure also needs to be stable. It is clear that self-reported risk tolerance measures are inadequate. Wang's^[3] financial interpretation of the famous Asian disease problem^[4], is among the many studies that shows how easy it is to influence financial choice by changing the way information is framed. Additionally, self-reporting risk tolerance is susceptible to changes in risk perception through the market cycle. Risk tolerance, as we define it, is a stable psychological trait, but risk *perception* is not. Weber et al.^[5] provide evidence that

¹ In a traditional economic context where we assume that all investors are *Homo economicus*, and act according to the economic axioms of rationality, then we may see risk tolerance as being the inverse of *risk aversion* that arises from the curvature of their 'rational' utility function over *total wealth* at the appropriate time horizon.

risk perception, and consequently investing behaviour, changes significantly with market cycles. This is often associated with a cycle of fear and greed that compels investors to invest more at the top of the market – when risk is perceived to be low, but is arguably at its highest – and to sell investments in favour of cash at the bottom of the market – when risk perception is highest. Asking, often-unsophisticated investors to self-report their risk tolerance is dangerously unstable and leads to poor advice.

Many advisors have adopted risk tolerance questionnaires, but this does not guarantee that the result measures risk tolerance at all^[6]. Approaches that require numerical trade-offs or probabilistic reasoning (e.g. willingness to accept percentage losses or hypothetical reactions to those losses) pick up a great deal of the variance in risk perception and cannot isolate stable risk tolerance. Indeed, using this method leads to institutionalised procyclical, 'buy-high, and sell-low' behaviour. At the holistic level, we can use psychometric testing to ascertain something stable and important about the degree to which an investor is comfortable making the trade-off between more and less achievable goals. Egan et al.^[7] make the case for psychometric assessment being the best approach for such a holistic measurement; and Davies and de Servigny^[8] show how this can be linked directly to portfolio optimisation by using the risk tolerance score to parameterise a utility function in a generalisation of modern portfolio theory they call *Behavioural Modern Portfolio Theory*.

This does not mean that the investor is not willing to risk not achieving certain goals relative to others – some are less important, further away, or more contingent on what happens in the future – but assessing this is properly done by adjusting risk capacity for the importance and timing of the investor's goal structure², not by asking investors to separately establish a level of risk tolerance for many independent goals.

On this point we disagree with the assertion made by Das *et al.*^[9] “that investors are better able to state thresholds and probabilities for sub-portfolios (e.g. retirement, bequest, education) than for an aggregate portfolio.” As an assumption of investors' introspective ability, and of the accuracy and stability of assessment techniques beyond those measuring holistic psychological traits, we find this implausible. Establishing stable risk preferences is difficult at any level, but only at the holistic level can we rely on established psychometric testing techniques to measure a stable personality trait. At any other level, we can only observe an unstable jumble of risk preferences and perceptions, which, even if they could be measured adequately, may not aggregate to anything sensible.

Das *et al.*^[9] show that, under restrictive technical assumptions, mean-variance optimised sub-portfolios aggregate to a portfolio that itself lies on the efficient frontier. This, however, is only possible because of a number of assertions regarding the behaviours and abilities of the investor that we feel cannot be substantiated in the real world. First, psychometric traits are not valid at the level of individual goals. Second, we know that requiring probabilistic trade-offs as an assessment method doesn't work – it may be valid to ask individuals to ascribe a level of priority to goals, but not to ask for precise risk preferences (or, in many cases, even precise timings or magnitudes). Third, the goals themselves are unstable and contingent. Hard coding them by separating them into 'pots', each with its own risk tolerance, loses the very valuable flexibility of being able to adjust goals to circumstances and preferences, thus perpetuating the status-quo bias in a way that may be harmful to the investor. Fourth, even if it were possible to adequately establish separate degrees of risk tolerance for separate components of the

² Considering goals as future expenditures means that goals' proximity and priority are major components of determining risk capacity, and so the relative importance of marginal goals should already be incorporated in the risk capacity. This allows us to use the combination of risk capacity and risk tolerance directly in establishing the appropriate portfolio.

portfolio, this would still require a holistic assessment of how they work together and whether the resulting overall risk was appropriate. We have to have some way of assessing how the risks attributed to each component affect risk in all the other elements; we also need a means of determining whether the overall effect on the individual's wealth is reasonable. That requires a holistic measurement of risk tolerance.

Defining risk tolerance at a holistic level is frequently a necessary tool for the financial advisor wherever assessing investment suitability is important. By combining a stable, holistic and meaningful measure of risk tolerance with one of risk capacity – to establish the *risk profile* for the investor's total assets – it becomes possible to build an efficient multi-asset allocation that delivers the optimal aggregate combination of risk and return. Though there is much to this beyond an accurate risk tolerance assessment, understanding the degree to which investors are psychologically disposed to trade-off the risk of poor outcomes for the chance of good outcomes is an essential and core component of providing suitable advice, and thus of mitigating the many risks of providing poor and unsuitable advice.

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