CAIA Level II

Emerging Topics

Abstracts

March 2022 Exam

Welcome to Level II of the CAIA® Charter Program. The Level II curriculum places the Candidate in the seat of an asset allocator. Throughout it, Candidates will learn advanced applications in the asset allocation and portfolio construction process, such as regulation, models and methods, investment and operational due diligence, and risk management. In addition to the core curriculum, Level II also introduces Candidates to recent and developing academic and industry research in alternative investments, asset allocation, and risk management.

The business school faculty and industry practitioners who have helped create the CAIA Charter Program bring years of experience in the financial services industry. Consequently, the curriculum is consistent with recent advances in the financial industry and reflects findings of applied academic research in investment management.

Candidates for the CAIA exams are assumed to understand the central concepts of quantitative analysis and finance. This includes awareness of the instruments that trade in traditional markets, models used to value these instruments, and the tools and methods used to analyze data. These concepts are typically covered in dedicated undergraduate courses or MBA-level investment and business statistics courses

The Learning Objectives (LOs) in each chapter are an important way for Candidates to organize their studies, as they form the basis for examination questions. LOs provide guidance on the readings and keywords that are most important to understanding the CAIA curriculum. Every learning objective is accompanied by one or multiple supporting concepts designed to provide Candidates with further context. The format for each learning objective is as follows:

Learning objective in bold

Including:

- Supporting concept for the learning objective

However, it is important to note that these supporting concepts may not encompass the entire learning objective, yet Candidates are responsible for understanding the learning objective in its entirety. Candidates should also be able to define all keywords provided, regardless of whether they are stated explicitly in a learning objective.

Passing the Level II examination is an important accomplishment and will require a significant amount of preparation. All Candidates will need to study and become familiar with the CAIA Level II curriculum material to develop the knowledge and skills necessary to be successful on examination day. Upon a candidate's successful completion of the Level II examination and meeting the membership requirements, CAIA Association will confer the CAIA Charter upon the candidate.

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The full articles, as they appear on CAIA website, must be studied for the Level II Exam. Please visit the CAIA Association's website to find the link to the version that is covered on CAIA Level II Exam.

"Decentralized Finance: On Blockchain- and Smart Contract-Based Financial Markets," Fabian Schär. Economic Research, Federal Reserve Bank of St. Louis. 2021.

Abstract

The term decentralized finance (DeFi) refers to an alternative financial infrastructure built on top of the Ethereum blockchain. DeFi uses smart contracts to create protocols that replicate existing financial services in a more open, interoperable, and transparent way. This article highlights opportunities and potential risks of the DeFi ecosystem. The article proposes a multi-layered framework to analyze the implicit architecture and the various DeFi building blocks, including token standards, decentralized exchanges, decentralized debt markets, blockchain derivatives, and on-chain asset management protocols. The article concludes that DeFi still is a niche market with certain risks but that it also has interesting properties in terms of efficiency, transparency, accessibility, and composability. As such, DeFi may potentially contribute to a more robust and transparent financial infrastructure.

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"Technical Guide for Limited Partners: Responsible Investing in Private Equity," Principles for Responsible Investing, 2020.

Abstract

Limited Partners (LPs) and General Partners (GPs) realize that responsible investment can contribute to both value creation and risk mitigation in this asset class. However, given the relationship between the LPs, GPs and portfolio companies, there are certain challenges to implementing responsible investment in private equity.

This guide is for any LP seeking to develop its own approach to responsible investment with respect to its private equity investment strategy, including (but not limited to): venture capital, growth capital, mid-market, buy-out, mezzanine, co-investments, secondary investments, distressed and special situations and funds of funds. It may also provide assistance to investors in other private market strategies if they use a private equity-style closed-ended fund structure, such as infrastructure and real estate.

This guide is not intended as a checklist, nor does it advocate altering a GP's management role and discretion over decision-making. Some aspects may seem aspirational for some private equity participants. It aims to present insights and provide actionable ideas into how responsible investment can be implemented by a broad range of LPs and GPs.

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"Asset Owners, Investment Management, and Commitment: An Organizational Framework," Gordon L. Clark and Ashby H. B. Monk, *The Journal of Retirement*, Winter 2019.

Abstract

This article focuses on asset owners, such as pension funds, and their models of investment management and describes the choice between insourcing, outsourcing, and re-intermediation. Drawing on the principal-agent problem and emphasizing the challenges facing asset owners when attempting to realize value from asset managers, the authors identify the dimensions of the management "problem." Implications are drawn for the management practices of asset owners and the implementation of investment strategy combining in-house capabilities with external relationships. The authors also identify a set of metrics of performance that is consistent with superior long-term investment performance metrics to a range of asset owners, large and small.

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"Building a Better Portfolio: Balancing Performance and Liquidity," Junying Shen, Ding Li, Grace Qiu, Vishv Jeet, Michelle Teng and Ki Cheong Wong, GIC EIS and PGIM IAS, 2020.

Abstract

The search for higher returns and better diversification has led many institutional investors to allocate more capital to illiquid private assets. This has come at the cost of decreasing portfolio liquidity, as private assets are not easily sold in a short period of time and may be unable to meet immediate portfolio liquidity demands. At the same time, private asset investors may encounter additional and often hard to predict liquidity demands when GPs make capital calls stemming from prior commitments. Investors need to have a strong understanding of how the liquidity characteristics of private assets impact their portfolios.

For asset allocators, liquidity risk is one of the most critical, but least quantified, risk dimensions in portfolio construction. Traditional portfolio construction techniques including mean-variance optimization or risk parity focus heavily on return variability and drawdowns, but often treat liquidity risk as a secondary consideration. Unlike fluctuations in returns, which tend to have a transitory impact, liquidity can be a matter of survival. Balance-sheet sustainability and funding stability are of critical importance to all investors.

Institutional investors with required periodic obligations (e.g., public and private pension plans) need to ensure that their asset allocation does not unduly risk meeting these obligations. Even investors without explicit obligations (e.g., some sovereign wealth funds) may have critical liquidity needs such as rebalancing the portfolio to manage risk or having enough dry powder to provide support during periods of market dislocation.

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"Demystifying Illiquid Assets: *Expected Returns for Private Equity*," Antti Ilmanen, Swati Chandra, and Nicholas McQuinn, *The Journal of Alternative Investments*, Winter 2020.

Abstract

The growing interest in private equity means that allocators must carefully evaluate its risk and return. The challenge is that modeling private equity is not straightforward due to a lack of good quality data and artificially smooth returns. We try to demystify the subject, considering theoretical arguments, historical average returns, and a forward-looking analysis. For institutional investors trying to calibrate their asset allocation decisions for private equity, we lay out a framework for expected returns, albeit one hampered by data limitations, that is based on a discounted cash-flow framework similar to what we use for public stocks and bonds.

In particular, the authors attempt to assess private equity's realized and estimated expected return edges over lower-cost public equity counterparts. Our estimates display a decreasing trend over time, which does not seem to have slowed the institutional demand for private equity. We conjecture that this is due to investors' preference for the return-smoothing properties of illiquid assets in general.

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"An executive's guide to AI," Michael Chui, Vishnu Kamalnath, and Brian McCarthy, McKinsey Analytics, 2019.

Abstract

Staying ahead in the accelerating artificial-intelligence race requires executives to make nimble, informed decisions about where and how to employ AI in their business. One way to prepare to act quickly: know the AI essentials presented in this guide.

This guide provides clear definitions of artificial intelligence, machine learning, and deep learning, describes the major types of and business cases for machine learning models (supervised, unsupervised, and reinforcement) and deep learning models (convolution neural networks and recurrent neural networks), and concludes with a timeline of artificial intelligence's evolution over time.

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"Longevity and Liabilities: *Bridging the Gap*," PGIM, Inc., 2017.

Abstract

Major improvements in human health and well-being have led to a drastic rise in global life expectancy — from approximately 48 years in 1950 to over 71 years in 2015. But with progress in extending life spans come new challenges for governments, private pension plans, and individuals trying to generate sufficient retirement income in an aging world.

The most discussed challenge is the cost of belatedly catching up to the increased social security, pension, and individual retirement income requirements resulting from the currently expected increases in life spans. Less well appreciated, but of similar magnitude and importance, are the costs of longevity risk — unexpected increases in human life spans beyond what actuaries and demographers have currently forecast. The IMF estimates that if everyone lives three years longer than expected — the average underestimation of longevity in the past — the present value of additional retirement expenses during these additional years of life could amount to 25-50% of global GDP.

For pension plan sponsors, especially in the US, longevity risk has often taken a backseat to investment and interest rate risks. And for good reason: the financial crisis decimated portfolios, and persistently low interest rates have made underfunding problems worse. But given ongoing improvements in life expectancy, plan sponsors will increasingly have to focus on the risk posed by unexpected longevity improvements to the funded status of pensions, especially as a persistently low rate environment only exacerbates the present financial impact of longevity risk.

Even sponsors with completely frozen, fully funded plans will be confronted with future liability growth due to longevity improvements. Understanding and quantifying the magnitude of longevity risk can help plan sponsors establish a framework for taking the appropriate actions today to ensure the ongoing health of their pension plans. This paper discusses the challenges posed to pension plan sponsors by longevity risk and the options available for managing it.

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"Blockchain and Financial Market Innovation," *Economic Perspectives*, Federal Reserve Bank of Chicago, July 2017.

Abstract

Blockchain technology is likely to be a key source of future financial market innovation. It allows for the creation of immutable records of transactions accessible by all participants in a network. A blockchain database is made up of a number of blocks "chained" together through a reference in each block to the previous block. Each block records one or more transactions, which are essentially changes in the listed owner of assets. New blocks are added to the existing chain through a consensus mechanism in which members of the blockchain network confirm transactions as valid. The technology allows the creation of a network that is "fully peer to peer, with no trusted third party," such as a government agency or financial institution.

While all are in the early stages of development, there are many promising applications of blockchain technology in financial markets. The bitcoin ecosystem represents the largest implementation of blockchain technology to date. Interest in the technology continues to grow in the financial technology and broader financial services communities. This article provides a brief overview of what blockchain technology is, how it works, and some potential applications and challenges.

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