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RISK TOLERANCE AND CIRCUMSTANCES

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CFA Institute Research Foundation

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ISBN 978-1-944960-39-1

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RISK TOLERANCE AND CIRCUMSTANCES

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INTRODUCTION

The term *risk tolerance* is defined and used in different ways. Whether risk tolerance is a stable characteristic of a given investor or also takes into account external circumstances (e.g., economic shocks or the domain of the decision) depends on how it is defined and measured. This brief focuses on a definition of risk tolerance prevalent in the practitioner community—namely, an investor's willingness to take perceived risk (Davies 2017) or the trade-off an investor is willing to make between the perceived risk and expected return of different investment choices (Grable 2017). This definition derives from a psychological interpretation of the risk–return framework of classical portfolio theory (Markowitz 1952). It treats risk tolerance as an *attitude toward risk* and decouples this pure attitudinal variable from the *perceptions of risks and returns*—psychological variables in their own right and distinct from the expected value and variance of the distribution of possible outcomes (Weber and Milliman 1997).

Defined in this way, risk tolerance may differ among investors as a function of socioeconomic and biological differences but (with the exception of a brief boost during adolescence) shows stability across an investor's lifespan, financial shocks, and other circumstances. Risk tolerance, in this sense, is the mediator that translates perceptions of risk and situational needs and constraints into decision and action (e.g., Grable 2017, Figure 1).

The variables that change with market conditions and other circumstances are investors' perceptions of investment risks and expectations of return. In contrast to risk tolerance, which attaches to an individual and her biological makeup and personality, these

variables change over time in response to changing external conditions. Therefore, an investor's risk-taking behavior (as revealed by her investment decisions) can look like it has changed, despite the stability in that person's risk tolerance. Perceived risks and expected returns are influenced by hopes and fears as much as by past returns and rational expectations and thus need to be assessed in their own right and possibly corrected.

A TALE OF TWO FRAMEWORKS

Apparent contradictions in conclusions about whether risk tolerance and risk taking are stable or depend on context give the casual observer the impression of a "confused landscape" (Davies 2017, 1). Such confusion stems in large part from the failure to differentiate between theory and conclusions about two very different species: *homo economicus* and *homo sapiens*—or, as Thaler (2015) more endearingly calls them, "econs" and "humans."

The consistency and stability of preference is a basic assumption in the framework economists use to predict rational behavior. *Homo economicus*, a mythical species that Herbert Simon compared to the gods, may have simple preferences, single-mindedly pursuing the maximization of material outcomes, but they apply these preferences systematically across contexts and integratively across their life cycle. High-level goals and decision processes used are assumed to be the same for every econ, although the utility of a given outcome and the importance of different dimensions (say, quality versus price) are allowed to vary. Time preference and risk preference are two parameters also allowed to differ between individuals, reflecting differences in values and acceptable trade-offs. In contrast to this allowed between-person difference, however, is an implicit assumption that a given investor's level of risk tolerance, defined as a parameter of the utility function that makes the investor risk seeking or risk averse in his choices under uncertainty, is stable across situations and describes that person in much the same way as a psychological trait does, invariant across circumstances.

This assumption of stable risk tolerance for a given individual is also reflected in regulatory requirements for financial advisers. In Europe, the Markets in Financial Instruments Directive (MiFID) requires financial advisers and financial institutions dealing with individual investors to understand and document the client's "preferences regarding risk taking, his risk profile, and the purpose of the investment" (European Parliament and European Council 2004 and 2006, Art. 35, 4). In its latest consultation paper on the subject, the European Securities and Markets Authority (ESMA) further specified that the questionnaires and tools used to elicit risk tolerance need to be "fit for purpose" and that objective criteria as well as a client's subjective biases should be explored (ESMA 2017). A client's risk profile has to be updated regularly to reflect

changing financial circumstances, but the regulations make no mention of variable risk tolerance owing to changes in an investor's emotional or psychological state. But do humans, like econs, have stable risk tolerance that reflects a stable attitude toward risk? And if so, what accounts for observed instances of inconsistency in their risky investment decisions?

In addition to the *attitudinal* differences (toward risk and time delay) allowed for by economics, psychology allows for individual or situational differences in the *perception* of a situation. Weber, Weber, and Nosić (2013) demonstrated the importance of changes in the subjective perception of risk during the 2008–09 financial crisis. From September 2008 to June 2009, the authors surveyed a large number of clients of an online UK brokerage firm about their attitudes toward risk, their expectation for risk and return in the overall stock market, and the contents of their portfolios. The survey allowed the authors to measure risk preferences and perceptions in real time every three months during a period spanning the depths of the stock market crash of 2008 through the first months of the recovery in 2009. The results, discussed in greater detail later, show that risk taking changed substantially during the observation period. Changes in individual risk taking were driven mostly by changes in the perception of risk rather than changes in risk attitude, assessed directly as an attitudinal variable, which changed little over the time period that was studied.

As further described later, these results show that humans, unlike econs, use a wide variety of information and mental processes to make financial decisions. These mental processes include emotions; moral and professional rules of conduct, as well as other social norms; and, of course, rational calculations like those an econ, if one existed, might use. It is the emotional state of the individual investor that can change rapidly over time as circumstances change. Emotional responses are generally not "objectively reproducible": The same set of external circumstances might elicit very different emotions depending on the way these circumstances are "experienced" or processed by the individual.

Assume, for instance, an investor purchases shares of company A at $50 per share in July 2017. By the end of 2017, the share price has doubled to $100. The investor decides to keep the shares, and in June 2018, the share price is $75. Objectively, the investor has made a gain of $25 per share, but many investors might not feel too happy about this gain because they would consider it a loss of $25 per share since the beginning of the year. As Benartzi and Thaler (1995) have shown, investors tend to assess their investments in a relative fashion, comparing current value with recent values, and experience regret when share price declines relative to a recent anchor, such as the price at the end of the previous year. Compare this investor with another who made the same investment at the same time but did not know about the stock's value at the end of 2017. This second investor is still anchored to the original reference point of $50 rather than

the year-end share price of $100. Her emotional state might thus be very different from, and happier than, that of the first investor.

This example can be expanded to ever-finer degrees of detail. The emotional reaction to an investment in stock A will depend not only on the price of stock A and its past performance but also on the investor's general mood when the information is presented to him, as a function of his personal experiences of sorrows and joys on that day. Even the day's weather (e.g., sunny or rainy) has been shown to influence investor emotions and decisions (Hirshleifer and Shumway 2003). Neuroscientist Lisa Feldman Barrett recently reviewed the evidence from neuroscience experiments, concluding that emotions in response to an event are highly dependent on the circumstances in which they are experienced. It is thus unlikely that two people presented with the same set of data—or even the same person at two different points in time—will have the same emotional reaction to it and make the same or even similar decisions (Feldman Barrett 2017).

Does all this mean that our efforts to define risk tolerance for individual investors are futile to begin with? We think not. The "risk as feelings" hypothesis (Loewenstein, Weber, Hsee, and Welch 2001) provides a theoretical foundation for the observed variability in risk taking and allows us to define and measure risk tolerance appropriately.

DISTINGUISHING BETWEEN PERCEIVED-RISK TOLERANCE AND APPARENT-RISK TOLERANCE

The previous examples of emotional reactions to changing circumstances notwithstanding, most of us know who among our friends, colleagues, or clients is more risk averse and who is more risk tolerant or even risk seeking. Some demographic variables influence risk tolerance and allow us to "cluster" our friends, colleagues, and clients into similar groups. Sahm (2008) finds that risk tolerance declines with age (when controlled for cohort effects) and varies with macroeconomic conditions (i.e., risk tolerance declines in recessions). Similarly, studies have documented statistically significant differences in risk tolerance between men and women, among members of different ethnic and racial backgrounds, and between married and unmarried persons, as well as among persons of different educational attainment.

If we want to understand which parts of risk tolerance are stable over time (and are thus somewhat like personality traits) and which parts change depending on the circumstances, it pays to take a closer look at the aforementioned study of UK brokerage clients

(Weber et al. 2013). In a traditional modern portfolio framework, we would expect *homo economicus* to form a portfolio based on her utility function. This portfolio can vary from person to person but should depend on the expected return and volatility of the investment in question as well as the person's risk attitude. In this traditional model, risk attitude might differ from person to person but remain stable over time.

This traditional model developed by Markowitz (1952) can be generalized in a psychological model, in which risk taking depends on expected return, expected risk, and personal risk attitude (Weber and Milliman 1997; Weber and Johnson 2008). Note that in this psychological model, expected return and risk do not have to be measured by expected return and volatility as defined in a statistical way but can be expressed as the individual's subjective perception of expected return and risk. Changes in risk tolerance can then be the result of either changes in risk attitude or changes in the perceived risk or return of the investment.

In Weber et al. (2013), changes of perceived return, risk, and risk attitude were measured in real time during the height of the financial crisis. Every quarter, investors were asked to allocate a fund amounting to £100,000 into either the UK stock market or a hypothetical risk-free asset that paid an annual interest of 4%. Investors were free to allocate that money in any proportion to the two investments and knew that they could adjust their allocation in three months' time. Their allocation to the risky asset provides a measure of risk taking in a hypothetical portfolio. Additionally, the investors were asked to rate their risk attitude by providing their degree of agreement with three statements from the brokerage firm's own risk questionnaire:

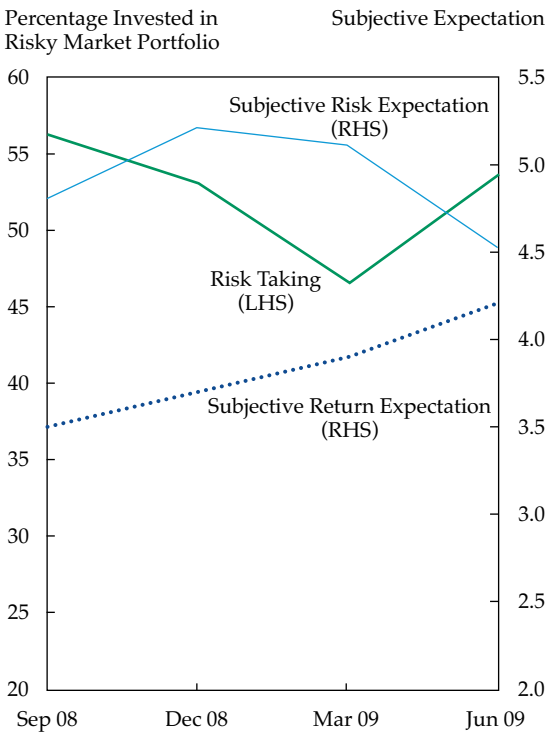
- It is likely I would invest a significant sum in a high-risk investment.
- I am a financial risk taker.
- Even if I experienced a significant loss on an investment, I would still consider making risky investments.

These statements about risk attitude were complemented by subjective and numerical questions about the individuals' perceptions of the riskiness of the UK stock market and its expected returns. The subjective measure was a simple question about the prospects for the UK stock market's return outlook in the next three months (on a scale from "extremely bad" to "extremely good") and how risky the stock market would be in the next three months (on a scale from "not at all risky" to "extremely risky"). In the numerical assessment of the stock market, investors were asked to give a midpoint estimate of the market return they expected in the coming three months as well as estimates for the returns at the 5th and 95th percentile, enabling Weber et al. (2013) to calculate the volatility that investors expected the stock market to have.

Figure 1 shows the study's key result. Actual risk taking (the amount invested in the UK stock market) changed substantially throughout the financial crisis, dropping from an average of 56% to 46.5% in March 2009 before rising again as the stock market recovery continued throughout 2009. In contrast, risk attitude as elicited by the survey statements (and not shown in Figure 1) hardly changed at all throughout the financial crisis. What did change, however, were the subjective perceptions of market risk and market return. The UK stock market was perceived as substantially riskier in December 2008, after the Lehman Brothers collapse, and in March 2009, at the trough of the stock market. Subjective perception of market risk began to drop again only when the stock market started to recover in March 2009.

The subjective estimates of the return opportunities in the stock market were more stable and continued to increase as stock markets declined throughout the financial crisis. The change in the perception of stock market riskiness was the single most

FIGURE 1. CHANGES IN RISK TAKING AND SUBJECTIVELY PERCEIVED RISKINESS AND RETURN OF UK STOCK MARKET, SEPTEMBER 2008–JUNE 2009



Source: Weber et al. (2013).

important driver of the change in risk taking. Note that this change in perceived riskiness of stocks is not necessarily based on numerical or rational expectations. Investors' numerical estimates of market risk increased after the Lehman Brothers collapse but stayed elevated and even increased toward the end of the study in June 2009. This trend indicates that perceived risk is an emotional concept for investors rather than just an exercise in rational thought and numerical analysis. It is this emotional reaction to financial markets that varies over time and drives risk taking.

Subsequent studies have found similar results. Nguyen, Gallery, and Newton (2017) confirm that Australian investors' investment decisions are influenced directly and indirectly by the perceived riskiness of financial markets. Hoffmann, Post, and Pennings (2015) show that subjective perception of risk and return influence trading decisions not only hypothetically via a survey but also in actual investor portfolios.

SYSTEMATIC DIFFERENCES IN RISK PERCEPTION

These studies bear both good news and bad news for financial advisers. The good news is that risk attitudes do not need to be assessed very frequently, because even during the worst financial crisis in decades, they remained rather stable. Risk attitude seems to be a stable psychological trait of an individual that can be assessed with the appropriate tools, such as a psychometric questionnaire (Grable 2016) or even a single general risk-attitude question that asks participants to assess their own willingness to take risks. There are also group-specific systematic differences in risk taking that may indicate differences in risk attitude, or in perceptions of risks or returns, that financial advisers should be aware of.

MEN TAKE MORE RISK THAN WOMEN BECAUSE THEY PERCEIVE THE RISKS TO BE LOWER

Probably the best-documented systematic difference in risk taking is gender based. Byrnes, Miller, and Schafer (1999) analyzed the results of 150 studies on the subject and found that, in most cases, men take systematically more risk than women. Their findings differed, however, among the domains in which risk taking was measured. Although there was hardly any gender-based difference in the propensity to use drugs or drink excessively, big differences between men and women appeared when asked about their behavior behind the wheel of a car. Reckless driving was far more prevalent in men than in women.

Weber, Blais, and Betz (2002) measured self-reported risk taking across different domains, ranging from financial decisions to social decisions. This study provides several important results.

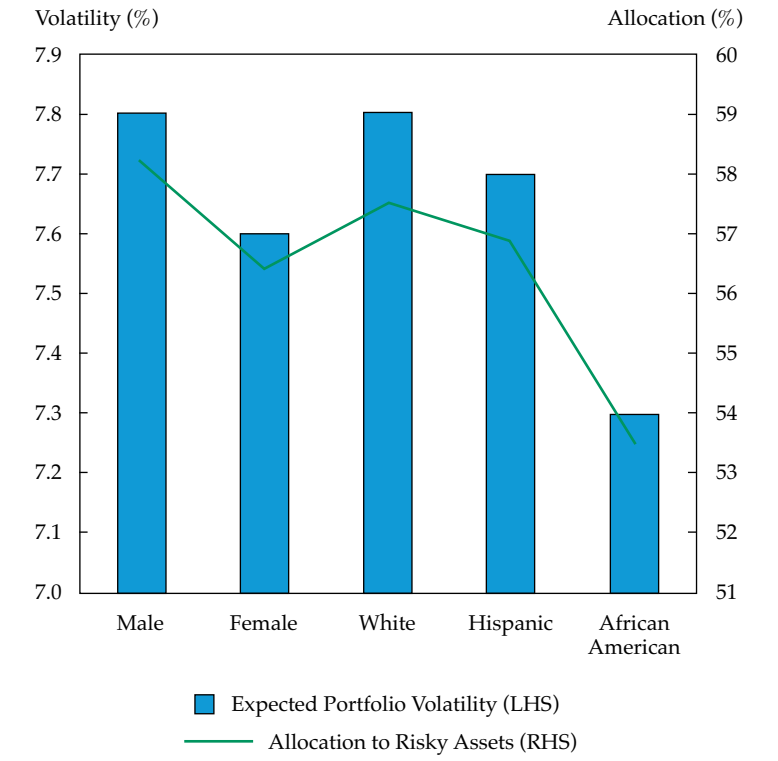
First, and important for financial advisers to remember, risk taking differs from one domain of human activity to another. Just because an investor enjoys skydiving, for example, does not mean that he will also take on more risks in the investment domain.

Second, it is important to know why women appear to take on less risk in financial decisions than men. Some 560 undergraduate students of The Ohio State University answered 21 questions about financial risk taking on a five-point scale ranging from 1 (extremely unlikely to engage in risky behavior) to 5 (extremely likely to engage in risky activity). The average response for men was 3.49, and for women, 2.18. The main driver of these differences was not an innate difference in risk attitude between men and women. Instead, the variation in risk taking originated in a difference in risk perception. When taking on financial risk, investors have to assess three key variables: expected return, perceived riskiness of the investment, and the likelihood of different outcomes. When expected returns are higher or perceived to be higher, then we expect an investor to be more likely to engage in a risky financial investment.

Similarly, when perceived risks are higher, we expect investors to be less likely to engage in the investment. Weber, Blais, and Betz (2002) found that systematic differences in risk perception drove the differences in risk attitude. Women were, on average, more cautious because they perceived financial decisions to be riskier than men did. This increased perception of risk can be documented in every domain of risk taking except the social domain, where women have a lower risk perception than men, presumably because women have greater familiarity with risky decisions in this domain. Greater familiarity with risky options has been shown to result in reduced perceptions of their riskiness, a process by which familiarity may breed liking (Weber, Siebenmorgen, and Weber 2005). Once differences in risk perception between women and men are properly taken into account, the gender differences in risk attitude (defined as the trade-off between perceived risks and benefits) disappear.

To see why even small differences in risk perception between men and women may lead to significant differences in financial outcomes in real life, it is instructive to review Farrell's (2011, 2014) work. By combining the results of the Florida State Board of Administration's Investment Plan Data and the Florida Department of Education's Employee Survey in the third quarter of 2008, Farrell analyzed the pension plan investments of approximately 34,000 state employees. **Figure 2** shows the average expected portfolio standard deviation and the average allocation to risky assets of pension plan participants by gender and culture.

FIGURE 2. PORTFOLIO RISK CHARACTERISTICS BY GENDER AND CULTURE



Source: Farrell (2014).

When saving for retirement, these small differences can have a big effect. Farrell (2014) estimates that if employees of the Florida Department of Education save 9% of their annual salary of approximately $34,000 for retirement, after 30 years of service the average white man would end up with a lump sum of $200,833 in real terms, whereas the average African-American woman would end up with $186,761 (93% of the white man's wealth at retirement). If these retirement lump sums are converted into an annuity plan that pays 50% of pre-retirement income, a white man would receive income for 17.6 years and an African-American woman would receive sufficient income for 15.6 years—despite the fact that women have longer life expectancies than men.

As Garnick (2016) points out, most women in the workplace are affected by a triple whammy. First, they have fewer years of service before retirement because they take time off to have children or care for parents and other relatives. Second, they earn less money than men, on average. Third, they are more risk averse with their retirement

savings. These three factors combine to create a smaller retirement nest egg for women. Once retired, women are again at a disadvantage—a fourth whammy—because of their longer life expectancy and higher healthcare costs (women live longer but are not necessarily healthier in old age).

These findings can provide guidance for financial advisers on how to engage with both women and men. Men tend to be more optimistic about the prospects of financial investments than women. Educating men about the particular risks of an investment will likely reduce this over-optimism. In contrast, women tend to perceive greater risks in their investment decisions . Educating women about the risks (or the lack thereof) and correcting their assessment of how likely these risks are to materialize will overcome some of the gender differences in risk taking.

The empirical data make clear that one of the key responsibilities of financial advisers is to nudge women toward increased retirement savings (not only in tax-advantaged accounts) and increased risk in their long-term investments. Advisers certainly should not push women into reckless investments with unjustified risks; instead, they should educate female clients about the long-term effects of their investment choices and help them become more familiar—and hence comfortable—with a higher allocation to sound long-term investment portfolios and additional savings.

CULTURAL DIFFERENCES

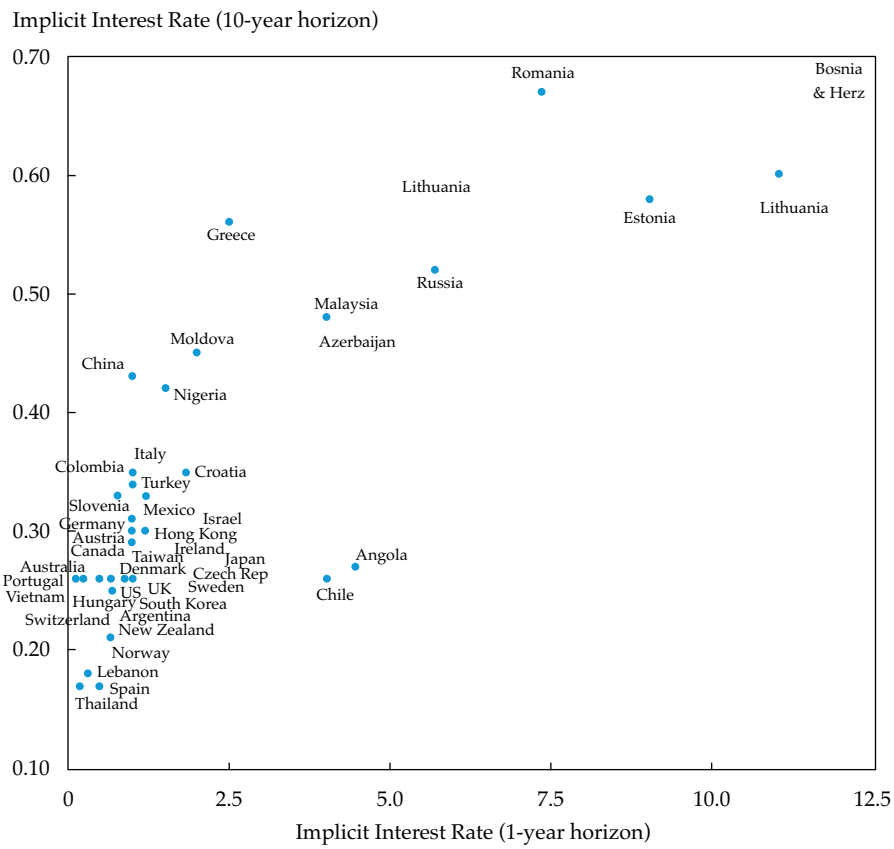
Just as differences in risk perception between women and men contribute to gender differences in risk taking, differences in perceived risk and their effects on risk taking have also been systematically observed across cultures. Weber and Hsee (1998) investigated the risk attitudes in financial decisions of individuals in the United States, the People's Republic of China, Poland, and Germany. They found that Chinese investors were systematically more likely to engage in risky investments than US investors. The variation between different cultures was significantly more than the variations within a given culture, and Chinese investors were willing to pay higher prices for risky investments than investors in the United States or Germany. Again, these cultural differences were mainly driven by differences in risk perception. Because of their extensive social networks that cushion them against experiencing extreme losses in their investments, Chinese investors perceived a given investment option as less risky than US investors, leading to a higher propensity to invest and a willingness to pay a higher price for the investment.

More recently, Wang, Rieger, and Hens (2009) investigated time preferences in 45 countries. Investors were given a choice between a payment of $100 now or a payment of X in 1 year from now or, in a separate question, in 10 years from now. The investors then had to provide the number X (presumably >$100) that would make the two options equally attractive to them. The results allowed the researchers to identify

time preferences and implicit discount rates for future cash flows. **Figure 3** shows that respondents from Germanic and Nordic countries (such as Germany, Switzerland, and Sweden) had systematically lower discount rates, which implies that investors from these countries were more likely to wait for a future cash flow than to opt for an immediate payout. Investors in Anglo-Saxon countries showed similar discount rates to Nordic and Germanic investors but were somewhat less likely to wait for a future payout given a specific alternative. The groups of investors that showed the highest-discount rates, who were thus least likely to invest for the long term, were located in Africa and Eastern Europe.

Again, as in the case of gender differences, the main driver behind the willingness to wait for a larger future cash flow instead of an immediate smaller cash flow was the

FIGURE 3. IMPLICIT DISCOUNT RATES IN DIFFERENT CULTURES



Source: Wang, Rieger, and Hens (2009).

perceived risk of the future cash flow. The researchers found that investors in cultures that—rightly or wrongly—perceived greater uncertainty around delayed cash flows were more likely to opt for immediate cash flows. Other cultural traits, such as individualism or long-term orientation, also played a role in determining the differences in perceptions of risk and uncertainty between cultures.

Notably, these cross-cultural differences may be driven not only by systematic cultural influences but also by current and recent economic circumstances. Such countries as Bosnia/Herzegovina, Russia, Angola, and Nigeria showed extremely high discount rates. Investors in these countries may be culturally different from investors in Germany or the United States. But such countries as Bosnia, Russia, and Nigeria are also characterized by high political and societal instability. It is only rational for an investor in a country where the government can confiscate private property at any time or where a civil war may erupt to prefer immediate cash flows. The stable legal, economic, and political framework observed in Scandinavia, Western Europe, and North America is certainly conducive to a lower level of risk perception. Similarly, more collectivist cultures or more tight-knit communities provide implicit insurance against financial risks (a social "cushion" by which community members help each other out in case of experienced losses), thus objectively reducing the risks and increasing risk taking (Weber and Hsee 1998) and decreasing the discounting of future rewards (Jachimowicz, Chafik, Munrat, Prabhu, and Weber 2017).

CONCLUSION: WHAT'S AN ADVISER TO DO?

The reviewed literature shows that risk attitudes, properly defined, are more or less stable throughout an investor's lifetime. These studies also show, however, that an important second determinant of risk aversion or risk taking is driven more by circumstances than by traits. Recent market events and investors' lifetime experiences do influence investment decisions because they change the perception of risk.[1] Financial advisers need to regularly assess these changing risk perceptions in order to provide the best possible advice for their clients. Without being too formulaic, we think that advisers can take four steps to help clients improve their investment decisions.

1. BE AWARE

Financial advisers need to be aware of their clients' base risk attitude and their potential systematic biases in their perception of risk. Risk attitude can be elicited through

[1]Malmendier and Nagel (2011) demonstrate the role lifetime experiences can play in changing risk perception.

simple survey questions and is relatively stable over time. Systematic biases in risk perception may result from gender, minority status within a society, lifetime experiences in financial markets, or recent market events. Differences in risk perception as the result of these variables can be elicited through appropriate survey questions that allow for the expression of subjective or emotional factors or simply by looking at the actual investment decisions investors have made in the past or their current investment portfolios, factoring in their known and stable attitudes toward risk.

2. EDUCATE

Educating clients about financial market risks is a vital ingredient for improving investment decisions. A key component of financial education is to demonstrate the differences between short-term and long-term outcomes of risky investments. A good understanding of the true riskiness of different investments for both short-term and long-term investments lays the groundwork for better decisions.

Advisers should not expect too much from education, however. Learning about investments is a higher cognitive process, and the research reviewed here has shown that short-term emotional reactions can easily override such "rational" considerations.

3. NUDGE

Nudging investors toward sensible investment decisions can go a long way to improve financial outcomes. These nudges can take many different forms. Pension plan sponsors are now well aware of the power of the default investment option for plan participants. By choosing a well-diversified portfolio of assets as the default option, many plan participants will end up with a portfolio that may be less than optimal but that will at least provide decent long-run outcomes.

But nudging investors toward better investment decisions can take much simpler forms. Most advisers present their clients with annual or quarterly investment statements. If quarterly investment results are shown in isolation, the investor's time horizon is immediately reduced to a three-month period. If, however, the quarterly results are put into a long-term financial context—for example, by showing the latest quarterly results in a chart with the expected long-term development of the portfolio over the next 10 or 20 years—then short-term fluctuations in the portfolio appear much less daunting and much less relevant for the long-term success of a chosen portfolio. Optics matter, and with the right presentation style, financial advisers can help their clients focus on long-term investment outcomes rather than short-term market fluctuations.

4. HOLD HANDS

Abraham Lincoln referred to an ancient Persian adage during a speech in 1859:

> It is said an Eastern monarch once charged his wise men to invent him a sentence, to be ever in view, and which should be true and appropriate in all times and situations. They presented him the words: "And this, too, shall pass away." How much it expresses! How chastening in the hour of pride! How consoling in the depths of affliction! (Lincoln 1859)

Conveying this motto to clients should be part of the daily work of every financial adviser.

Managing investor emotions through the ups and downs of financial markets is arguably a financial adviser's most important task. The groundwork needs to be laid in calm times when investments are doing well, when advisers need to prepare their clients for the inevitable turbulence that will come in the future and the emotional responses that go along with it. These calm times provide an opportunity to discuss and formulate an investment policy for each client that can be consulted when emotions are running high.

When times are good, a financial adviser's first task is to keep expectations under control. Clients may become greedy or simply too optimistic about the future when risks are perceived to be low or minimal. Similarly, in a market downturn or in a market crisis, a financial adviser's first task is to boost optimism. Risk perceptions in these situations are high, and most investment options appear too risky. In these times, the focus should be on the long-term opportunities of different investments as well as the increased return potential. If the groundwork has been laid properly—by formulating a long-term investment policy, by educating clients about the riskiness of investments in the short term and the long term, and by limiting over-optimism when times are good—it is much easier for an adviser to convince clients that things will eventually get better.

Too often, financial advisers define their main responsibility as finding the right investment products and building the best portfolio for their clients. As we have illustrated, the best investment portfolio might not help a client whose risk perceptions change dramatically in different financial market circumstances. When emotions run high, even the best portfolio might be abandoned, leaving the client with inferior investment outcomes. Managing risk perceptions requires the financial adviser to act more like a therapist than a mechanic. It is above all about managing expectations and emotions and helping clients to better deal with emotions when it comes to financial decisions. The end result of this process might be a portfolio that is not "optimal" in the sense of

modern portfolio theory, with its assumption of econs, but rather a portfolio that "satisfies" the human need for investments that can be handled in the presence of changing emotions and changing risk perceptions.

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The CFA Institute Research Foundation acknowledges with sincere gratitude the generous contributions of the Named Endowment participants listed below.

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ISBN 978-1-944960-39-1