CFA Institute

INVESTMENT RISK PROFILING
A GUIDE FOR FINANCIAL ADVISORS

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EXECUTIVE SUMMARY

Establishing an investment risk profile (IRP) is an essential part of structuring an investor's investment portfolio, and the IRP is an integral element of an investor's investment policy statement. Financial advisors must use their best professional judgment to determine how investors can achieve financial goals through appropriate portfolio security selection. However, doing so requires balancing return objectives with the risk of variation in returns—in particular, the risk of negative returns.

Current financial advisor practices vary significantly and, with the advent of new digital tools, often revolve around a single characterization of an investor's "risk tolerance" and/or a similar summary characterization of an investor's appetite for portfolio risk. In addition, although current regulatory guidelines require a consistent process for compliance, prescriptive standards for how and in what manner IRP data should be measured or applied are lacking.

An important financial advisory skill is the ability to develop a comprehensive representation of an investor's IRP. A robust IRP measure provides a pathway to ensure that any proposed portfolio strategy is fit for the purpose with respect to achieving an investor's goals. This requires careful analysis and synthesis of three dimensions of an IRP:

- An investor's **need for risk** should be assessed by considering the required rate of return (RoR) on the investment portfolio to fulfill the investor's future lifestyle, charitable, and dynastic goals. In concert with capital markets expectations,

a calculated required portfolio RoR will suggest potential asset allocation strategies that align with market risks.

- An investor's **ability to take risk** includes the investor's time horizon, potential need for liquidity, and risk capacity. These factors will determine the investor's financial ability to withstand declines in portfolio values. The ability to take risk can often be a limiting factor when considering an investor's need for risk to meet corresponding goals.

- An investor's **behavioral loss tolerance** can upset the most carefully devised quantitative portfolio strategy. Best practice is to use psychometric tools (often questionnaires) that have demonstrated reliability and validity in predicting an investor's emotional and behavioral tendencies around loss of portfolio value and investing discipline.

Having independently analyzed the three dimensions that comprise an IRP—risk need, risk-taking ability, and behavioral loss tolerance—the financial advisor must then reconcile these dimensions into a portfolio consistent with the investor's IRP. This report proposes best practices with regard to investment risk profiling: Financial advisors should strive to combine straightforward calculations of risk need, careful assessment of risk-taking ability, and a robust examination of investor behaviors and attitudes to create the foundation for portfolio strategies and accompanying investment and financial planning decisions.

INTRODUCTION

At the heart of the relationship between financial advisors and their clients is the process by which a client's current financial state is related to the client's investment aspirations for the future. The value of current assets, future savings and spending, and risks undertaken to achieve desired investment returns work together to shape the success or failure of goal achievement. When working with investors, financial advisors face the following complex dilemma: Given that reward is not possible without risk, just how much risk is appropriate?

Because of repeated episodes of misconduct, regulators globally have been taking steps to require firms and financial advisors to somehow assess the risk-related attributes or "profile" of a prospective or current client when developing and justifying investment recommendations. Currently, the assumption is that as long as firms and financial advisors can readily document a consistent evaluation process, regulatory requirements will be met. However, uncertainty surrounds this assumption because few standards or restrictions with respect to "how" to make a risk-profile assessment have been prescribed or enforced. For this reason, financial advisors have typically viewed the risk-profiling process primarily as a regulatory hurdle. When conceptualized as a threshold measure, rather than a tool to guide the development of a portfolio strategy and financial recommendations, the risk-profiling documentation requirement has been met using short risk-tolerance questionnaires and assessment tests along with, at a minimum, an acknowledgment of an investor's age and financial circumstances.

What makes matters even more confusing for the typical financial advisor is that no recognized regulatory body imposes specific guidelines regarding how the results of a risk profile should be directly applied to portfolio recommendations. In most jurisdictions, common law gives broad discretion to financial advisors using their professional judgment, which is a similar standard applied in other professional activities, such as medicine, accounting,

and law (Appendix B provides additional details about the regulatory environment). Under common law standards, financial advisors are expected to ensure that investors are aware of the potential risks associated with available options. Less well prescribed, however, are how investor information is obtained and how that information is presented to investors. This has created an environment in which the use of risk-profiling tools varies dramatically from one advisor and firm to another, as do the subsequent portfolio recommendations.

Given the gap in practice standards, numerous commercial firms have entered the risk-tolerance and risk-profiling assessment marketplace.[1] Some of these firms provide products that are intended to meet minimum regulatory compliance requirements (i.e., the investor risk profile provides a starting point in investor discussions). Scores are generally presented on a numerical scale from very low to very high, but rarely are these scores defined in terms of an investment recommendation. Other firms provide more robust measures related to an investor's IRP (investment risk profile).

Essentially, all "risk-profiling" tools in the marketplace can be used to meet regulatory customer due diligence requirements.[2] In addition, nearly all existing tools provide a basis for investor–advisor risk–return discussions. As a result, financial advisors who are merely looking for a regulatory compliance tool have access to multiple alternatives.

The purpose of this report is to present a framework of best practices that financial advisors, educators, and regulators can use to specify, measure, and evaluate objective and behavioral factors unique to an investor, which can then be assessed and combined into an IRP. This report provides a methodology that financial advisors can follow to guide the development of investment portfolio strategies that reconcile an investor's goals, assets, savings, and willingness to assume risk, affirming the intent of regulatory requirements and improving investor outcomes relative to each investor's investment goals.

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[1]Nearly all broker/dealers and custodians require advisor staff to use in-house–developed risk-profiling tools.
[2]Regulators have not historically prescribed validity, reliability, design, or interpretation guidelines related to risk-profiling tools, making nearly all risk-tolerance and risk-profiling assessment tools, by default, compliant with regulations.

THE INVESTMENT RISK PROFILE

The primary purpose of the risk-profiling process is to **_ensure that investment and financial recommendations match an investor's financial and emotional aptitude to engage in financial transactions, at the household level, that entail financial/investment risk_**.

We begin by presuming that a financial advisor collects necessary objective and behavioral information from and about an investor with the intention of making investment recommendations that are always in the investor's best interests and that align with the investor's IRP.

When viewed from this perspective, the use of an IRP is analogous to deciding how fast to drive a car:

- Before embarking, a driver makes a mathematical estimate of how long the journey will take, and thus how fast she or he needs to drive to arrive at the appointed time.

- At the same time, the driver applies subjective probabilities to assess the severity and consequences of arriving late.

- Along the way, the driver faces limitations with respect to how fast her car can actually go; this ability factor is equivalent to a regulatory speed limit, the amount of fuel the car has, and the traffic conditions the driver encounters.

- Finally, the driver's behavioral preferences come into play; some drivers, for instance, get a thrill out of driving aggressively, regardless of the possible consequences of being pulled over by law enforcement or getting in an accident, whereas others prefer a more cautious journey.

Each of these elements—need, ability, and behavioral loss tolerance—plays a distinct role in shaping how fast someone drives. One factor alone is insufficient to predict a trip's characteristics. The combination of driver, car, and environmental characteristics is what shapes the driving profile of each trip. Similarly, multiple factors must be combined in the development of an IRP.

Financial advisors use an analytical process to evaluate what level of portfolio risk (e.g., often simply volatility as measured by standard deviation or its derivative, with more sophisticated downside measures and/or value at risk calculations increasingly common) is appropriate for a particular investor. Conventional wisdom and practice standards, based on heuristic models, often lead financial advisors to base investment and portfolio recommendations primarily on an investor's age, so a younger investor is generally encouraged to take more risk, whereas an older investor, all else being equal, is positioned to take less risk.

However, the use of just one investor characteristic, such as age, can lead to improper alignment of an investor's need, ability, and behavioral loss tolerance associated with taking investment risk. Risk need, the ability to take risk, and the behavioral tolerance to engage in risk-taking activities often exist contradictorily within a single investor. An investor's risk need, ability to take risk, and behavioral loss tolerance are also subject to change based on investor and environmental circumstances.

Conceptually, the elements comprising an IRP can be grouped according to three factors. As shown in **Figure 1**, these factors are (1) risk need, (2) risk-taking ability, and (3) behavioral loss tolerance.

FIGURE 1. IRP FACTORS AND RELATED ELEMENTS

Risk Need
- Required Rate of Return (%)
- Market Risk Environment
- Consequence of Failure

Risk-Taking Ability
- Time Horizon
- Need for Liquidity
- Risk Capacity

Behavioral Loss Tolerance
- Risk Tolerance
- Risk Preference
- Financial Knowledge
- Investing Experience
- Risk Perception
- Risk Composure

A FRAMEWORK FOR THE CONSTRUCTION OF AN INVESTMENT RISK PROFILE

What follows is a description of each factor in the risk-profiling process (as illustrated in Figure 1), a review of the elements comprising each factor, and an example of how a financial advisor can measure/evaluate each element. This is followed by an explanation of how the factors can be combined into a comprehensive IRP for use in making portfolio allocation recommendations. Two points are worth noting:

- In the context of this report, *risk* refers to the degree of potential financial loss inherent in an investment decision, generally measured by downside portfolio standard deviation or a derivative of standard deviation (i.e., volatility). *Uncertainty* refers to a situation in which a decision maker lacks information about known probabilities before making a decision. For example, investment decisions are uncertain, whereas gambling decisions involve risk. Investors tend to be more averse to uncertainty than to risk. As a result, investors are apt to act based on perceptions of risk rather than on actual risk.[3]

- Although researchers, risk-profiling firms, and regulators have taken steps to standardize risk-profiling terms and definitional guidelines, to date, reaching a general consensus about risk-profiling terminology has been challenging. The definitions used in this report (see Appendix C) are based on the work of researchers across the finance, financial planning, psychology, and business management fields.[4]

Factor 1 of 3: Establishing an Investor's Risk Need

- Required Rate of Return (%)
- Market Risk Environment
- Consequence of Failure

Risk Need

The first factor comprising an IRP is related to establishing investor goals and the required return needed to grow or preserve current assets to fund future goals. Essentially, this step in the IRP development process is equivalent to relating a required rate of return (RoR) to capital markets expectations and thus potential portfolio risk. Often, an investor may need assistance from a financial advisor to develop required returns and associated risk needs, which can include jointly developed assumptions regarding how long the investor will work, how much the investor will save or spend yearly, and whether the investor has a desire to leave a bequest for his family or a charity. The required RoR estimate can be objectively measured using one or more present/future value calculations. Alternatively, some financial advisors may choose to take a balance sheet approach and characterize the present value of assets (including discounted future cash flows) and the present value of liabilities (investor goals).

In the context of an IRP, one should note that for an investor to express more than one financial goal is not unusual. Rather than aggregating investor goals, the framework presented in this report treats each goal separately, which implies that a financial advisor

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[3]Michael Joseph Roszkowski and Geoff Davey, "Risk Perception and Risk Tolerance Changes Attributable to the 2008 Economic Crisis: A Subtle but Critical Difference," *Journal of Financial Services Professionals* 64, no. 4 (July 2010): 42–53.

[4]See the following sources:

Shawn Brayman, Michael Finke, Ellen Bessner, John Grable, Paul Griffin, and Rebecca Clement, *Current Practices for Risk Profiling in Canada and Review of Global Best Practices* (Toronto: Investor Advisory Panel of the Ontario Securities Commission, 2015). http://www.osc.gov.on.ca/documents/en/Investors/iap_20151112_risk-profiling-report.pdf.

Nicholas Carr, "Reassessing the Assessment: Exploring the Factors That Contribute to Comprehensive Financial Risk Evaluation" (PhD diss., Kansas State University, 2014).

A. Hubble, "The Amalgamation of Professional Judgement: A Mean–Variant Approach from an International Survey of Financial Advisers" (PhD diss., University of Georgia, 2018).

Liana Holanda Nepomuceno Nobre, and John E. Grable, "The Role of Risk Profiles and Risk Tolerance in Shaping Investor Decisions," *Journal of Financial Service Professionals* 69, no. 3 (May 2015): 18–21.

Liana Holanda, N. Nobre, John E. Grable, Wesley Vieira da Silva, and Fabio Chaves Nobre, "Managerial Risk Taking: A Conceptual Model for Business Use," *Management Decision* 56, no. 11 (2018): 2487–2501. https://www.emeraldinsight.com/doi/pdfplus/10.1108/MD-09-2017-0892.

should estimate a unique IRP for each goal. This risk-profiling approach is based on the mental accounting observations of Richard H. Thaler[5] and others,[6] which suggest that *investors will have a distinct risk profile based on a specific goal*. The goal should be stated specifically and in measurable terms as a pathway to estimating an RoR or internal rate of return necessary to accomplish each account/goal.

The goal at this stage of the risk-profiling process is to assess the risk an investor needs to take (or the volatility an investor must be willing to endure) to achieve the goal.[7] The risk-need factor comprises three elements: (1) required RoR (%), (2) market risk environment, and (3) consequence of failure. Each element is described as follows:

Required RoR

As conceptualized in this report, the *required RoR* is synonymous with risk need, which refers to the amount of portfolio risk an investor must accept to meet a specific financial goal. Typically, risk need is expressed in terms of a real net (after inflation and fees) RoR or internal RoR figure.

For example, assume an investor has a goal of accumulating $3.5 million at the end of 20 years. If the investor can save $75,000 annually, the investor needs to earn approximately 8.18% on an annualized basis to reach her goal. In this example, the investor's risk need corresponds to a portfolio with an expected annual return of 8.18% and expected volatility derived from capital markets expectations, including volatility and correlation of returns among asset classes.

In nearly all cases, the estimation of a risk need is a quantifiable step in the risk-profiling process that is well within the capability of most financial advisors using modern financial planning software and/or a spreadsheet analysis. In some situations, however, an RoR estimate may not be an appropriate measure of risk need. Consider, for example, an investor with a net worth of $35 million whose primary goal is capital preservation in relation to a later-life charitable bequest. This investor's risk need may be low in relation to cash flow needs, primarily because the investor has the risk capacity to deal with portfolio losses. Nonetheless, estimating the investor's risk

profile is helpful in ensuring that an appropriate match is made between portfolio recommendations and the investor's goal(s).

Market Risk Environment

The current market *interest rate and inflation environment* must also be evaluated when finalizing an investor's risk need. A financial advisor's assessment of the current and future market environment can play an important role in shaping portfolio development and allocation decisions. Factors that contribute to an assessment of the market environment include current equity, fixed income, and cash/cash equivalent returns compared with historical averages, current and projected inflation, and other factors that shape the risk premium an investor faces. Although these and other components can be quantified, financial advisors commonly apply professional judgment and models when evaluating the market environment. As part of the risk-profiling framework presented in this report, an advisor should assess whether the investor's required RoR is realistic, given capital markets expectations, and when appropriate adjust the goal(s) and/or revisit assumed savings rates.

Consequence of Failure

The third element when assessing a goal is consequence of failure. *Risk consequence* refers to the financial and emotional threats an investor faces if a goal is not achieved. For example, some investors may consider that ensuring sufficient capital is available to pay for a grandchild's college education is a goal with an acceptable consequence of failure, whereas others might consider that not achieving this goal is unacceptable. Goal consequence, therefore, is a key element in determining how much portfolio risk is appropriate to recommend.

The consequence of failing to meet an investor's goal is not specifically quantified within the risk-need factor. However, when combined with an investor's ability to take risk and her behavioral loss tolerance (defined in detail later in this report), the severity of failing to meet a goal should be accounted for using the financial advisor's judgment as to whether the advisor should "nudge" an investor toward a higher volatility

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[5]Richard H. Thaler, "Mental Accounting and Consumer Choice," *Marketing Science* 4, no. 3 (Summer 1985): 199–214.

[6]See Jean L. P. Brunel, "Revisiting the Asset Allocation Challenge through a Behavioral Finance Lens," *Journal of Wealth Management* 6, no. 2 (January 2003): 10–20; Dan Nevins, "Goals-Based Investing: Integrating Traditional and Behavioral Finance," *Journal of Wealth Management* 6, no. 4 (Spring 2004): 8–23; and Franklin J. Parker, "The Erosion of Portfolio Loss Tolerance over Time: Defining, Defending, and Discussing," *Journal of Wealth Management* 19, no. 2 (July 2016): 23–31.

[7]Categorizing the risk need as low, moderate, or high is used throughout this report to describe, in simple terms, how a risk profile can be developed for an investor. These categories can be expanded, depending on a financial advisor's business model.

portfolio than what her behavioral loss tolerance would otherwise allow, assuming the investor has the financial ability to deal with the magnitude of potential losses associated with the risk need.

For example, assume an investor's RoR need is 8.18%, which in nearly all cases would be classified as a high risk need. If the consequence of failure is high, a financial advisor should present different scenarios and trade-offs associated with taking more portfolio risk and failing to meet the goal. Perhaps other solutions exist that will meet the investor's needs, such as (1) saving more, (2) spending less, (3) working longer, or (4) reducing a bequest that could better align the investor's risk need with his behavioral risk tolerance.

Simplifying the Process

Financial advisors may find that categorizing an investor's goal as low, moderate, or high risk (as measured by exposure to volatility) is useful, once the required RoR has been estimated and the estimate has been confirmed through a market risk environment analysis. The following guidelines can be used to classify a risk need:

Portfolio Composition of Growth Assets Necessary to Meet RoR (%)	Risk-Need Categorization
Less than 30%	LOW
Between 30% and 70%	MODERATE
Greater than 70%	HIGH

Risk Need Summary

The questions and tasks shown in **Table 1** can be used to help guide the risk need estimation process for a given future goal.

TABLE 1.	FRAMEWORK FOR ESTABLISHING AN INVESTOR'S RISK NEED
1.	What is the investor's goal?
2.	What is the future value need ($)?
3.	What is the present value of investment account ($)?

(Continued)

TABLE 1.	FRAMEWORK FOR ESTABLISHING AN INVESTOR'S RISK NEED *(CONTINUED)*
4.	What is the time horizon for accomplishing stated goal (years)?
5.	What is the regular saving to (+)/spending from (–) the account?
6.	What is the frequency of saving/spending (monthly/quarterly/yearly/occasionally)?
7.	What is the estimated required RoR (%) to meet stated goal?
8.	Given capital markets expectations and the current market risk environment, is this RoR realistic to obtain?
9.	DECISION POINT:
	• Proceed or stop and revise goal and/or savings rate.
10.	Financial consequence of failing to meet stated goal, if any:
	• Acceptable, unacceptable, unknown.

Factor 2 of 3: Establishing an Investor's Risk-Taking Ability

- Time Horizon
- Need for Liquidity
- Risk Capacity

Risk-Taking Ability

An investor's risk-taking ability encompasses three elements: (1) goal time horizon, (2) need for liquidity, and (3) risk capacity (i.e., capacity to deal with a financial loss).

Goal Time Horizon

Not only is an investor's *goal time horizon* an input used to determine the risk need (i.e., the required RoR need), but it is also an important element describing risk-taking ability. Conceptually, the goal time horizon is the period between when a goal is established and the date of that goal's achievement, which in some cases may exceed the investor's remaining lifetime. All else being equal, investors with long goal time horizons have a greater capacity to withstand

and recoup portfolio losses resulting from market volatility, compared with investors with shorter goal time horizons. Financial advisors should account for an investor's goal time horizon when applying their professional judgment with respect to the investor's ability to take risk.

Simplifying the Process

Financial advisors may find that classifying an investor's goal time horizon as follows is useful in the risk-profiling process:

- An investor is deemed to have a short goal time horizon if the time needed for goal achievement is five years or fewer.
- An investor is deemed to have a long goal time horizon if the time needed for goal achievement is 10 years or more.
- A goal time horizon that falls between these two points is defined as an intermediate time horizon.

Need for Liquidity

Need for liquidity is defined as an objective requirement or desire to hold cash for ongoing current or future expected distribution needs. During the capital accumulation phase of an investor's lifespan, liquidity needs may be quite low—which would increase an investor's ability to withstand market risk—whereas a liquidity need may be very high during the capital distribution phase of an investor's lifespan—thus reducing the investor's ability to incur investment risk. Financial advisors should account for the investor's need for liquidity when applying their professional judgment with respect to the investor's ability to take risk.

Simplifying the Process

Financial advisors may find that classifying the investor's need for liquidity is useful in the risk-profiling process, doing so using the following guidelines:

- A net (after advisory fees) expected or ongoing annual distribution need of 5% or more of a portfolio's value indicates a high liquidity need or a correspondingly low ability to take financial risk.
- An absence of expected distributions indicates a low liquidity need or a correspondingly high ability to take financial risk.

Risk Capacity

Risk capacity refers to an investor's financial capability to withstand a financial loss without meaningfully compromising her desired standard of living. Risk capacity is often evaluated using objective investor characteristics. For example, risk capacity can be gauged by total investable assets relative to net worth and the amount of outside assets or income available to the investor to cover future or unexpected liabilities. If an investor has adequate cash savings, pension income, insurance, and/or access to credit to cover his standard-of-living needs should an unexpected loss occur as the result of an emergency or a market decline—without significantly relying on or affecting the value of portfolio assets dedicated to achieving investor goals—the investor would be considered to have a high risk capacity. If, however, a significant drop in portfolio value could compromise the investor's standard of living, the financial advisor should consider the investor's risk capacity low.

Consider an investor with a long goal time horizon, low need for liquidity, and high degree of wealth or outside sources of income in relation to daily standard-of-living needs. This type of investor would generally be considered to have a high ability to take financial risk. All else being equal, recommending a portfolio that has a risk (volatility) need greater than the investor's risk-taking ability allows would be considered imprudent regardless of the investor's risk need or behavioral loss tolerance (described later in this report).

Risk-Taking Ability Summary

Although some subjectivity is involved, consideration of an investor's goal time horizon, liquidity needs, and capacity to take risk all inform a financial advisor's professional judgment about the investor's risk-taking ability. *Note that the ability elements, more than the other IRP elemental factors, will change, often significantly, throughout the goal timeline.* These elements should be revisited whenever an investor's situation (financial or otherwise) changes dramatically and as the goal moves closer to completion, primarily because an investor's ability to take risk generally declines as the goal nears.

Simplifying the Process

Financial advisors may find that classifying an investor's risk-taking ability as follows is useful in the risk-profiling process:

If <u>EITHER</u> of the following situations is present, the investor's ability to take risk is ***LOW***:

✓ Time horizon is less than or equal to five years.

✓ The expected and/or ongoing annual liquidity need is greater than or equal to 5% of the portfolio value *and* no outside income or assets (e.g., employment income, access to credit, cash savings, insurance) are available to maintain standard of living in case of an emergency.

If <u>ALL</u> of the following scenarios are present, the investor's ability to take risk is ***HIGH***:

✓ Time horizon is greater than or equal to 10 years.

✓ Investor has no expected and/or ongoing annual liquidity needs that are greater than 5% of the portfolio value.

✓ Sufficient outside income or assets (e.g., current income, access to credit, cash savings, insurance) are available to maintain standard of living in case of an emergency.

Otherwise, the investor's ability is ***MODERATE***.

Factor 3 of 3: Establishing an Investor's Behavioral Loss Tolerance

• Risk Tolerance
• Risk Preference
• Financial Knowledge
• Investing Experience
• Risk Perception
• Risk Composure

Behavioral Loss Tolerance

Although, in general, the first two IRP factors are easily measured with objective data points—that is, each

element can be calculated using financial software, spreadsheet packages, or a financial calculator with time value of money capabilities—elements of behavioral loss tolerance tend to be subjective and unique to each investor. As such, an investor's behavioral loss tolerance must usually be inferred from the administration of appropriately designed questionnaires, tests and scales, and conversations with the investor, as well as/or by examining the investor's past behavior with regard to asset allocation decisions. Relying on just one of these inputs can result in a skewed assessment of an investor's emotional wherewithal to engage in risky financial behaviors.

In the context of the risk-profiling process described in this report, an investor's behavioral loss tolerance can be described by six elements:

(1) risk tolerance
(2) risk preference
(3) financial knowledge
(4) investing experience
(5) risk perception
(6) risk composure

Unless a financial advisor is using a fit-for-purpose behavioral loss tolerance questionnaire, *each of these elements must be assessed independently*.[8] The six elements comprising this factor are described in greater detail in the following sections.

Risk Tolerance

Risk tolerance (i.e., willingness to take risk) represents the maximum amount of uncertainty an investor is willing to accept when making a financial decision.[9] Risk tolerance can also be conceptualized as an investor's inclination to engage in financial behavior whose outcome is unknown and potentially negative.[10] Risk aversion is the inverse of risk tolerance. In general, one can reasonably assume that an investor's financial risk tolerance is relatively stable across time.

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[8]The six elements comprising the behavioral loss tolerance factor tend to be highly correlated. This does not mean, however, that the elements can be used as substitutes for each other. Just as income and net worth are highly correlated, measuring, say, income and then assuming net worth based on the income assessment would be irresponsible. In this report, an investor (or her financial advisor) is responsible for evaluating each of the six elements. How the exact assessment is made is a decision the financial advisor and/or the firm must make. The risk-profiling methodology outlined in this report is assessment and product neutral. Appendix A provides an overview of the concepts needed to effectively evaluate risk-tolerance and risk-aversion questionnaires. The information in Appendix A can also be used to guide the choice of questions and questionnaires used to measure risk preference, financial knowledge, investing experience, risk perception, and risk composure.

[9]David M. Cordell, "RiskPACK: How to Evaluate Risk Tolerance," *Journal of Financial Planning* 14, no. 6 (June 2001): 36–40.

[10]The concept of risk tolerance is related to loss tolerance/aversion. Loss tolerance relates to prospect theory and the notion that people weigh losing money more heavily than making money. When risk tolerance is viewed this way, an investor will establish a baseline portfolio value level. The investor will then tolerate swings in the market so long as the resulting portfolio balance remains above the reference point.

Numerous commercial firms provide financial risk-tolerance evaluation and assessment platforms. The two most common approaches used to measure risk tolerance are psychologically derived risk-tolerance questionnaires[11] and economics-based revealed preference tests.[12] Appendix A provides a detailed description of the questions a financial advisor should ask before choosing a risk-tolerance questionnaire or revealed preference test for use in the risk-profiling process this report describes.

Simplifying the Process

Financial advisors may find that categorizing risk tolerance as follows is useful in the risk-profiling process:

1 = Very Low; 2 = Low; 3 = Moderate; 4 = High;
5 = Very High.

Risk Preference

Risk preference refers to an investor's use of subjective and objective cognitive evaluations to describe her feelings regarding a real or potential course of action. For example, an investor may prefer investing in certificates of deposit based on subjective probability estimates that indicate a minimal chance of losing money; another investor may prefer to avoid certificates of deposit based on a cognitive evaluation showing that the after-tax and after-inflation returns associated with these assets result in problematic outcomes. In nearly all cases, investors prefer taking less risk.[13] Keep in mind that an investor may prefer a low volatility investment or portfolio while also being willing to invest more aggressively if the returns justify the risks. Stated another way, an investor may prefer low volatility investments while concurrently exhibiting a willingness to take financial risk.

Simplifying the Process

Financial advisors may find that categorizing an investor's risk preference as follows is useful in the risk-profiling process:

1 = Maximize Safety; 2 = Mostly Safety;
3 = Mix of Safety and Return; 4 = Mostly Return;
5 = Maximize Return.

Financial Knowledge

Financial knowledge represents the combined financial information, facts, and skills an investor exhibits and uses when making financial decisions. Financial knowledge is gained through education, training, and experience. In the context of risk profiling, an investor's financial knowledge can be evaluated multiple ways, including via assessments a financial advisor makes after discussing broad financial topics with the investor. A more precise estimate of financial knowledge can be obtained by having an investor complete a financial knowledge quiz during the data-gathering phase of the investment management process. For example, the Financial Industry Regulatory Authority (FINRA) Investor Education Foundation's national financial capability study (www.usfinancialcapability.org/quizzes.php) has questions that can be used for this purpose.[14]

Simplifying the Process

Financial advisors may find that categorizing an investor's financial knowledge as follows is useful in the risk-profiling process:

1 = Not at All Knowledgeable; 2 = Minimally Knowledgeable; 3 = Moderately Knowledgeable; 4 = Competent; 5 = Very Knowledgeable.

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[11]Financial advisors who are primarily interested in anticipating or predicting an investor's future investment or financial behavior—after a recommendation has been implemented—will find behavioral prediction tools valuable. Scores from these tools provide a forecast estimate of future investor behavior during market corrections and other events.

[12]These tools ask questions based on the economic concept of risk in which probability outcomes are predetermined. Resulting answers to such questions can be used to derive a measure of constant relative risk aversion. Constant relative risk aversion can then be used to estimate an investor's utility curve. Where the utility curve intersects the efficient frontier then becomes the recommended portfolio.

[13]Harry M. Markowitz, "Portfolio Selection," *Journal of Finance* 7, no. 1 (March 1952): 77–91.

[14]See Annamaria Lusardi and Olivia S. Mitchell, "Baby Boomer Retirement Security: The Roles of Planning, Financial Literacy, and Housing Wealth," *Journal of Monetary Economics* 54, no. 1 (January 2007): 205–224.

Investing Experience

Investing experience refers to an investor's mastery of financial topics and skills obtained through action, behavior, or participation in financial and/or investment activities. The relationship between risk taking and experience is generally positive, with those who exhibit modest to high levels of experience being more likely to trade securities, purchase and hold investment assets (including real estate), and save and borrow more aggressively. Few financial experience questionnaires, scales, or measurement tools exist. Within the financial risk-profiling framework presented in this report, financial experience can be assessed using a financial advisor's professional judgment. A key element of this assessment should be linked to the number of years the investor has been actively engaged in making financial decisions and/or the number of investment and business cycles the investor has experienced.

Simplifying the Process

Financial advisors may find that categorizing an investor's investing experience as follows is useful in the risk-profiling process:

1 = None; 2 = Very Little; 3 = Some; 4 = Modest; 5 = Extensive.

Risk Perception

Risk perception refers to a judgment an investor makes (feels) regarding the severity of risk in association with the broader economic environment. Risk perception can be influenced by the media and/or an investor's lack of knowledge and experience. How an investor perceives the degree of risk associated with a behavior is known to contribute to his engagement in risk-taking behavior.[15] Risk perception is primarily a cognitive activity involving the appraisal of external conditions and internal states.[16] Generally, perception of risk involves a subjective evaluation of potential risk-taking outcomes.

As conceptualized in the risk-profiling process described in this report, risk perception is linked to an investor's judgment of the riskiness associated with investing. Those who perceive little to no such risk should exhibit greater adaptability in the face of market volatility. Risk perception can be evaluated based on a financial advisor's discussions with an investor or by asking an investor how she or he feels about taking financial risks (e.g., "How risky is the stock market?").

Simplifying the Process

Financial advisors may find that categorizing an investor's risk perception as follows—based on the investor's answer to the question "How risky is the stock market?"—is useful in the risk-profiling process:

1 = Very Risky; 2 = Somewhat Risky; 3 = Neutral; 4 = Somewhat Safe; 5 = Very Safe.

Risk Composure

Risk composure refers to the likelihood that in a perceived or actual crisis, an investor will exhibit behavior fundamentally different from her past actions.[17] Investors with low risk composure tend to act in a biased manner, which often results in actions that crystalize losses. Risk composure can be measured by evaluating an investor's past decisions and actions.

Simplifying the Process

Financial advisors may find that categorizing an investor's risk composure as follows—based on an investor's answer to the question "In the past, when faced with investment losses, what did you do?"—is useful in the risk-profiling process:

1 = Sold Investment (Low Risk Composure); 3 = Did Nothing (Moderate Risk Composure); 5 = Purchased More (High Risk Composure).

Behavioral Loss Tolerance Summary

Financial advisors should assess and evaluate each of these six elements to arrive at an estimation of an investor's behavioral loss tolerance.

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[15]Sim B. Sitkin and Amy L. Pablo, "Reconceptualizing the Determinants of Risk Behavior," *Academy of Management Review* 17, no. 1 (January 1992): 9–38.

[16]Michael Joseph Roszkowski and Geoff Davey, "Risk Perception and Risk Tolerance Changes Attributable to the 2008 Economic Crisis: A Subtle but Critical Difference," *Journal of Financial Service Professionals* 64, no. 4 (July 2010): 42–53.

[17]David M. Cordell, "RiskPACK: How to Evaluate Risk Tolerance," *Journal of Financial Planning* 14, no. 6 (June 2001): 36–40.

Simplifying the Process

Table 2 provides a scoring sheet that can be used to evaluate the behavioral loss tolerance elements described in this report and to derive an investor's behavioral loss tolerance score.

TABLE 2. BEHAVIORAL LOSS TOLERANCE SCORING SHEET				
What is the investor's risk tolerance or willingness to take financial risk?				SCORE
Very Low	Low	Moderate	High	Very High
1	2	3	4	5
What is the investor's preference when holding risky assets?				
Maximize Safety	Mostly Safety	Mix of Safety and Return	Mostly Return	Maximize Return
1	2	3	4	5
How knowledgeable is the investor about financial and investment concepts?				
Not at All Knowledgeable	Minimally Knowledgeable	Moderately Knowledgeable	Competent	Very Knowledgeable
1	2	3	4	5
How much experience does the investor have with investment products?				
None	Very Little	Some	Modest	Extensive
1	2	3	4	5
What is the investor's perception of the riskiness of the stock market?				
Very Risky	Somewhat Risky	Neutral	Somewhat Safe	Very Safe
1	2	3	4	5
In the past, when faced with investment losses, what action did the investor take?				
Sold Investment		Did Nothing		Purchased More
1		3		5
				TOTAL

Scores for each of the elements comprising the behavioral loss tolerance factor should be summed. The total scores possible for the factor range from a low of 6 to a high of 30. Scores should then be matched to the following behavioral loss tolerance categories:

- LOW = 6 to 13
- MODERATE = 14 to 22
- HIGH = 23 to 30

RECONCILING AND RELATING THE IRP TO A PORTFOLIO STRATEGY

Once the three factors of risk need, risk-taking ability, and behavioral loss tolerance have been assessed independently, the financial advisor can develop an IRP that will inform portfolio recommendations. The IRP is not only a qualitative assessment of an investor's financial and emotional aptitude for engaging in transactions that involve risk but also a quantitative assessment of an investor's need for risk (usually expressed as a required RoR to achieve goals) and risk-taking ability (typically considered in the context of drawdowns or volatility and related to the effect on an investor's standard of living).

The IRP may reveal conflicting factors that require an advisor's professional judgment to reconcile. The following decision rules can be used to guide the interpretation of an IRP:

- The investor's risk need cannot exceed the investor's risk-taking ability associated with the goal. Reconciling these two factors requires that a financial advisor counsel the investor to reconsider goals and/or savings rates.

EXAMPLE

Risk Need	Risk-Taking Ability	Behavioral Loss Tolerance	Portfolio Strategy
High	Low	High	Reconsider Goals

- A lower risk need can be discounted when both risk-taking ability and behavioral loss tolerance are higher.

EXAMPLE

Risk Need	Risk-Taking Ability	Behavioral Loss Tolerance	Portfolio Strategy
Low	High	High	Consistent with Risk-Taking Ability and Behavioral Loss Tolerance

- Higher risk-taking ability can be discounted when both the risk need and behavioral loss tolerance are lower.

EXAMPLE

Risk Need	Risk-Taking Ability	Behavioral Loss Tolerance	Portfolio Strategy
Low	High	Low	Consistent with Risk Need and Behavioral Loss Tolerance

- Higher behavioral loss tolerance can be ignored when both the risk need and risk-taking ability are lower; the advisor may need to coach the client to overcome her behavioral tendencies to take risk in light of the realities of the client's risk need and risk-taking ability.

EXAMPLE

Risk Need	Risk-Taking Ability	Behavioral Loss Tolerance	Portfolio Strategy
Low	Low	High	Consistent with Risk Need and Risk-Taking Ability

- Low behavioral loss tolerance can *never* be ignored; however, a financial advisor may conclude that appropriate client counseling and education can be used to "nudge" an investor into a higher-risk portfolio when the risk need and risk-taking ability are higher.

EXAMPLE

Risk Need	Risk-Taking Ability	Behavioral Loss Tolerance	Portfolio Strategy
High	High	Low	Counseling and Education

- A financial advisor should not recommend a portfolio allocation that exceeds an investor's risk-taking ability. Risk-taking ability sets an upper volatility bound to a portfolio recommendation. *Because risk-taking ability changes (especially as the goal time horizon shortens), this factor must be reassessed regularly.*

EXAMPLE

Risk Need	Risk-Taking Ability	Behavioral Loss Tolerance	Portfolio Strategy
Low	Low	High	Consistent with Risk-Taking Ability

Portfolio Implications of IRP Categorizations

Throughout this report, documentation has been made indicating where financial advisors may simplify the process by categorizing elements of the three factors that make up an IRP. These categorizations may be used to guide some financial advisors to appropriate portfolio recommendations. A process for categorization based on the IRP development process described in this report is presented in Appendix D.

SUMMARY

The current standard of practice of using a single risk coefficient or data input as a guide to an appropriate portfolio choice (either within the context of modern portfolio theory or as a tool to select an advisor-developed portfolio) is likely flawed. Stated another way, a single score derived from a risk-tolerance questionnaire or revealed preference test, while useful in describing a broader risk profile, is not sufficient to describe an investor's risk need, risk-taking ability, or behavioral loss tolerance.

Regardless of the approach used to develop portfolio selection recommendations, financial advisors face the real risk of failing to meet an investor's goal(s) if a selected portfolio is positioned either too conservatively or too aggressively. To increase the likelihood of achieving investor goals, financial advisors must use tools that fully inform professional judgment when making portfolio allocation recommendations. The risk-profiling modelling process this report describes helps move risk profiling away from the measurement of one or a few data points while standardizing some of the elements and decision points in the risk-profiling process.

APPENDIX A

Assessing and Choosing a Risk-Tolerance Measure[18]

The measurement of financial risk tolerance—an investor's *willingness* to engage in financial behavior whose outcomes are unknown and potentially negative—is typically conducted using one of two tools:

- a psychologically derived questionnaire
- a revealed preference risk-aversion test

Normally, financial advisors either use a commercial product or rely on a questionnaire developed in-house to asses an investor's tolerance for financial risk and to meet regulatory requirements. Both approaches offer unique advantages and disadvantages in terms of accuracy, repeatability, and overall validity. When deciding on an approach—and selecting a particular risk-tolerance assessment tool—both the validity and reliability of the tool should be considered.

Validity

Validity refers to how accurate a tool is in describing or predicting human trait factors, attitudes, or behavior. Stated another way, "validity refers to how well the assessment tool actually measures the underlying outcome of interest" (p. 119),[19] in this case, an investor's willingness to take financial risk. For a questionnaire or test to be valid, scores must be accurate in forecasting how an investor will respond in real-life financial situations. Two forms of validity are especially important with respect to the choice of a financial risk-tolerance tool:

- *Content validity:* This assessment of validity is based on the professional judgment of subject matter experts. The questions asked in the questionnaire or test should appear, to a professional, appropriate in terms of accurately assessing an investor's willingness to take a financial risk. A measurement tool should also pass a financial advisor's test of *face validity*, which is an advisor's feeling that the questions asked appear correct.
- *Criterion validity:* This assessment of validity is measured using a statistical test (e.g., correlation

coefficient). Asking a questionnaire or test developer for evidence of criterion validity before adopting a tool is appropriate. Two types of criterion validity are particularly important:

o *Concurrent validity* provides evidence that the questionnaire or test score is associated with other measures of financial risk taking.

   ■ For example, a financial risk-tolerance score should be positively associated with holding equities and negatively associated with holding cash and cash equivalent assets.

o *Predictive validity* provides evidence that questionnaire or test scores provide meaningful insight into future behavior.

   ■ For example, scores should be predictive of who is more or less likely to react negatively during a bear market.

"Red flags" that a question or questionnaire might not be valid include the following:

Questions elicit risk tolerance outside the context of investment risk taking. These types of questions do a poor job of predicting investment risk-taking behavior primarily because risk tolerance tends to be domain specific and not a generalized characteristic. The following is an example of a poor question:

I enjoy risky activities such as skydiving, motorcycle riding, and rock climbing.

- *1—Strongly Agree*
- *2—Agree*
- *3—Neutral*
- *4—Disagree*
- *5—Strongly Disagree*

Questions focus on having an investor anticipate future behavior. Investors are generally unable to accurately assess their own financial sophistication or future behavior, especially when asked during a market in which prices are generally increasing. These types of questions should be avoided in favor of more objective questions. The following is an example of a problematic question:

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[18]The authors wish to thank Dr. Michael Roszkowski for his comments on elements of this appendix.

[19]Gail M. Sullivan, "A Primer on the Validity of Assessment Instruments," *Journal of Graduate Medical Education* 3, no. 2 (June 2011): 119–120.

If the stock market were to fall 30% over the next six months, which would you choose to do?

- *1—Sell Immediately*
- *2—Do Nothing*
- *3—Buy More*

Questions pose 50/50 chance outcome choices. Investors are more likely to take a risk when the odds of success are known in advance; however, financial and investment outcomes are not known in advance, nor do typical investment choices have 50/50 predetermined odds. All revealed preference tests use a series of 50/50 outcome choice questions. These tests should be approached with caution because responses may not be valid. An example of a revealed preference question follows:

Suppose that you are about to retire and have two choices for a pension. Annuity A gives you an income equal to your preretirement income. Annuity B has a 50% chance your income will be double your preretirement income and a 50% chance that your income will be 20% less than your preretirement income. Which annuity would you choose?

Questions bias an investor. A common problematic question is one in which an illustration is provided showing how an investor should respond or how others (particularly experts or peers) most often respond. This type of question may bias an investor to respond with what she or he believes is the "correct" answer rather than how the investor truly feels. The following is an example of a biased question:

Many financial experts recommend that the percentage of equity securities in your portfolio should be equal to 100 minus your age. What percentage of equity securities would you be comfortable investing?

- *1—0–20%*
- *2—21–40%*
- *3—41–60%*
- *4—61–80%*
- *5—81–100%*

Questions imbed complex language or investment-specific verbiage. Words such as "risky," "volatile," "aggressive," and "conservative" have different connotations in different contexts. Words, terms, and phrases should be well defined and understood within the context of a question, and words should exhibit a consistent magnitude for each scale response. Financial abbreviations and acronyms, even well-known ones, should be avoided. The following is an example of a complex language question:

How would you describe your preferred investment strategy?

- *1—Capital Preservation*
- *2—Conservative*
- *3—Balanced*
- *4—Risky*
- *5—Maximize ROI*

Questions are double-barreled. Questions should be framed to assess just one concept or issue because with "double-barreled" questions, the investor could both agree and disagree simultaneously, which then forces the investor into a guessing situation. The following is an example of a double-barreled question:

Please agree or disagree with the following statement: I am financially knowledgeable and experienced.

- *1—Agree*
- *2—Disagree*

Reliability

Of equal importance when selecting a risk-tolerance assessment tool or questionnaire is documentation of reliability. Reliability refers to whether a tool or questionnaire generates the same results each time it is used in the same setting with the same person. For example, a person's scored outcome should be similar in periods of market stress and market expansion. If a questionnaire or measurement tool is not reliable, the approach is, by definition, invalid.

The measurement of reliability is based on a statistical test. Reliability is most often measured as internal consistency between and among items asked in a questionnaire. Questionnaires and scale developers commonly report reliability as Cronbach's alpha.[20]

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[20]Traditional measures of reliability have been criticized as being inadequate. Alternatives to Cronbach's alpha include *omega* and the *greatest lower bound*. See Gjalt-Jorn Ygram Peters, "The Alpha and the Omega of Scale Reliability and Validity: Why and How to Abandon Cronbach's Alpha and the Route towards More Comprehensive Assessment of Scale Quality," *European Health Psychologist* 16, no. 2 (April 2014): 56–69.

Another form of reliability is based on test-retest data. This estimate of *alpha* is derived by comparing a test taker's score on the same questions from one period to that from another period. From a due diligence point of view, a questionnaire or test should exhibit a reliability score of 0.70 or higher.

- Asking a risk-tolerance questionnaire developer to provide evidence of reliability is a best practice. Reliability will generally be reported as Cronbach's alpha (α). Scores of $\alpha \geq 0.70$ indicate that the questionnaire is more likely to generate consistent, dependable, and meaningful results across time and across investors.

A Note on Psychologically Derived Questionnaires

Numerous firms provide risk-tolerance (risk-aversion) assessment platforms for use when assessing an investor's willingness to take financial risk, and most are administered via a series of scale questions in which a single "score" is estimated. In the context of this report, a questionnaire that includes questions related to all six elements of the behavioral loss tolerance factor of the risk-profiling process would be beneficial.[21] Unfortunately, few such questionnaires exist. Instead, those who use the risk-profiling process described in this report will need to choose a risk-tolerance questionnaire and supplement the derived score with data representing the other elements.

When evaluating a particular risk-tolerance questionnaire or test, understanding the validity and reliability characteristics of the questionnaire or test, as has been described, is important. Another factor to consider is the length of the risk-tolerance assessment. How many questions a questionnaire or test should include is a matter of some dispute. Financial advisors and investors prefer fewer questions; however, researchers, in general, argue that asking more questions helps increase validity and reliability, making scores more accurate. As Michael Joseph Roszkowski explains,[22]

> Only by presenting the investor with a sufficiently large number of questions can you hope to get a representative sample of past behaviors, current attitudes, and intentions regarding the future. The greater

the number of questions asked, the more accurate the results of the assessment are likely to be. (p. 47)

While the optimal number of questions is still a matter of preference, an appropriate range is between 7 and 30 items.

Another problem observed in many risk-tolerance questionnaires is an attempt to blend subjective behavioral tolerance questions with objective questions relating to an investor's need and ability to take risk. For a questionnaire to ask about time horizon, age, liquidity need, and risk capacity is common. Although each of these elements is crucial to developing an overall risk profile, subjective and objective elements should not be averaged together within a weighting methodology. This ad hoc commingling of subjective and objective questions can lead to an over- or underweighting of subjective behavioral factors relative to objective factors. Time horizon and risk capacity questions should generally not be included in a risk-tolerance questionnaire or test.

Overall, the use of a psychometrically valid and reliable risk-tolerance questionnaire is the preferred method for measuring an investor's risk tolerance—one of the six elements comprising an investor's behavioral loss tolerance; however, financial advisors and regulators must be cognizant of the common theoretical problems observed in both commercial and in-house firm-developed questionnaires and be able to identify and discern the good tools from the bad.
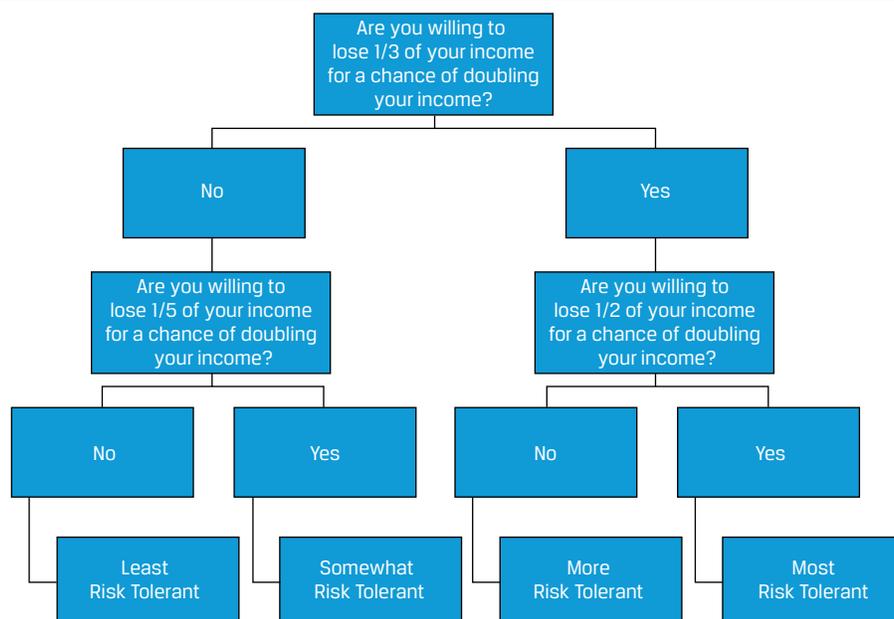
A Note on Measures of Revealed Preference

As noted earlier in the text, two types of risk-tolerance assessments are widely used in practice: psychologically derived questionnaires and revealed preference risk-aversion tests. The evaluation of a revealed preference test requires additional due diligence.

Although sometimes presented in questionnaire format, measures of revealed preference are generally not developed in the same manner as a psychologically derived scale. Tools based on psychological theory almost always combine responses across questions when calculating a score.[23] Revealed preference measures,

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[21]These elements are willingness to take financial risk, risk preference, financial knowledge, financial experience, risk perception, and risk composure (past behavior).

[22]Michael Joseph Roszkowski, "How to Assess an Investor's Financial Risk Tolerance: The Basics," in *Personal Finance Risk Tolerance* (Bryn Mawr, PA: The American College, 1992).

[23]This is sometimes referred to as a summated scale.

FIGURE A1.   EXAMPLE OF REVEALED PREFERENCE TEST

Are you willing to lose 1/3 of your income for a chance of doubling your income?

- No
  - Are you willing to lose 1/5 of your income for a chance of doubling your income?
    - No → Least Risk Tolerant
    - Yes → Somewhat Risk Tolerant
- Yes
  - Are you willing to lose 1/2 of your income for a chance of doubling your income?
    - No → More Risk Tolerant
    - Yes → Most Risk Tolerant

like the example shown in **Figure A1**, rely on skip-pattern responses.[24]

When enough items are asked and responses from the answered items analyzed, estimates of constant relative risk aversion (the inverse of risk tolerance) can be derived. Constant relative risk aversion can then be used to estimate an investor's utility function in the context of portfolio selection along the efficient frontier. *In the risk-profiling methodology presented in this report, however, a revealed preference score is not intended to be used in isolation.* Instead, scores from a revealed preference test should, as Alessandro Bucciol and Marina Stuefer note, be used in the risk-profiling process as a proxy for financial risk tolerance or as an "indicator of self-assessed risk attitude" (p. 23).[25]

Before selecting a revealed preference measure, asking the test developer about the tool's validity and reliability is important, as is keeping in mind that given the way questions are presented in most revealed preference tests, a reliability estimate using a traditional estimate, such as Cronbach's alpha, may not be available. Instead, a test developer should provide a reliability estimate based on test-retest data (i.e., an illustration of test scores by the same person over time).

Conclusion

To review, the first step when selecting a risk-tolerance measure involves conducting a validity review. Essentially, this means determining whether the questions included in a questionnaire or test, and the resulting output, "look" and "feel" right. This is not always a statistical test but sometimes an assessment based on professional judgment. Once one or more potential questionnaires have been identified for potential use in the risk-profiling process, the following checklist can be used to refine the risk-tolerance questionnaire decision choice.[26]

Checklist for Evaluating Risk-Tolerance Measurement Tools

- The questionnaire developer's website or marketing material documents questionnaire validity.
- The questionnaire developer's website or marketing material documents questionnaire reliability via test-retest scores or Cronbach's alpha ($\alpha \geq 0.70$).
- The questionnaire includes a variety of questions and scenarios (minimum of seven questions)

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[24]The questions in Figure A1 are from Robert B. Barsky, F. Thomas Juster, Miles S. Kimball, and Matthew D. Shapiro, "Preference Parameters and Behavioral Heterogeneity: An Experimental Approach in the Health and Retirement Study," *Quarterly Journal of Economics* 112 (May 1997): 537–579.

[25]Alessandro Bucciol and Marina Stuefer, "Measuring Household Financial Risk," *Journal of Wealth Management* 15, no. 3 (Winter 2012): 20–29.

[26]Adapted from Michael Joseph Roszkowski, Geoff Davey, and John E. Grable, "Insights from Psychology and Psychometrics on Measuring Risk Tolerance," *Journal of Financial Planning* 18, no. 4 (April 2005): 66–77.

that relate to the type of product or service being offered (e.g., investing, savings choices, business ownership).

- The individual questions are free of biased language.

- Questionnaire scores have been correlated (with a statistical correlation coefficient) to other measures of financial risk taking (e.g., participation in the stock market, portfolio holdings).

- The scoring methodology and question weighting are clearly stated and free of objective factors (e.g., time horizon, age, liquidity, risk capacity). These factors should be measured independently within the broader risk profile, *not* "averaged" into a single score measure.

Assuming a measurement tool exhibits elements of validity and reliability, the decision to use a risk-tolerance questionnaire or revealed preference test should be driven by ease of use, the quality of documentation provided by the tool's vendor, and ongoing documentation of validity and reliability. The final risk-tolerance score—derived from either a questionnaire or a revealed preference test—can then be incorporated into the risk-profiling process as described in this report.

APPENDIX B

Regulatory Background and Risk-Profiling Requirements

Regulators and boards of professional practice in all major developed markets require advisory firms and financial advisors to assess and evaluate an investor's risk profile (or more precisely, the elements of an IRP).[27] Consider the FINRA customer due diligence requirements as prescribed in the United States. Customer due diligence rules require financial advisors to take steps to understand the nature and purpose of a customer relationship. FINRA rules further state that a firm or financial advisor must[28]

have a reasonable basis to believe that a transaction or investment strategy involving securities that are or have been recommended to an investor are suitable. . . . [A] reasonable basis underlying suitability is due diligence to assess an investor's investment profile, which can be comprised of a risk-tolerance assessment, an investor's age, other investments, financial needs, tax status, investment objectives, experience, time horizon, liquidity need, and other factors.

The Investment Industry Regulatory Organization of Canada has a similar rule whereby a financial advisor must be able to demonstrate that an investor's willingness and ability to take risks have been measured and evaluated before an investment recommendation is developed.[29]

In the European Union, Article 25 of the Markets in Financial Instruments Directive II states,

When providing investment advice or portfolio management the investment firm shall obtain the necessary information regarding the investor's knowledge and experience in the investment field relevant to the specific type of product, that person's financial situation including his ability to bear losses, and his investment objectives including his risk tolerance.

In the United States, the Certified Financial Planner Board of Standards, Inc., as an element of its Code of Ethics and Standards of Conduct, also mandates the measurement of risk-profiling factors for those who hold the CFP® certification:[30]

A CFP® professional must act with the care, skill, prudence, and diligence that a prudent professional would exercise in light of the Client's goals, risk tolerance, objectives, and financial and personal circumstances. (p. 3)

Similarly, the Association of International Certified Public Accountants mandates that those who hold the Personal Financial Specialist (PFS) designation, as part of the Certified Public Accountant/PFS Body

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[27]See FINRA's Customer Due Diligence Requirements for Financial Institutions (CDD Rule) and FINRA Rule 3310 (Anti-Money Laundering Compliance Program).

[28]Based on FINRA rules, investor financial risk profiles may consist of individualized risk scoring that allows an investor to be categorized into an appropriate investment classification.

[29]See Shawn Brayman, Michael Finke, Ellen Bessner, John Grable, Paul Griffin, and Rebecca Clement, *Current Practices for Risk Profiling in Canada and Review of Global Best Practices* (Toronto: Investor Advisory Panel of the Ontario Securities Commission, 2015). http://www.osc.gov.on.ca/documents/en/Investors/iap_20151112_risk-profiling-report.pdf.

[30]Certified Financial Planner Board of Standards, Inc., *Code of Ethics and Standards of Conduct* (Washington, DC: Certified Financial Planner Board of Standards, 2018). https://www.cfp.net/docs/default-source/for-cfp-pros---professional-standards-enforcement/CFP-Board-Code-and-Standards.

of Knowledge, assess elements of an investor's risk profile,[31]

> reviewing client investment preferences and risk tolerance to help them develop appropriate investment strategies. (p. 8)

Globally, CFA Institute, in its *Standards of Practice Handbook* (11th edition), directs the following:[32]

> When Members and Candidates are in an advisory relationship with a client, they must . . . make a reasonable inquiry into a client's or prospective client's investment experience, risk and return objectives, and financial constraints prior to making any investment recommendation or taking investment action and must reassess and update this information regularly. (p. 9)

Given the way existing rules have been written, nearly all "risk-profiling" tools in the marketplace can be used to meet regulatory customer due diligence requirements.[33] In addition, nearly all existing tools provide a basis for investor–advisor risk–return discussions. Financial advisors who are merely looking for a regulatory compliance tool therefore have access to multiple alternatives. Additional assessment is required for those who wish to use the risk-profiling process described in this report.

APPENDIX C

Risk-Profiling Terminology

Consequence of Goal Failure: The subjective acceptability of failing to accomplish a financial goal. Can be used as a scale whereby a high magnitude of unacceptability of failing to accomplish an investor's goals would require higher relative weighting of the investor's risk-need factor and vice versa.

Financial Knowledge: An investor's financial literacy concerning investing and risk–return dynamics. Higher knowledge is generally associated with higher willingness to take investment risk.

Goal Time Horizon: Length of time, generally stated in years, between the present moment and the target goal achievement date. Generally related to age but not interchangeable.

Investing Experience: Related to financial knowledge but can be gained only by "living through" various economic cycles—in particular, severe economic downturns. Contrary to knowledge, experience can be associated with high or low willingness to take financial risk, given that an investor's past experiences naturally influence his perception of the riskiness of a possible future investment.

Investment Risk Profile (IRP): The combination of factors about an investor that are expected to affect the level of portfolio risk that would be appropriate for a financial advisor to recommend. Generally, an IRP will include all the factors listed in this appendix, along with any other unique circumstances, tax/legal considerations, biases, or personality traits.

Market Risk Environment: The market interest rate, inflation, and return expectations that exist at the time of assessment.

Need for Liquidity: An objective need or desire to hold cash for ongoing current or future expected distribution needs. High need for liquidity is often related to a short time horizon.

Risk Capacity: Otherwise known as an investor's ability to sustain portfolio volatility without material effect on the investor's standard of living or capability to meet stated goals. High risk capacity is often related to the existence of an emergency fund, current outside and/or employment income, access to credit, insurance coverage, etc.

Risk Composure: An individual's past penchant for behaving in a consistent manner. An example assessment would be to enquire how an individual responded to the global financial crisis of 2008–2009: Did she or he sell, hold, or buy more?

Risk Need: The magnitude of risk necessary to achieve a financial goal, based on predetermined levels of expected return. The related required RoR determination, calculated from present/future value models, can be adjusted and reevaluated via manipulation of the input factors (present value, future value, number of payments, interest rate, payment).

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[31]Association of International Certified Professional Accountants, *PFS Credential Handbook: A Guide to the AICPA Personal Financial Specialist Credential* (Durham, NC: Association of International Certified Professional Accountants, 2019). https://www.aicpa.org/content/dam/aicpa/membership/join/downloadabledocuments/pfs-credential-handbook.pdf.

[32]CFA Institute, *Standards of Practice Handbook, 2014*, 11th ed. (Charlottesville, VA: CFA Institute, 2014). https://www.cfainstitute.org/-/media/documents/code/code-ethics-standards/standards-practice-handbook-11th-ed-eff-July-2014-corr-sept-2014.ashx.

[33]Regulators have not historically prescribed validity, reliability, design, or interpretation guidelines related to risk-profiling tools, making nearly all risk-tolerance and risk-profiling assessment tools compliant with regulations.

Risk Perception: An individual's cognitive assessment of the riskiness of a given situation, regardless of the objective truth. Perception can be heavily influenced by the media and an individual's social environment, as well as a lack of thorough understanding of financial concepts.

Risk Preference: An individual's general feeling or partiality toward one or more options over another/others. Preference is a rank order of preferred choices. Although investors are assumed to be risk averse, some may have a greater preference for "return maximization" over "risk reduction."

Risk Tolerance: The maximum level of uncertainty an individual is willing to tolerate in exchange for incremental units of return. This term is often used interchangeably in everyday nomenclature to mean "risk profile" or "risk attitude"; however, in practice, risk tolerance is an individual's willingness to implement a risky strategy after all other factors have been considered.

APPENDIX D

In the context of this report, a *risk profile is the combination of an investor's risk need, risk-taking ability, and behavioral loss tolerance*. Given that each factor may be characterized with three levels of intensity, 27 IRP combinations are possible.[34] For example, an investor with a very high IRP can be described as high need (HN), high ability (HA), and high tolerance (HT). An investor with a very low IRP can be described as low need (LN), low ability (LA), and low tolerance (LT). However, rarely do all three factors align perfectly.

Essentially, each IRP can be thought of as representing a different "risk personality." An investor's unique combination of IRP factors, as shown in **Table D1**, can be used by an investor, financial advisor, educator, or regulator when calibrating an investor's IRP into a portfolio asset allocation recommendation. This calibration process is analogous to a traffic light that instructs drivers to proceed on green, use caution on yellow, and stop on red.

The following risk-profiling rules apply when using the IRP technique outlined in this report:

- An investor's risk need cannot be higher than the investor's risk-taking ability associated with the goal.

  - Doing so will trigger an automatic red light, indicating that the investor's goal must be reevaluated to realign with her risk-taking ability.

- A lower risk need is ignored when both risk-taking ability and behavioral loss tolerance are higher.

- Higher risk-taking ability is ignored when both the risk need and behavioral loss tolerance are lower.

- Higher behavioral loss tolerance is ignored when both the risk need and risk-taking ability are lower.

- Low behavioral loss tolerance can *never* be ignored; however, behavioral loss tolerance can be used to "nudge" an investor into a higher-risk portfolio when the risk need and risk-taking ability are higher.

- A financial advisor should not recommend a portfolio allocation that exceeds an investor's risk-taking ability.

  - Risk-taking ability sets an upper volatility bound to a portfolio recommendation.

Green Light Profiles

Some IRP combinations represent "green light" profiles, meaning that no further calibration or data are necessary to make an appropriate portfolio allocation recommendation.

For example, if an investor's IRP is HN, HA, and HT, a financial advisor can reasonably recommend a "high volatility portfolio," which for risk-profiling purposes is defined as a portfolio with at least 70% exposure to growth assets (equities and alternatives). In the same way, a "moderate volatility portfolio" is one with 30% to 70% exposure to growth assets, and a "low volatility portfolio" is one with less than 30% exposure to growth assets.

Yellow Light Profiles

"Yellow light" IRPs signal that an investor's *behavioral loss tolerance* is lower than either his *risk need* or *risk-taking ability*. This means the investor may need some additional behavioral interventions before investing in a portfolio more consistent with his risk need and risk-taking ability.

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[34]Although 27 IRP combinations ultimately exist, only "green light" and "yellow light" IRP combinations, 18 in total, are acceptable when making portfolio allocation recommendations.

It may be appropriate for a financial advisor to "nudge" an investor into a higher volatility portfolio in yellow light cases. This behavioral "nudge," or soft paternalism,[35] may be necessary to promote what is objectively in the best long-term interest of the investor; however, this should not be automatically assumed. In practice, 55% of investors understand that they need to take investment risk to achieve their goals; however, 52% of investors prefer to miss goal achievement rather than take additional investment risk.[36]

With this in mind, referencing the consequence of failing to meet a stated goal is appropriate. If the consequence is high, financial advisors should recommend a portfolio consistent with the investor's risk need and risk-taking ability. However, if the consequences of failure are low, financial advisors should initially recommend a portfolio consistent with the investor's behavioral loss tolerance and attempt to improve the investor's financial knowledge and investing experience over time.

Red Light Profiles

When the required RoR (i.e., risk need) and corresponding portfolio volatility needed to accomplish an investor's stated goal exceed an investor's risk-taking ability—whether this is because of a short time horizon, liquidity constraints, or a lack of risk capacity— an automatic "red light" is triggered.

When the risk need exceeds risk-taking ability, an investor and her financial advisor must reevaluate the investor's goals and expectations to bring them in line with the investor's risk-taking ability, regardless of the investor's level of behavioral loss tolerance. A red-light situation means that making a portfolio allocation recommendation will be possible only when the investor's risk need and corresponding required RoR need are adjusted downward. For example, a financial advisor could recommend that an investor work longer,

Risk Need	Risk-Taking Ability	Behavioral Loss Tolerance	Green/ Yellow/ Red Light	Recommendation	Strategy
High	High	High	Green Light	Proceed: Allocate to High Volatility Portfolio	All factors align; move forward with portfolio implementation.
~~Mod~~	High	High	Green Light	Proceed: Allocate to High Volatility Portfolio	Moderate need can be safely ignored; move forward with portfolio implementation.
~~Low~~	High	High	Green Light	Proceed: Allocate to High Volatility Portfolio	Low need can be safely ignored; move forward with portfolio implementation.
Mod	Mod	Mod	Green Light	Proceed: Allocate to Moderate Volatility Portfolio	All factors align; move forward with portfolio implementation.
Mod	~~High~~	Mod	Green Light	Proceed: Allocate to Moderate Volatility Portfolio	High ability can be safely ignored; move forward with portfolio implementation.
~~Low~~	Mod	Mod	Green Light	Proceed: Allocate to Moderate Volatility Portfolio	Low need can be safely ignored; move forward with portfolio implementation.

TABLE D1.   HUBBLE–GRABLE THREE-FACTOR MODEL OF INVESTOR RISK PROFILING

(Continued)

[35]See Richard H. Thaler and Cass R. Sunstein, "Libertarian Paternalism," *American Economic Review* 93, no. 3 (May 2003): 175–179.
[36]See David Blake and Alistair Haig, *How Do Savers Think About and Respond To Risk? Evidence from a Population Survey and Lessons for the Investment Industry* (London: The Pensions Institute, 2014).

TABLE D1.	**HUBBLE–GRABLE THREE-FACTOR MODEL OF INVESTOR RISK PROFILING** *(CONTINUED)*				
Risk Need	Risk-Taking Ability	Behavioral Loss Tolerance	Green/ Yellow/ Red Light	Recommendation	Strategy
~~Low~~	~~High~~	Mod	Green Light	Proceed: Allocate to Moderate Volatility Portfolio	Both low need and high ability can be safely ignored in favor of moderate tolerance; move forward with portfolio implementation.
Low	Low	Low	Green Light	Proceed: Allocate to Low Volatility Portfolio	All factors align; move forward with portfolio implementation.
Low	~~High~~	Low	Green Light	Proceed: Allocate to Low Volatility Portfolio	High ability can be safely ignored; move forward with portfolio implementation.
Low	~~Mod~~	Low	Green Light	Proceed: Allocate to Low Volatility Portfolio	Moderate ability can be safely ignored; move forward with portfolio implementation.
Mod	Mod	*High*	Yellow Light	Caution: Allocate to Moderate Volatility Portfolio after Discussion with Investor	Investor's loss tolerance exceeds investor's risk-taking ability; investor may expect or have a desire to take on more volatility than is prudent; some education may be required.
~~Low~~	Mod	*High*	Yellow Light	Caution: Allocate to Moderate Volatility Portfolio after Discussion with Investor	Investor's loss tolerance exceeds investor's risk-taking ability; investor may expect or have a desire to take on more volatility than is prudent; some education may be required. Low need can be safely ignored.
Low	Low	*High*	Yellow Light	Caution: Allocate to Low Volatility Portfolio after Discussion with Investor	Investor's loss tolerance exceeds investor's risk-taking ability; investor may expect or have a desire to take on more volatility than is prudent; some education may be required.
Low	Low	*Mod*	Yellow Light	Caution: Allocate to Low Volatility Portfolio after Discussion with Investor	Investor's loss tolerance exceeds investor's risk-taking ability; investor may expect or have a desire to take on more volatility than is prudent; some education may be required.
High	High	*Mod*	Yellow Light	Caution: Allocate Only after Discussion with Investor	Investor's loss tolerance is lower than investor's risk need and risk-taking ability; some education may be needed to encourage investor to increase volatility to meet goals; do not assume investor is willing to increase volatility exposure; reevaluating investor's goal to align with the behavioral loss tolerance score may be necessary.

(Continued)

TABLE D1.   HUBBLE–GRABLE THREE-FACTOR MODEL OF INVESTOR RISK PROFILING (CONTINUED)

Risk Need	Risk-Taking Ability	Behavioral Loss Tolerance	Green/ Yellow/ Red Light	Recommendation	Strategy
High	High	*Low*	Yellow Light	Caution: Allocate Only after Discussion with Investor	Investor's loss tolerance is lower than investor's risk need and risk-taking ability; some education may be needed to encourage investor to increase volatility to meet goals; do not assume investor is willing to increase volatility exposure; reevaluating investor's goal to align with the behavioral loss tolerance score may be necessary.
Mod	~~High~~	*Low*	Yellow Light	Caution: Allocate Only after Discussion with Investor	Investor's loss tolerance is lower than investor's risk need and risk-taking ability; some education may be needed to encourage investor to increase volatility to meet goals; do not assume investor is willing to increase volatility exposure; reevaluating investor's goal to align with the behavioral loss tolerance score may be necessary.
Mod	Mod	*Low*	Yellow Light	Caution: Allocate Only after Discussion with Investor	Investor's loss tolerance is lower than investor's risk need and risk-taking ability; some education may be needed to encourage investor to increase volatility to meet goals; do not assume investor is willing to increase volatility exposure; reevaluating investor's goal to align with the behavioral loss tolerance score may be necessary.
High	*Mod*	High	Red Light	Stop: Goal Achievement Problematic; Reevaluate Goals	Reestablish investor expectations; investor's risk need exceeds investor's risk-taking ability. Even though investor's need and tolerance allow for a high volatility portfolio, investor has only a moderate ability and can withstand only a moderate volatility strategy.
High	*Mod*	Mod	Red Light	Stop: Goal Achievement Problematic; Reevaluate Goals	Reestablish investor expectations; investor's risk need exceeds investor's risk-taking ability. Investor has only a moderate ability and can withstand only a moderate volatility strategy.
High	*Mod*	Low	Red Light	Stop: Goal Achievement Problematic; Reevaluate Goals	Reestablish investor expectations; investor's risk need exceeds investor's risk-taking ability; some education may be needed to encourage investor to increase volatility to meet goal; do not assume investor is willing to increase volatility exposure; reevaluating investor's goal to align with the behavioral loss tolerance score may be necessary instead. Investor has only a moderate ability and can withstand only a moderate volatility strategy.

(Continued)

	Risk-Taking Ability	Behavioral Loss Tolerance	Green/ Yellow/ Red Light	Recommendation	Strategy
TABLE D1.	**HUBBLE–GRABLE THREE-FACTOR MODEL OF INVESTOR RISK PROFILING** *(CONTINUED)*				
Risk Need	Risk-Taking Ability	Behavioral Loss Tolerance	Green/ Yellow/ Red Light	Recommendation	Strategy
High	*Low*	High	Red Light	Stop: Goal Achievement Problematic; Reevaluate Goals	Reestablish investor expectations; investor's risk need exceeds investor's risk-taking ability; some education may be needed to encourage investor to increase volatility to meet goal; do not assume investor is willing to increase volatility exposure; reevaluating investor's goal to align with the behavioral loss tolerance score may be necessary instead. Investor has a low ability and can withstand only a low volatility strategy.
High	*Low*	Mod	Red Light	Stop: Goal Achievement Problematic; Reevaluate Goals	Reestablish investor expectations; investor's risk need exceeds investor's risk-taking ability; some education may be needed to encourage investor to increase volatility to meet goal; do not assume investor is willing to increase volatility exposure; reevaluating investor's goal to align with the behavioral loss tolerance score may be necessary instead. Investor has a low ability and can withstand only a low volatility strategy.
High	*Low*	Low	Red Light	Stop: Goal Achievement Problematic; Reevaluate Goals	Reestablish investor expectations; investor's risk need exceeds investor's risk-taking ability. Investor has a low ability and can withstand only a low volatility strategy.
Mod	*Low*	High	Red Light	Stop: Goal Achievement Problematic; Reevaluate Goals	Reestablish investor expectations; investor's risk need exceeds investor's risk-taking ability, and investor's loss tolerance exceeds investor's risk-taking ability; investor may expect or have a desire to take on more volatility than is prudent; additional education is warranted. Investor has a low ability and can withstand only a low volatility strategy.
Mod	*Low*	Mod	Red Light	Stop: Goal Achievement Problematic; Reevaluate Goals	Reestablish investor expectations; investor's risk need exceeds investor's risk-taking ability, and investor's loss tolerance exceeds investor's risk-taking ability; investor may expect or have a desire to take on more volatility than is prudent; additional education is warranted. Investor has a low ability and can withstand only a low volatility strategy.
Mod	*Low*	Low	Red Light	Stop: Goal Achievement Problematic; Reevaluate Goals	Reestablish investor expectations; investor's risk need exceeds investor's risk-taking ability. Investor has a low ability and can withstand only a low volatility strategy.

save more, spend less, or lower her future value target to bring the risk need in line with risk-taking ability.

Table D1 provides an overview of the different IRPs that are possible using the categories of IRP illustrated in this report. The strategies shown in Table D1 are intended to provide a financial advisor with guidance when interpreting IRP scores, as well as a foundation for further investor–financial advisor discussions.

CASE STUDIES

The following case studies provide examples of how the three-factor model presented in this report can be used in practice. The first case study illustrates a capital accumulation scenario, and the second case illustrates a capital depletion/preservation scenario.

Case One

Clint and Pat Bronson have asked you to develop a plan to allocate current retirement assets and ongoing retirement savings. An important first step in the investment-planning process involves developing an IRP for Clint and Pat related to this capital accumulation goal. During your initial meetings with Clint and Pat, you learned the following information:

- Clint and Pat would like to accumulate $4,100,000 for retirement.
- They have an 11-year time horizon.
- They currently have $1,200,000 saved for retirement.
- Clint and Pat are aggressive savers; they are able to save $22,000 toward goal achievement each quarter.
- You charge a 1% assets under management fee.
- All savings and investments are held in tax-advantaged accounts.

Based on conversations with Clint and Pat, you know that failing to meet the retirement goal is unacceptable.

In preparation for your next meeting with Clint and Pat, you have gathered the following information about their situation:

- Prior to retirement, Clint and Pat have sufficient outside income and other assets to maintain their standard of living in the case of an emergency.
- They have no significant liquidity needs at this time.

- As a couple, they have a moderate level of risk tolerance (i.e., willingness to take risk).
- They prefer investments that provide a mix of safety and return (i.e., risk preference).
- Based on discussions with Clint and Pat, you believe they have a moderate degree of financial knowledge and some experience with investment products (i.e., knowledge and experience).
- When you asked them to tell you "how risky the markets are," Clint and Pat answered that in their opinion, the markets are not very risky (i.e., risk perception).
- You also know that during the last market correction, they did nothing dramatic with their portfolio positions (i.e., risk composure).

Based on this information, estimating an IRP for Clint and Pat that aligns with this particular goal is possible. The following discussion highlights the steps in the IRP developmental process.

Step 1: The process begins by estimating the net (after fees and taxes) required RoR necessary to achieve the capital accumulation goal over the next 11 years. Based on a simple time value of money calculation, Clint and Pat must generate an 8.23% annualized RoR to reach their retirement goal (the base return plus the advisory fee). At this point, you must answer three questions using your capital markets expectations:

1. Given the current market risk environment, can the return need be realistically achieved: yes or no?
   - You could choose yes, given historical stock and bond returns.

2. What is the level of portfolio volatility associated with the return need? The following guidelines form the basis of the IRP model used in this case:
   - Low: < 30% Growth Assets
   - Moderate: 30% to 70% Growth Assets
   - High: > 70% Growth Assets

As such, Clint and Pat's RISK NEED is HIGH; based on your models, a HIGH portfolio of at least 70% growth assets will accomplish the required RoR objective.

3. What is the financial consequence associated with failing to meet the stated goal: acceptable, unacceptable, or unknown?
   - You should indicate unacceptable, given the case narrative.

Step 2: The next step in the IRP development process involves estimating the investor's risk-taking ability. The following guidelines should be followed:

Test 1: If <u>EITHER</u> of the following situations is present, the investor's ability to take risk is LOW:

✓ Time horizon is less than or equal to five years.

✓ The expected and/or ongoing annual liquidity need is equal to or greater than 5% of the portfolio value *and* no outside income or assets are available to maintain standard of living (e.g., current income, access to credit, cash savings, insurance) in case of an emergency.

Test 2: If <u>ALL</u> of the following scenarios are present, the investor's ability to take risk is HIGH:

✓ Time horizon is greater than or equal to 10 years.

✓ Investor has no significant liquidity needs (> 5% of portfolio value) for at least 10 years.

✓ Sufficient outside income and/or assets are available to maintain standard of living (e.g., current income, access to credit, cash savings, insurance) in case of an emergency.

Otherwise, the investor's ability is MODERATE.

Answers to these questions suggest that Clint and Pat have a *HIGH risk-taking ability score*.

Step 3: The third step in the IRP development process focuses on estimating a behavioral loss tolerance score. Each of the six inputs that comprise the score comes from investor data-gathering forms, assessments, and notes made by you and/or your staff. Based on the inputs described in the case narrative, Clint and Pat have a behavioral loss score of 19, as shown below:

What is the investor's risk tolerance or willingness to take financial risk?					SCORE
Very Low	Low	Moderate	High	Very High	3
1	2	3	4	5	
What is the investor's preference when holding risky assets?					
Maximize Safety	Mostly Safety	Mix of Safety and Return	Mostly Return	Maximize Returns	3
1	2	3	4	5	
How knowledgeable is the investor about financial and investment concepts?					
Not at All Knowledgeable	Minimally Knowledgeable	Moderately Knowledgeable	Competent	Very Knowledgeable	3
1	2	3	4	5	
How much experience does the investor have with investment products?					
None	Very Little	Some	Modest	Extensive	3
1	2	3	4	5	
What is the investor's perception of the riskiness of the stock market?					
Very Risky	Somewhat Risky	Neutral	Somewhat Safe	Very Safe	4
1	2	3	4	5	
In the past, when faced with investment losses, what action did the investor take?					
Sold Out		Did Nothing		Purchased More	3
1		3		5	
				TOTAL	19

Scores should then be matched to the following behavioral loss tolerance categories:

- LOW = 6, 7, 8, 9, 10, 11, 12, and 13
- MODERATE = 14, 15, 16, 17, 18, 19, 20, 21, and 22
- HIGH = 23, 24, 25, 26, 27, 28, 29, and 30

Clint and Pat's behavioral loss tolerance score is MODERATE.

Step 4: The fourth step in the IRP development process involves combining the risk need, risk-taking ability, and behavioral loss tolerance scores. In the case of Clint and Pat,

- their risk need is HIGH;
- their risk-taking ability is HIGH; and
- their behavioral loss tolerance is MODERATE.

This results in a score of HN, HA, MT. This score should then be matched to Table D1 in Appendix D.

Step 5: Once an IRP has been developed, the next step involves evaluating the IRP score in relation to the investor's risk need. For Clint and Pat, the score results in a "yellow light" portfolio recommendation. In other words, caution is warranted in implementing the portfolio recommendation. In this case, although the risk need and risk-taking ability scores match, they misalign with the behavioral loss tolerance score.

The "yellow light" outcome is a signal that you should confirm with Clint and Pat the goal inputs and RoR requirements needed to achieve their goal. Clint and Pat need to (and likely should) take relatively high portfolio risk to achieve their retirement goal; however, the behavioral loss tolerance score indicates that during a market correction, Clint and Pat may experience stress. As a result, Clint and Pat likely need ongoing education about market events and risks—focused on the benefits of diversification—to encourage maintenance of the recommended portfolio. Ongoing educational efforts to increase Clint and Pat's risk tolerance and financial knowledge should help to align market expectations, preferences, and perceptions with portfolio realities.

Case Two

You recently started working with Prince (now King) Eric and Princess (now Queen) Ariel. After many years of ruling happily together, they are looking forward to stepping aside and entering retirement. You have developed a retirement plan you believe will help them step down from their royal duties and enter retirement. A key element of your analysis involved estimating the

RoR Eric and Ariel need to earn in retirement to make their retirement dream a reality. You know the following about their situation:

- Eric and Ariel would like to plan for a 30-year retirement period.
- They have $11,000,000 saved in the royal treasury for retirement.
- They would like to endow $2,000,000 to fund The Flounder Foundation, which is dedicated to mermaid conservation efforts, upon the death of the second spouse.
- During retirement, the investors need a $350,000 yearly income that will increase at the rate of inflation (3%) yearly.
- You charge a 1% assets under management fee.
- As sovereigns, Eric and Ariel are exempt from taxation.

Based on conversations with Eric and Ariel, you know that failing to meet their retirement and bequest goals is unacceptable.

In preparation for your next meeting with Eric and Ariel, you have gathered the following information about their situation:

- When they officially retire, they will have no outside income or assets available to maintain their standard of living.
- As a couple, they have a low level of risk tolerance (i.e., willingness to take risk).
- Eric and Ariel prefer investments that provide safety over returns (i.e., risk preference); Ariel has historically invested only in antique collectibles.
- Based on your professional experience, you believe Eric and Ariel have a moderate degree of financial knowledge and very little experience with investment products (i.e., knowledge and experience).
- When you asked them to tell you "how risky the markets are," Eric and Ariel answered that in their opinion, the markets are very risky (i.e., risk perception).
- You also know that during the last market correction, Eric held his portfolio positions even though other investors sold out (i.e., risk composure).

Based on this information, estimating an IRP for Eric and Ariel that aligns with their particular goal is possible. The following discussion highlights the steps in the IRP developmental process.

Step 1: The process begins by estimating the net (after fees and taxes) required RoR necessary to provide income over the 30-year period, adjusted for inflation. In this example, a very simple income withdrawal strategy can be used to estimate a net real annual return need of 5.10% (this includes a base return estimate coupled with the inflation estimate and the advisory fee). At this point, you must answer three questions using your capital markets expectations:

1. Given the current market risk environment, can the return need be realistically achieved: yes or no?
    a. You should choose yes, given historical stock and bond returns.
2. What is the level of portfolio volatility associated with the return need? The following guidelines form the basis of the IRP model used in this case:
    a. Low: < 30% Growth Assets
    b. Moderate: 30% to 70% Growth Assets
    c. High: > 70% Growth Assets

Based on your market expectations, Eric and Ariel's RISK NEED should be categorized as MODERATE.

A MODERATE portfolio of 30% to 70% growth assets will accomplish the required RoR objective.

3. What is the financial consequence associated with failing to meet the stated goal: acceptable, unacceptable, or unknown?
    o You should indicate unacceptable, given what is described in the case narrative.

Step 2: The next step in the IRP development process involves estimating the investor's risk-taking ability. The following guidelines should be followed:

Test 1: If <u>EITHER</u> of the following situations is present, the investor's ability to take risk is LOW:

✓ Time horizon is less than or equal to five years.

✓ The expected and/or ongoing annual liquidity need is equal to or greater than 5% of the portfolio value *and* no outside income or assets are available to maintain standard of living (e.g., current income, access to credit, cash savings, insurance) in case of an emergency.

Test 2: If <u>ALL</u> of the following scenarios are present, the investor's ability to take risk is HIGH:

✓ Time horizon is greater than or equal to 10 years.

✓ Investor has no expected and/or ongoing annual liquidity needs that are greater than 5% of the portfolio value.

✓ Sufficient outside income and/or assets are available to maintain standard of living (e.g., current income, access to credit, cash savings, insurance) in case of an emergency.

Otherwise, the investor's ability is MODERATE.

As a reminder, Eric and Ariel have a time horizon of 30 years. They need to generate $350,000 each year (adjusted for inflation) from a $9,000,000 portfolio. This is equivalent to a 3.18% ongoing liquidity need. Although the liquidity need falls below the 5% benchmark, Eric and Ariel have limited outside income and assets available to maintain their standard of living, so they fail both tests. ***Therefore, their risk-taking ability score should be classified as MODERATE.***

Step 3: The third step in the IRP development process focuses on estimating a behavioral loss tolerance score. Each of the six inputs that comprise the score comes from investor data-gathering forms, assessments, and notes made by you and/or your staff. Based on the inputs described in the case narrative, Eric and Ariel have a behavioral loss score of 13, as shown.

Scores should then be matched to the following behavioral loss tolerance categories:

• LOW = 6, 7, 8, 9, 10, 11, 12, and 13
• MODERATE = 14, 15, 16, 17, 18, 19, 20, 21, and 22
• HIGH = 23, 24, 25, 26, 27, 28, 29, and 30

Their behavioral loss tolerance score is LOW.

Step 4: The fourth step in the IRP development process involves combining the risk need, risk-taking ability, and behavioral loss tolerance scores. In the case of Eric and Ariel,

• their risk need is MODERATE;
• their risk-taking ability is MODERATE; and
• their behavioral loss tolerance is LOW.

This results in a score of MN, MA, LT. This score should then be matched to Table D1 in Appendix D.

Step 5: Once an IRP has been developed, the next step involves evaluating the IRP score in relation to the investor's risk need. For Eric and Ariel, the score results in a "yellow light" portfolio recommendation, meaning that caution is warranted in implementing the portfolio recommendation. Why?

What is the investor's risk tolerance or willingness to take financial risk?					SCORE
Very Low	Low	Moderate	High	Very High	2
1	2	3	4	5	
What is the investor's preference when holding risky assets?					
Maximize Safety	Mostly Safety	Mix of Safety and Return	Mostly Return	Maximize Returns	2
1	2	3	4	5	
How knowledgeable is the investor about financial and investment concepts?					
Not at All Knowledgeable	Minimally Knowledgeable	Moderately Knowledgeable	Competent	Very Knowledgeable	3
1	2	3	4	5	
How much experience does the investor have with investment products?					
None	Very Little	Some	Modest	Extensive	2
1	2	3	4	5	
What is the investor's perception of the riskiness of the stock market?					
Very Risky	Somewhat Risky	Neutral	Somewhat Safe	Very Safe	1
1	2	3	4	5	
In the past, when faced with investment losses, what action did the investor take?					
Sold Out		Did Nothing		Purchased More	3
1		3		5	
				TOTAL	13

- The behavioral loss tolerance score for Eric and Ariel as a couple is not consistent with their risk need and risk-taking ability scores.

Because of the "yellow light" outcome, Eric and Ariel, under your direction, should circle back to the "consequence of goal failure" question. Based on the case narrative, you know that Eric and Ariel feel that failure to meet their goal is unacceptable. Given this fact and the "yellow light" outcome, an appropriate approach would be to discuss implementing a moderate portfolio allocation (a portfolio consistent with their risk need and risk-taking ability scores), coupled with educational efforts to increase Eric and Ariel's risk tolerance and financial knowledge, as well as to realign their market expectations, preferences, and perceptions.

In situations where the consequence of goal failure is acceptable—for example, a determination is made that leaving the bequest is not that important in relation to achieving the larger retirement goal or that spending can be decreased—no compelling reason (or need) may exist to encourage the investors to accept volatility that exceeds their stated behavioral loss tolerance.

When the consequence of failure is unknown, further discussion may be warranted and different scenarios presented as options. *The investor should rarely, however, be encouraged to invest in a high volatility portfolio when the investor's behavioral loss tolerance is low.*

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