

An Investment Risk Management Paradigm¹

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1.1 INTRODUCTION

Risk management analytics and methodologies have evolved significantly over the last 20+ years. Nevertheless, as events continue to demonstrate, putting an effective risk management program and culture into place remains, for some, quite difficult. Doing so requires comprehensive risk management policies and procedures, effective analytics, efficient tools, and people committed to the mission. Each team member, whether a portfolio manager, trader, analytics developer, or risk manager, has an important role to play in managing risk responsibly—risk management only works as a team sport. Effective risk management also requires significant resources and focus.

Establishing an effective risk and control environment typically involves three “lines of defense.” As primary risk owners, “the business,” i.e., portfolio managers and business managers in the investment management business, are the first line of defense and have the primary responsibility for identifying, managing, and mitigating risk. Risk and control functions, i.e., investment risk, counterparty risk, operational risk, model risk, serve as a second line of defense, acting ideally as independent and trusted advisors to help the business operate more effectively while using its independence to observe and escalate issues of concern. Finally, internal audit is usually thought of as the third line of defense, responsible for reviewing and testing the effectiveness of the control environment as defined by the firm’s policies and procedures.

Yet, for all of this effort to be fully effective, a strong and pervasive risk culture across the entirety of the firm is required. Ideally, all employees view themselves as risk managers, regardless of where they fit into the three lines of defense model. This level of engagement will drive the risk management culture forward as well as provide multiple levels of checks and balances.

Aligning the risk management function and culture with the organization’s priorities and business model is critical. Different types of financial institutions can have radically different business models which must be fully understood when designing and developing a risk management function. Investment management firms, such as BlackRock, serve clients almost

exclusively as fiduciaries. They invest money on behalf of their clients based upon agreed terms and fees. Investment managers do not own (nor ultimately control) the assets managed on behalf of their clients, reducing most (but not eliminating all) conflicts of interest and allowing them to act almost exclusively in their clients' best interests. In this type of organization, risk managers need to ensure that client assets are invested consistently with the explicit or implicit risk tolerance of each client's portfolio, usually, but not always, dictated in prospectuses or written investment management agreements (IMAs). While this can be a complex and challenging endeavor, it entails, for the most part, a close alignment of interests between the investment manager and the ultimate client. This natural alignment of interests, in turn, makes it easier for a positive and committed risk culture to flourish. Failure to thoughtfully align the risk management function to the business model can result in a low performing business with reduced focus on risk-based priorities, lack of trust in management, and low employee morale.

BlackRock has grown from an eight-person organization located in a few small New York conference rooms in 1988, to a global company with more than 19,000 employees managing over \$9 trillion of client assets, as of March 31, 2023. As the firm expanded and globalized, BlackRock's core mission has remained the same—serving as a fiduciary to clients. BlackRock's clients currently include governments, pensions, companies, foundations, insurers, mutual funds, and ETFs, and indirectly, billions of individuals—parents and grandparents, doctors and teachers—who are saving for their future. Risk management is a critical part of helping clients create a better financial future for themselves by meeting their financial goals.

The term "risk management" covers a wide variety of risks including enterprise risks, such as operational, technology, regulatory, model, and other compliance-related risks. While all these risks are important and can significantly impact an organization, this book, similar to the first edition, focuses primarily on investment risk management and the problems specific to portfolio management, trading, financial modeling, hedging, and other areas associated with financial decision-making.

Many investors' priorities appear to be shifting with a rise of interest in sustainability, resulting in the growth of environmental, social, and governance (ESG) products and investment strategies. While BlackRock has made and continues to make significant investments in analytics and processes designed to facilitate risk management through an ESG lens, this important topic is a rapidly evolving domain and deserves a comprehensive review on its own.

This book, as the successor to the first edition, necessarily focuses heavily on fixed-income risk practices, analytics, and models. However, many of the concepts and theories presented can be applied or modified to be applicable to other asset classes. Most of the examples and case studies included in the following chapters are based on BlackRock's risk management approaches, models, and analytics. Heavy reliance has been made on BlackRock Solutions' Aladdin system and its underlying data.

1.2 ELEMENTS OF RISK MANAGEMENT

The following are some critical elements that underpin a strong and effective investment risk management program.

Propagating a risk management culture: Risk management should be a core component of the organization's culture, with senior management recognizing and reinforcing the importance of understanding risk and operating with the highest ethical standards. There must be

comprehensive governance and an enterprise risk management framework that evolves to meet business growth, product development, and emerging risks. Internal risk committees and boards should meet regularly to discuss risk management priorities and topics, and risk managers should establish trusted and independent relationships with investors, traders, and other “first line of defense” managers. This culture relies upon high levels of internal transparency regarding the risks being taken by investors and portfolios, subject to regulations and the need to segment certain types of activities.

While practitioners can read about risk management in textbooks, experiencing the risks directly and realizing their consequences provides a different perspective. The financial crash of 1987 had a profound impact on the original founders of BlackRock and demonstrated the consequences of uncontrolled financial risks. As such, high-quality risk management has been a visceral part of BlackRock’s culture since the firm’s inception. From its very early days, BlackRock has had a dedicated and independent risk management function, ensuring that there is an informed set of independent eyes reviewing portfolio risk and performance to protect clients. As the firm’s AUM and product set grew, so too has its risk management team. BlackRock’s investment philosophy was founded on always being “risk-aware,” and BlackRock’s founders and leadership have remained committed to maintaining and disseminating the firm’s founding principles and risk management culture.

Knowing the risks: Risk management involves identifying and measuring all material risks, which is far from a static exercise. Markets, technology, competitive pressures, and regulatory regimes are constantly evolving, requiring businesses to continuously respond and adapt. Risk managers should have a deep understanding of how this dynamic process gives rise to new risks and changes existing ones, ensuring that the risks are properly understood across the organization.

The financial crash of 1987 underscored the necessity to understand securities and their nonlinear behavior. Back then, BlackRock focused heavily on the “micro-analytics” of complex securities to have a clear understanding of the characteristics of the portfolios. Further, BlackRock’s risk models combine bottom-up and top-down analysis of fund exposures. The risk management team continuously partners with the firm’s financial modelers and technologists to create state-of-the-practice risk analytics, continuing the quest to understand portfolios and the risks to which they are exposed.

Relying on one consistent set of information: Everyone—risk takers, risk managers, senior management—should share the same timely information on risk, creating a “virtuous circle” of cleansed data to the fullest extent legally permissible. When everyone relies on one consistent set of information, risk management becomes a transparent and self-enforcing process. Rather than spending time reconciling disparate measures and inconsistencies, team members can concentrate on the substance of fiduciary risk taking: Are the risks deliberate? Are they diversified? Are they appropriately scaled? Are they aligned with client expectations?

BlackRock has a long history of embracing technology and encouraging maximum transparency, which is critical for risk management. Leveraging technology and developing Aladdin were part of BlackRock’s founding vision and has enabled the firm to be highly efficient, integrated, dynamic, and scalable. BlackRock started developing Aladdin soon after the firm was founded with the goal of understanding the micro-analytic details of the securities by bringing sell-side analytics to the buy-side. Since the 1990s, Aladdin has been the firm’s central operating platform, integrating risk, investment, and client management processes. Aladdin is the foundation of the firm’s risk management process, providing sophisticated analytics to enable informed decision making. Each day, risk managers are enabled to review and analyze portfolio risk using a centralized data source.

Risk measures that are “used and useful”: Risk management should be a practical exercise aimed at addressing real-world risks—it is not a science project. For risk management to be truly practical and impactful, it is important to employ risk measures that accurately capture risks in meaningful and actionable ways. Armed with these measures, risk managers are positioned to help risk takers understand and manage risks by clearly articulating the issues at hand. BlackRock has continuously believed that assisting risk takers to do “the right thing” is the best way to manage risk. “Policing” risk is a last resort and usually demonstrates a failure to effectively communicate.

Clients come first: As a fiduciary, BlackRock acts as stewards of clients’ capital and trust. Putting clients’ interests first and working to meet reasonable expectations is important as it serves to protect the firm itself and its reputation. Accurately and consistently measuring and managing risk for clients is paramount for protecting clients’ fiduciary interests. Furthermore, risk managers serve a pivotal role in this process by ensuring that clients’ investment and risk-taking objectives are properly understood across all stakeholders, that they are accurately reflected in ongoing portfolio management activities, and that the resulting performance is consistent with the risks taken.

1.3 BLACKROCK’S INVESTMENT AND RISK MANAGEMENT APPROACH

Given the importance of risk management to the firm, BlackRock purposefully built a risk framework that touches all aspects of the organization. The process starts at the top with the board of directors and includes a robust governance framework with committees that oversee key risks in the firm. BlackRock’s independent risk management team, Risk & Quantitative Analysis (RQA), reports to the firm’s president. Structurally, BlackRock’s risk management team is independent of BlackRock’s various businesses, allowing risk managers to provide an unbiased perspective while working closely with the various risk takers. RQA oversees investment risk, along with counterparty, enterprise, operational, regulatory, technology, third-party, model, and reputational risks. While there is not perfect symmetry and depth in how RQA engages with each of these risk domains, the paradigms are all based on the application of constructive challenge with the ability to independently escalate, as required.

The conceptual model used is intentionally designed not to be intrinsically adversarial. Particularly for an active asset manager, clients are seeking the risk taking and risk management skills of the firm’s portfolio managers. Therefore, RQA pursues a *dual mission*. In addition to providing a risk oversight/control role to help manage fiduciary and enterprise risks, RQA uses its deep risk management and analytical subject matter expertise to provide independent consultative advice. Given the subject of this book, what follows will focus specifically on the investment risk management function.

Risk managers at BlackRock are constantly striving to promote a culture of constructive challenge when interacting with investors. The goal is to develop high levels of challenge alongside high trust relationships that result in accuracy in portfolio construction and management. Managing risk requires building close partnerships with investors. Prior to the forced logistical changes that arose due to the Coronavirus pandemic, risk managers were co-located, whenever possible, with investors globally to ensure constant effective communication and trust between risk managers and risk takers. This way, risk managers with significant subject matter expertise are “eyeball-to-eyeball” with portfolio managers. People take risks, not computers or algorithms, so it is important for risk managers to work together with investors and traders to help ensure risks are properly understood and appropriately

managed for clients. By partnering with investors, risk management seeks to ensure risk taking is deliberate, diversified, and scaled to meet the reasonable expectations of clients. During the pandemic, we were able to maintain relatively strong connectivity between risk managers and portfolio managers via the necessity for most communications to be through scheduled video calls, as opposed to many impromptu discussions. This arrangement worked much better than (some of us) anticipated. As of March 2023, BlackRock's model operates "at least three days in the office," which seeks to retain the social value of physical proximity while recognizing that working from home provided many advantages to many employees.²

BlackRock's portfolio managers oversee thousands of portfolios with many distinct mandates specified by clients or fund constituents. BlackRock's investment process is highly decentralized with well over 100 independent investment teams, responsible and accountable for the decisions and outcomes of the portfolios they manage. BlackRock's portfolio managers have the flexibility to design, implement, and execute independent investment processes, subject to clients' approval, internal transparency requirements, and, more recently, integrating ESG-related characteristics into the actively managed investment process. Portfolio managers can leverage BlackRock's platform-level investment insights, such as those of the BlackRock Investment Institute, while retaining the ability to use their own discretion subject to client constraints. Investment risk managers partner with each investment business to help investors build risk-aware portfolios by advising on portfolio construction, hedging strategies, and managing the risk-return trade-off.

To deliver effective risk management at scale, BlackRock's risk managers employ both top-down and bottom-up approaches as part of their daily risk management processes. This allows risk managers to independently review portfolio composition and determine if the resulting risk profiles are consistent with client guidelines and fund mandates on an ongoing basis. Additionally, risk managers regularly engage with investment teams, both formally and informally, to review risk positioning and performance outcomes.

1.4 INTRODUCTION TO THE BLACKROCK INVESTMENT RISK MANAGEMENT PARADIGM

As a large and complex organization, BlackRock needs to ensure that certain risk management activities occur regularly and consistently across the entire investment platform. To organize this conceptually, BlackRock has developed an Investment Risk Management Paradigm (IRMP) to bring consistency and structure to the myriad of risk management activities and create a coherent and comprehensive approach across all its businesses. This IRMP rests on five pillars, each of which describes a necessary component of an effective investment risk management program. The following chapters in this section of the book will expand upon the five IRMP pillars:³

1. Ex ante risk measurement
2. Risk governance (i.e., having and maintaining agreed upon levels of risks)
3. Portfolio manager risk-return awareness
4. Performance attribution
5. Performance analysis

The first pillar is *ex ante risk measurement*, which means ensuring portfolio managers and risk managers have the appropriate tools to identify, measure, and understand important

portfolio risks. Multiple risk measures are invariably required and available to provide the most complete picture possible. Risk factors and ex ante risk models are employed (when meaningful) to measure portfolio ex ante volatility and active risk (i.e., ex ante tracking error relative to a defined benchmark) and, where appropriate, Value at Risk (VaR). Among other things, this allows a statistical decomposition of risks. To attempt capturing the inevitable tail risks often missing from statistically driven analytics, Market-Driven Scenarios can be a very useful tool. Numerous “what-if” scenarios can be formulated corresponding to geopolitical events or market factor moves.

Additionally, measures of liquidity risk provide insight on both the liquidity of positions held on the asset side of a fund’s balance sheet and the potential for redemptions, driven by the liability side. More recently, an increasing number of exposure metrics are being developed that include not only environmental characteristics but those related to social considerations and institutional governance.

The second pillar is *risk governance*. This is the mechanism by which the appropriateness of the level of risk taking in a portfolio is controlled. To meet clients’ reasonable expectations, return and risk objectives for portfolios need to be clearly understood and communicated. This can be specified explicitly or, if necessary due to the nature of the asset owner, inferred implicitly. For instance, based on a client’s return objective, an acceptable range of expected ex ante risk for a given fund, consistent with its ability to achieve return objectives, can be determined. Given that level of target risk, a “green zone” can be defined (as part of a two-sided red, amber, green framework) based upon a reasonable range around the targeted ex ante risk level. However clarified, once determined, examining a portfolio relative to the client’s expectations and identifying inconsistencies or misaligned risks becomes possible. Above and below this “green zone” represents risk levels that either require heightened attention (low and high “amber zones”) or may require timely remediation (low and high “red zones”), indicating that the risks are becoming potentially increasingly inconsistent with prudently achieving the client’s identified return objectives. Portfolios can be tracked relative to these ranges. Given the complexity and heterogeneity of investment risk management, a risk scan framework facilitates scalable risk monitoring with improved governance and oversight. Providing a consistent framework to monitor risk across asset classes, a risk scan framework allows for exceptions to be identified, investigated, and escalated, as necessary.

At BlackRock, this process takes place in a regular *Portfolio Risk Oversight Committee*. When exceptions arise and portfolios stray outside the “green zone,” risk managers and portfolio managers discuss what remediation, if any, is needed. More complex rules can be constructed that go beyond simply looking at levels of active risk. Following a similar design pattern, acceptable and exception ranges can be determined for any risk exposure of interest, such as liquidity risks or credit concentrations, with exceptions being tracked and actioned, as required.

The third pillar, *portfolio manager risk-return awareness*, ensures that portfolio managers understand and are aware of the types and levels of risks they are taking. Risk managers establish a cadence of interaction with portfolio managers, including regularly scheduled reviews of risk positioning and performance, as well as more informal conversations. The goal is always to collectively understand risk positions in the context of current and expected market conditions, assessing whether the risks are *deliberate*, *diversified*, and *scaled* appropriately. Through these interactions, risk managers seek to build trusted relationships with portfolio managers and form their own independent understanding of the investment process, allowing them to constructively challenge portfolio managers, when necessary.

The notion of an emotionally always cool and fully dispassionate portfolio manager is more myth than fact. Over the past two decades, there has been a significant amount of research into how human beings can systematically deviate from purely economically rational decision-making. At BlackRock, some of these insights are incorporated into our risk management process. Portfolio managers can and do benefit from insights from behavioral finance. For example, combining the information provided in trade diaries with actual buy/sell decisions helps to identify potential biases and determine plans for combatting behavioral blind spots. There are also opportunities to improve portfolio manager performance by applying related insights associated with physiological characteristics. Some BlackRock portfolio managers voluntarily choose to wear Oura⁴ rings, a biometric sensor, which sends output to a BlackRock psychologist. Analyzing this data can help to identify when these portfolio managers may not always be able to make the best decisions. Managing this may help to improve their effectiveness.

The fourth pillar, *performance attribution*, seeks to understand the drivers of portfolio performance. It turns out that while at 10,000 feet performance attribution seems a rather straightforward analytical task, the reality is that it is often very difficult to execute reliably with a high level of resolution. Attribution requires a reconciliation between portfolio actions, statistical factor decomposition, and accounting profit and loss data.

Risk managers can utilize a variety of performance attribution approaches and analytical techniques to decompose returns. These techniques vary in terms of their operational complexity, precision, and implied decision-making model. Brinson attribution identifies a baseline and analyzes performance based on allocation and selection decisions, while factor-based models are used to also attribute actual performance to underlying market factors. Performance attribution can be used to better understand any number of aspects of the investment process, including the following:

- Consistency between the intended bets in a portfolio and the resulting performance
- Consistency between the portfolio manager's declared style and the resulting performance
- Portfolio manager expertise and style
- Decomposition of market impact from portfolio management decisions

The fifth pillar, *performance analysis*, measures portfolio performance relative to many different benchmarks, such as similar investment mandates, benchmark indices, comparable accounts, and peers' performance. Performance analysis provides insight into the overall market environment and competitive landscape, detailing information about the overall health of a business. Having a performance measurement framework that is consistent, robust, and transparent, lets measures of success be clear to all stakeholders. Important considerations include whether performance is being evaluated gross or net of fees, consistency of share class choice versus peers, and peer group definitions, which vary by vendor. Controlling the ownership of performance analysis at an investment manager is vital because there are necessarily many actors who have extreme self-interests in how the outcomes are measured and reported.

Throughout the remaining first section of this book, each pillar will be discussed in detail, including examples and exhibits to help illustrate the approaches and analytics, as part of BlackRock's comprehensive approach to investment risk management. As a reminder, most of the examples are focused on fixed-income portfolios. However, many of the concepts can be applied across other asset classes.

NOTES

1. Kristen Walters, Allison White, and Nikki Azznara significantly helped to develop this chapter.
2. As of September 2023, BlackRock's model will change to employees working at least four days per week in the office.
3. While the following chapters in this section of the book further develop the IRMP pillars, there is not a one-to-one linkage between pillars and chapters. For instance, several chapters expand upon the first pillar, *ex ante risk measurement*.
4. Oura Ring, 2023.