HARVARD, YALE, AND ALTERNATIVE INVESTMENTS: A POST-CRISIS VIEW

KEITH BLACK, PHD, CFA, CAIA

SHOWCASE YOUR KNOWLEDGE

ASSOCIATION

The Global Mark of Distinction in Alternative Investments

ABOUT CAIA ASSOCIATION

The global leader in alternative investment education

- Non-profit established in 2002, based in Amherst, MA, with offices in Hong Kong and London
- Over 7,000 current charter holders in more than 80 countries
- Almost 20 vibrant chapters located in financial centers around the world
- More than 120 educational and networking events each year
- Offers AI education through the CAIA designation and the Fundamentals of Alternatives certificate program

ALTERNATIVE INVESTMENT EDUCATION

Alternatives currently represent over $12 trillion in assets under management and liquid alternatives are projected to triple by 2017.

The CAIA Association Mission:

- Establish the CAIA designation as the benchmark for alternative investment education worldwide
- Promote professional development through continuing education, innovative research and thought leadership
- Advocate high standards of professional ethics
- Connect industry professionals globally

THE CAIA CHARTER DESIGNATION

Globally recognized credential for professionals managing, analyzing, distributing, or regulating alternative investments.

Highest standard of achievement in alternative investment education.

Comprehensive program comprised of a two-tier exam process:

- **Level I** assesses understanding of various alternative asset classes and knowledge of the tools and techniques used to evaluate the risk-return attributes of each one.
- **Level II** assesses application of the knowledge and analytics learned in Level I within a portfolio management context.
  - Both levels include segments on ethics and professional conduct.

FUNDAMENTALS OF ALTERNATIVE INVESTMENTS

The **Fundamentals of Alternative Investments Certificate Program** is a course that provides a foundation of core concepts in alternative investments.

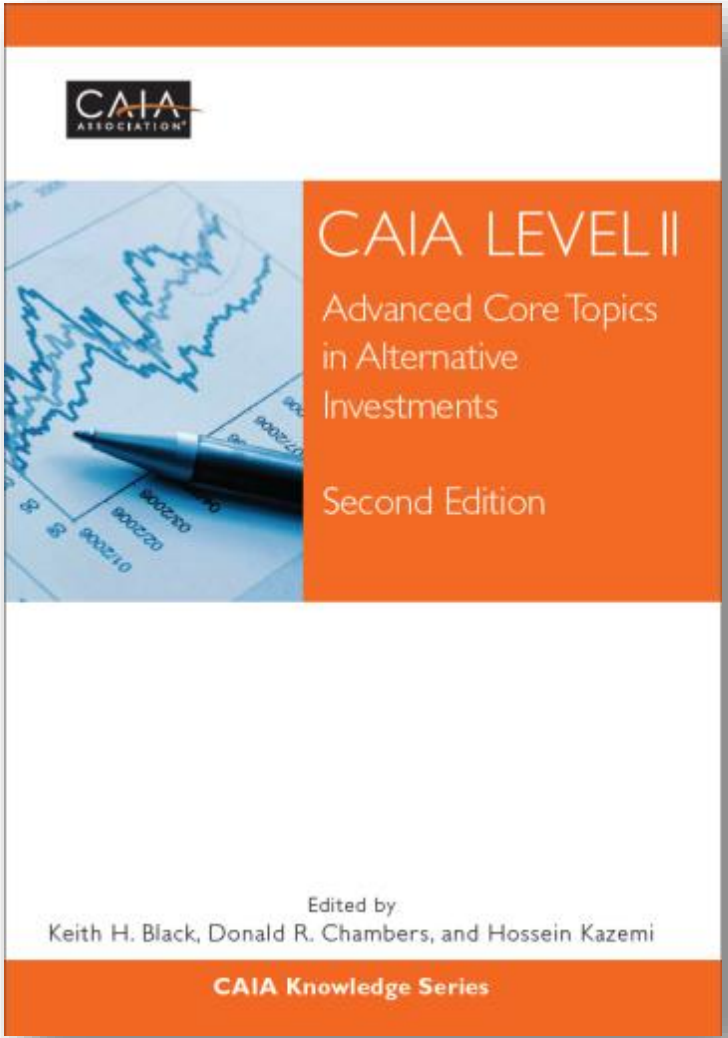
Fills a critical education gap for those who need to understand the evolving landscape of alternative investments.

- Online, 20-hour, self-paced course
- Earns CE hours for the CIMA®, CIMC®, CPWA®, CFP® designations
- Understand the core concepts in alternative investments
- Gain confidence in discussing and positioning alternatives

CAIA CURRICULUM

Level II

- Chapter 2: The Endowment Model
- Chapter 3: Risk Management for Endowment and Foundation Portfolios



UNIVERSITY ENDOWMENTS

- The largest university endowments are leaders in allocations to alternative investments
  - The largest 10% of schools (over $1 billion) manage over 70% of all endowment funds
- Endowments are designed to last in perpetuity, not a difficult assumption for a university that is over 300 years old with more than $19 billion in assets

Assets of the Largest North American University Endowments			
	Assets ($Billion)	Assets ($Billion)	
	as of June 2008	as of June 2013	Year Founded
Harvard University	$36.6	$32.3	1636
Yale University	$22.9	$20.7	1701
University of Texas System	$16.1	$20.4	1883-1895
Princeton University	$16.3	$18.2	1746
Stanford University	$17.2	$18.7	1891
Massachusetts Institute of Technology	$10.1	$11.0	1861
Total Assets of the Six Largest Endowments	$119.2	$121.4	
Total Assets of US and Canadian Endowments	$412.8	$448.6	
Number of Endowments > $1 Billion AUM	77	82	

NACUBO-Commonfund Study of Endowments, 2013

FOUNDATIONS

- The foundation community has greater assets than university endowments, but with a larger number of smaller pools

Assets of the Largest U.S. Foundations in 2013	
	Assets ($Billion)
Bill & Melinda Gates Foundation	$37.2
Ford Foundation	$11.2
J. Paul Getty Trust	$10.5
Robert Wood Johnson Foundation	$9.5
W.K. Kellogg Foundation	$8.2
William and Flora Hewlett Foundation	$7.7
Total Assets of the Six Largest Foundations	$84.3
Total Assets of U.S. Foundations	$715.0
Total Giving	$52.0
Number of Foundations > $1 Billion AUM	65
Total Number of Foundations	86,192

The Foundation Center, 2013

SPENDING RATES

- The assets of the endowment or foundation are used to supplement the income of the organization
- Endowment spending averages 4.4% of assets, while foundations are legally required to spend at least 5% of assets annually. Universities with larger endowments have higher average spending rates
- Spending rates are smoothed to reduce the impact of a single year change in endowment return
- It is much more difficult for foundations to last in perpetuity than foundations
  - Endowments have a greater flexibility in their spending rate
  - Independent foundations are often funded by a single individual or family and receive no subsequent gifts
  - A perpetual institution is more likely when there is a substantial and regular gift income

INTERGENERATIONAL EQUITY

- Intergenerational equity seeks to balance spending on current vs. future beneficiaries
  - Intergenerational equity is best served when the real value of the corpus is constant over time, allowing for constant inflation-adjusted spending across generations
    - To do so, income has to exceed spending and losses to inflation
    - In the absence of gifts, the return target is the spending rate plus inflation
- CPI + 5% is a high required return, which leads endowments and foundations to aggressive asset allocations

ENDOWMENT RETURNS

- Larger endowments have earned higher returns
  - In the absence of gifts, ten year returns of CPI +4.8% maintain the real value of the corpus
  - Ten year returns above equity indices have attracted admirers

Returns of North American University Endowments				
	Ending June 2013			
	1 Yr	3Yr	5 Yr	10 Yr
60% MSCI World Equity Index, 40% Barclays Global Aggregate Bond Index	9.9%	9.8%	3.5%	6.5%
60% Russell 3000 Equity Index, 40% Barclays US Aggregate Bond Index	12.8%	12.9%	7.0%	6.9%
40% Russell 3000, 20% MSCI World Equity Index, 40% Barclays Global Aggregate Bond Index	11.0%	11.7%	5.3%	6.8%
MSCI World Index Free U.S. Currency	18.6%	13.7%	2.7%	7.2%
Russell 3000 Index	21.5%	18.6%	7.2%	7.8%
Barclays Capital Global Aggregate	-2.2%	3.6%	3.7%	4.8%
Barclays Capital U.S. Aggregate	0.7%	4.0%	5.5%	4.7%
Endowments Over $1 Billion	11.7%	10.5%	3.8%	8.3%
Total Endowment	11.7%	10.1%	3.9%	7.1%
Consumer Price Index	2.0%	2.4%	1.2%	2.3%
Higher Education Price Index	1.6%	1.9%	1.8%	3.3%

NACUBO-Commonfund Study of Endowments, 2013

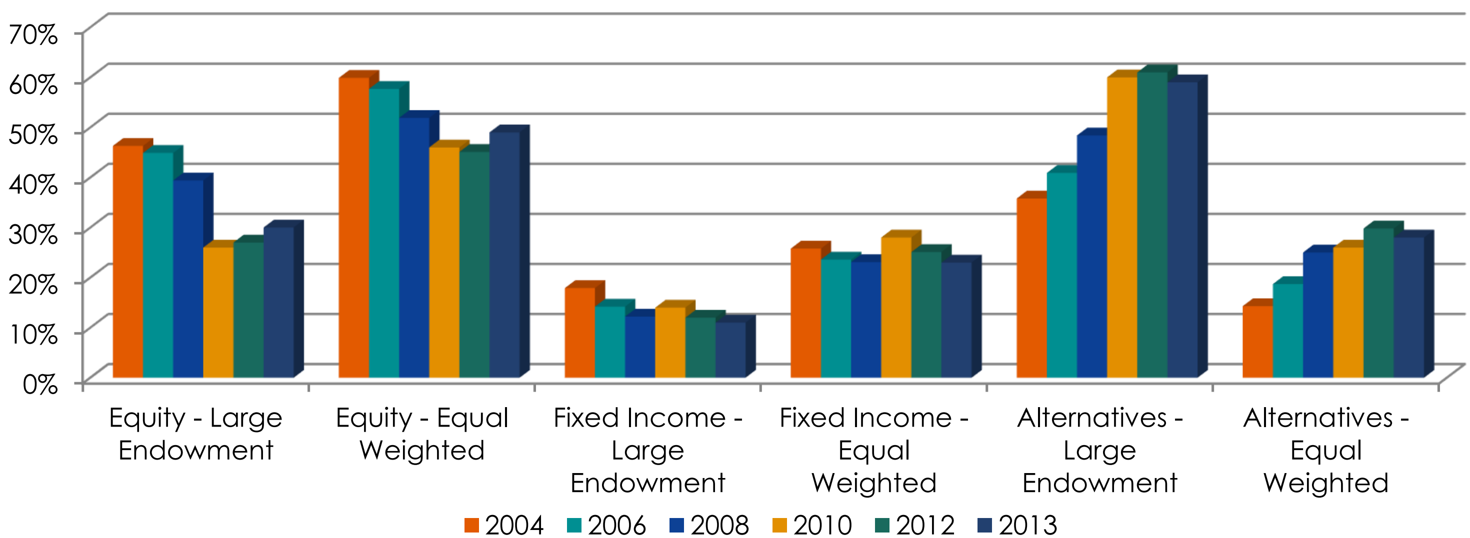
HOW CAN ENDOWMENTS OUTPERFORM?

The following slides will explore six reasons that may explain the outperformance of large endowments

- Aggressive asset allocation
- Rebalancing and contrarian views
- Effective investment manager research
- First mover advantage
- Access to a network of talented alumni
- Acceptance of liquidity risk

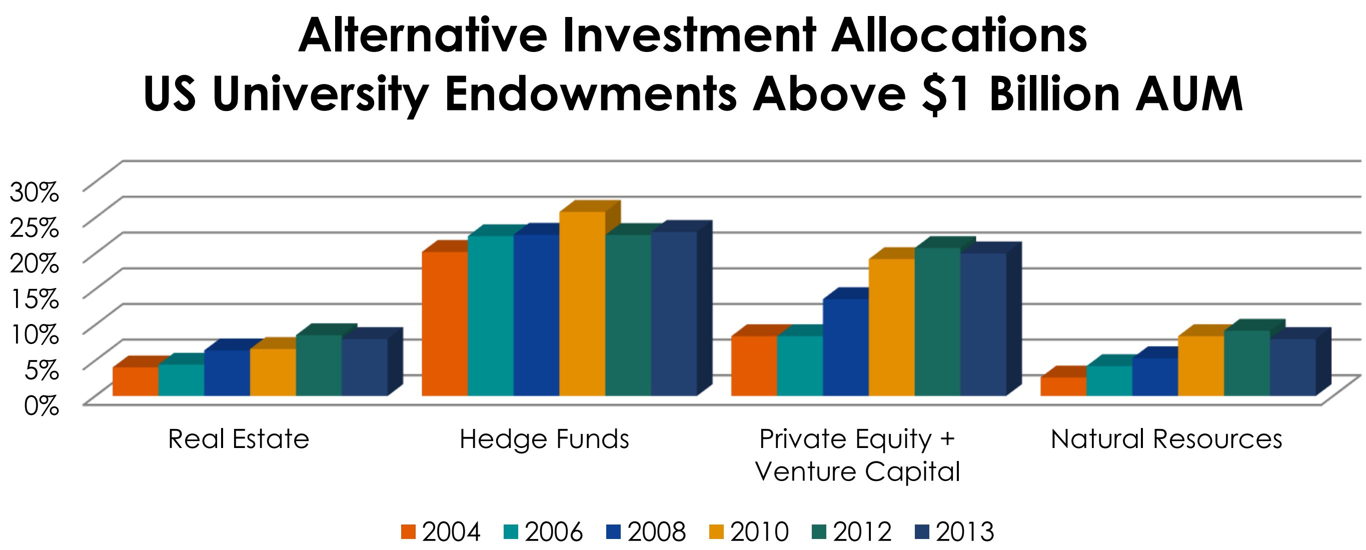
AGGRESSIVE ASSET ALLOCATION

- The endowment model is typically characterized by a large allocation to alternative investments and a low allocation to fixed income and cash
- While endowments with over $1 billion AUM allocate 59% to alternative investments, the average endowment allocates less than 30%



ALTERNATIVE INVESTMENT ALLOCATIONS

- The largest endowments have average allocations of;
  - 13% US equity, 17% non-US equity, 11% in fixed income and cash
  - 23% hedge funds, 20% PE/VC, 16% real assets



REBALANCING AND CONTRARIAN VIEWS

- David Swensen, the CIO of Yale University and author of Pioneering Portfolio Management, is seen as the father of the endowment model
- Swensen explains the importance of rebalancing and contrarian views in endowment investing
  - But many alternative investments have limited ability for rebalancing
- In traditional investment portfolios, strategic asset allocation accounts for over 90% of the variance in fund returns
- In endowments, strategic asset allocation explains just 74.2%, while market timing explains 14.6% and security selection explains 8.4%*
- Over 20 years, Swensen estimates that 80% of Yale's value added is from active management while just 20% is from asset allocation

Brown, Garlappi and Tiu, "Troves of Academe: Asset Allocation, Risk Budgeting, and Investment Performance of University Endowment Funds," Journal of Financial Markets, 2010

FIRST MOVER ADVANTAGE

- Yale University made its first investments far earlier than other investors
  - Natural resources in 1950
  - LBOs in 1973
  - Real estate in 1978
  - Venture capital in 1976, far earlier than public pensions which started in the 1990s
- Being an early investor has guaranteed access to today's top managers, many of which are closed to new investors

ACCESS TO TALENTED ALUMNI

- The majority of hedge fund managers attended the top universities
  - The middle 50% of managers attended undergraduate schools where SAT scores averaged between 1199 and 1421
  - Hedge fund managers attending schools with higher SAT scores earned higher returns, lower risk, and greater inflows
  - A 200 point difference in SAT scores explained 73bp higher returns*
- Perhaps, these alumni reserve capacity for their university's endowment
- No SAT effect was found for managers of mutual funds

*Li, Zhang and Xhao, "Investing in Talents," Journal of Financial and Quantitative Analysis, 2011

HOW CAN ENDOWMENTS OUTPERFORM?

- Investing in less liquid asset classes may earn higher returns
- This liquidity premia varies by asset class and lock-up period
- Ang computes that illiquidity requires a hurdle rate to compensate for liquidity risk borne, such as 2% for a two year lock-up and 6% for a ten year lock-up*
  - Hedge funds and liquid strategies have shorter lock-up periods
    - Concern about declining alpha and high fees is leading to decline in capital invested in funds of funds while single manager funds have stable to growing AUM
    - In-house management reduces fee burden
  - Private equity and real estate partnerships may have lock-up periods of ten years or longer
    - Focus investments on top quartile managers whose performance seems to be persistent

* Ang, "Illiquid Assets: Premiums and Optimal Allocations", 2011

RISKS OF THE ENDOWMENT MODEL

- Inflation and spending rates
- Liquidity
- Tail Risk

INFLATION AND SPENDING RATES

- Maintaining a constant or growing real corpus over time requires returns and gifts that exceed the spending rate plus the rate of inflation
- Spending at a rate of 5% of the endowment's five year average value runs a 50% risk of losing half of the endowment's real value during the course of a generation
- Lower spending rates and larger gift income significantly reduce the probability of a declining corpus
- The fear of inflation is directly linked to rising real asset allocations
- Real asset inflation betas far exceed those of traditional assets*

20 Year US Treasuries	S&P 500	3 Month T-bils	Farmland	Commodity Futures
-3.1	-2.4	0.3	1.7	6.5

*Bernstein Global Wealth Mgmt, "Deflating Inflation: Redefining the Inflation-Resistant Portfolio", 2010

LIQUIDITY RISK

- Liquidity risk is perhaps the most discussed issue in the post-crisis endowment world
- Endowments and foundations need liquidity to fund the spending rate and capital calls to private equity and real estate partnerships
- Liquidity can be sourced through fixed income and cash allocations, distributions from private equity and real estate partnerships
- In 2008-2009, top universities floated debt issues, sought to sell partnership interests in the secondary market, sold equity and corporate bonds in a down market, and drastically cut spending on staff and building projects
- Depending on spending and capital commitments, fixed income and cash allocations of 6% to 14% can avert a liquidity crisis in 95% of market conditions, while 35% is needed to completely avoid liquidity issues*

*Sheikh and Sun, "Defending the "Endowment Model" – Quantifying Liquidity Risk in a Post-Credit Crisis World," Journal of Alternative Investments, 2012

POST-CRISIS CHANGES IN LIQUIDITY

- Careful consideration of the size of commitments to the least liquid assets
  - Universities are reducing the degree of over commitment to real estate and private equity partnerships
  - Harvard reduced uncalled capital commitments by over $4 billion in the first two years after the crisis
- Increased access to credit lines
  - Guarantee access to cash before the next crisis
- Growing cash allocations and reduced leverage
  - Harvard grew cash from -5% to +2%, Yale grew cash from -4% to +4%
- Moving assets toward more liquid alternatives
  - Commodity futures are becoming increasingly attractive relative to natural resource partnerships

TAIL RISK

- The best way to compound long-term wealth may be to have an appropriately defensive strategy during down markets
- The best way to destroy long-term wealth may be to reduce risk tolerance at the bottom of a bear market
- Owning negatively correlated assets can increase cash flow in a down market, allowing rebalancing and the purchase of assets from distressed sellers at cyclical lows
- Many private equity, real estate, and hedge fund strategies have a return profile similar to selling put options on liquidity risk*
- Defensive strategies may include
  - Put options on equity, credit, and commodities
  - Sovereign debt
  - Macro, managed futures, and volatility arbitrage funds

*Page, Simonia and He, "Asset Allocation: Systemic Liquidity as a Risk Factor," Global Liquidity III, 2011

ASSET RETURNS IN 2007-2009

Asset Returns				
	2007	2008	2009	2007-2009
GSCI Commodities	32.7%	-46.5%	13.5%	-19.4%
MSCI World Free	9.0%	-40.7%	30.0%	-16.0%
S&P 500	5.5%	-37.0%	26.5%	-15.9%
Convertible Arb	5.2%	-31.6%	47.3%	6.0%
Emerging Markets Hedge	20.2%	-30.4%	30.0%	8.8%
Fixed Income Arb	3.8%	-28.8%	27.4%	-5.9%
60% MSCI World, 40% Barclays Global	9.4%	-24.9%	20.7%	-0.8%
Equity Long-Short	13.7%	-19.7%	19.5%	9.0%
Hedge Fund Index	12.6%	-19.1%	18.6%	8.0%
Event Driven Multistrategy	16.8%	-16.2%	19.9%	17.3%
Macro	17.4%	-4.6%	11.5%	24.9%
Barclays Global Aggregate	9.5%	4.8%	6.9%	22.7%
Managed Futures	6.0%	18.3%	-6.6%	17.2%

LONG TERM RETURNS FOR TAIL HEDGES

- Put option solutions have a negative expected return, while cash earns near zero
- Bond, macro and managed futures investments earn positive returns over time, reducing hedging costs
- Returns that are more normally distributed have less issues with significant drawdowns

(Jan. 1994-Dec. 2014)	**Average Return**	**Standard Deviation**	**Maximum Drawdown**	**Skewness**	**Kurtosis**
MSCI World Free	7.9%	15.0%	-56.0%	-0.8	1.7
S&P 500	10.2%	14.9%	-56.7%	-0.7	1.2
Convertible Arbitrage	7.5%	6.9%	-37.5%	-2.9	26.6
Emerging Markets	8.4%	13.2%	-47.7%	-0.8	5.9
Fixed Income Arbitrage	5.4%	5.4%	-32.1%	-4.7	34.9
Long/Short Equity	9.4%	9.4%	-25.2%	0.0	3.7
Hedge Fund Index	8.4%	7.2%	-22.8%	-0.2	2.9
Multi-Strategy	8.6%	6.6%	-20.8%	-1.7	7.8
Global Macro	10.8%	9.2%	-29.4%	0.1	4.5
JPM Global Aggregate Bond	5.6%	5.7%	-12.3%	0.2	0.8
Managed Futures	6.2%	11.5%	-24.1%	0.0	0.0

CAIA CURRICULUM

Level II

- Chapter 2: The Endowment Model
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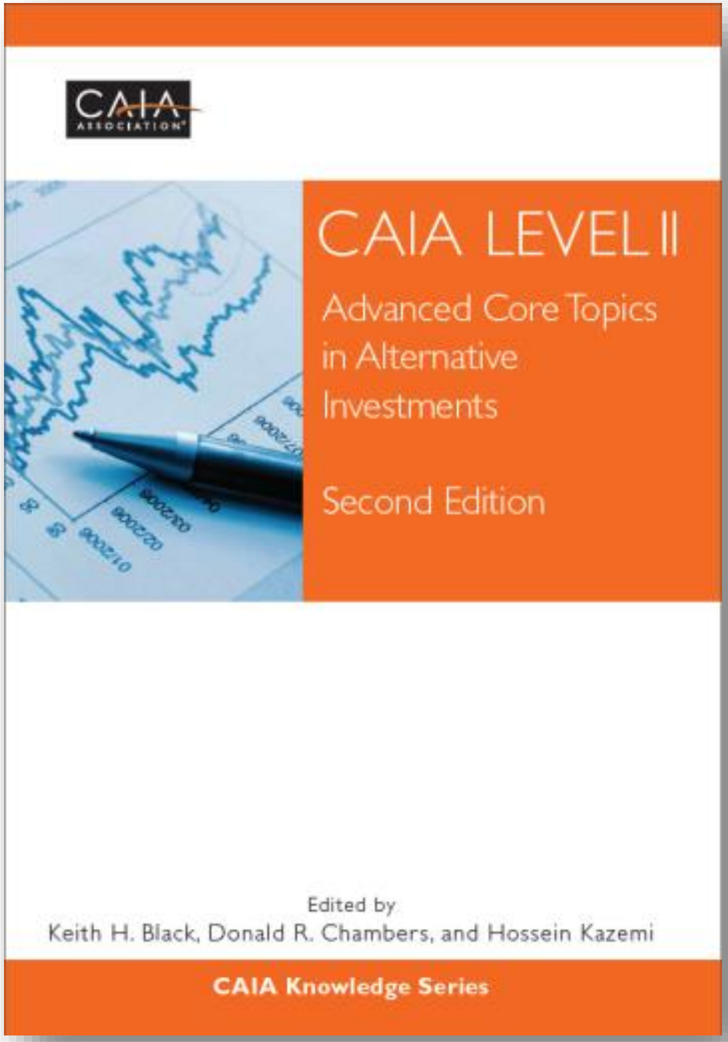

THE CAIA CHARTER

The Global Benchmark In Alternative Investment Education

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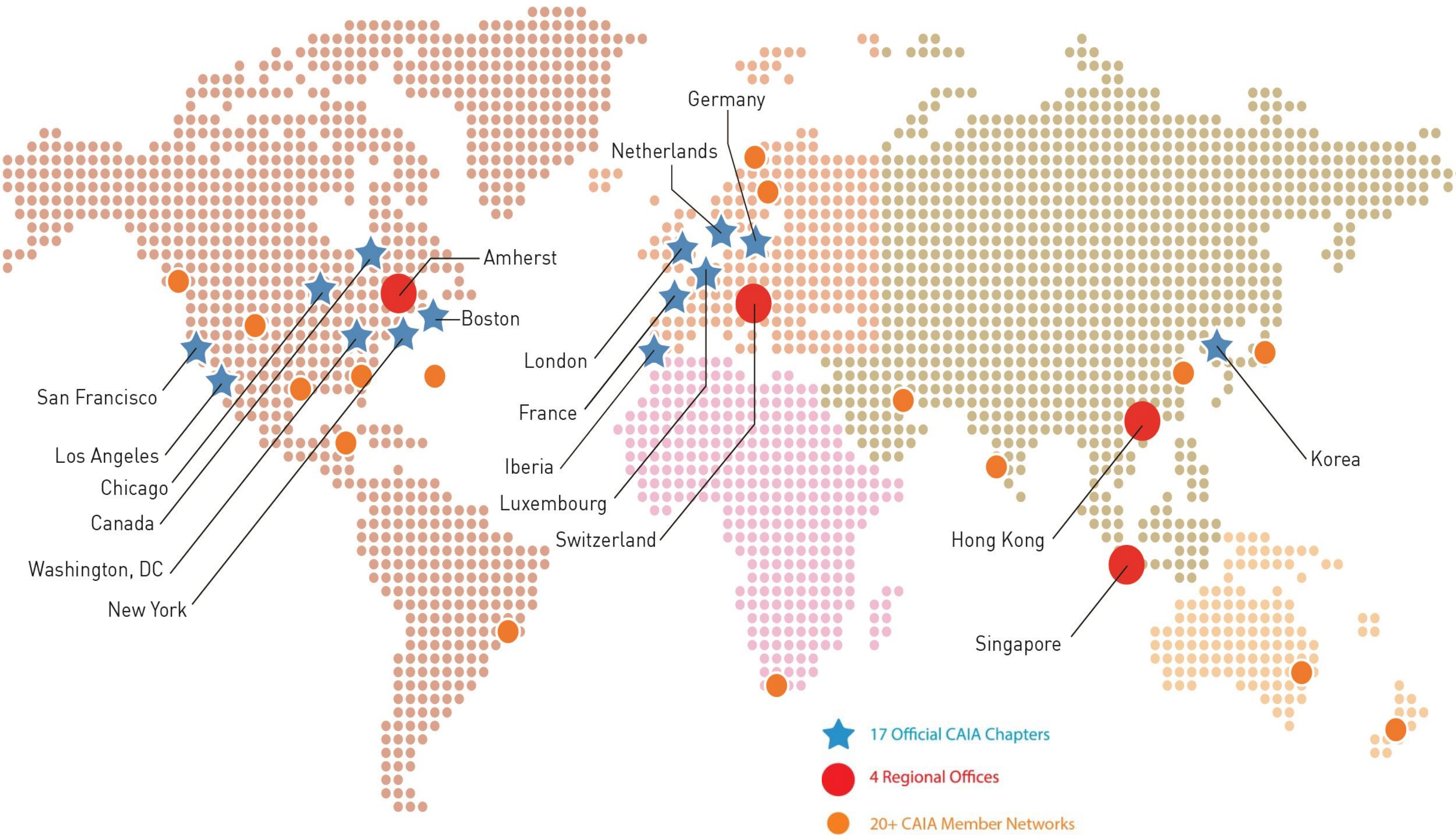
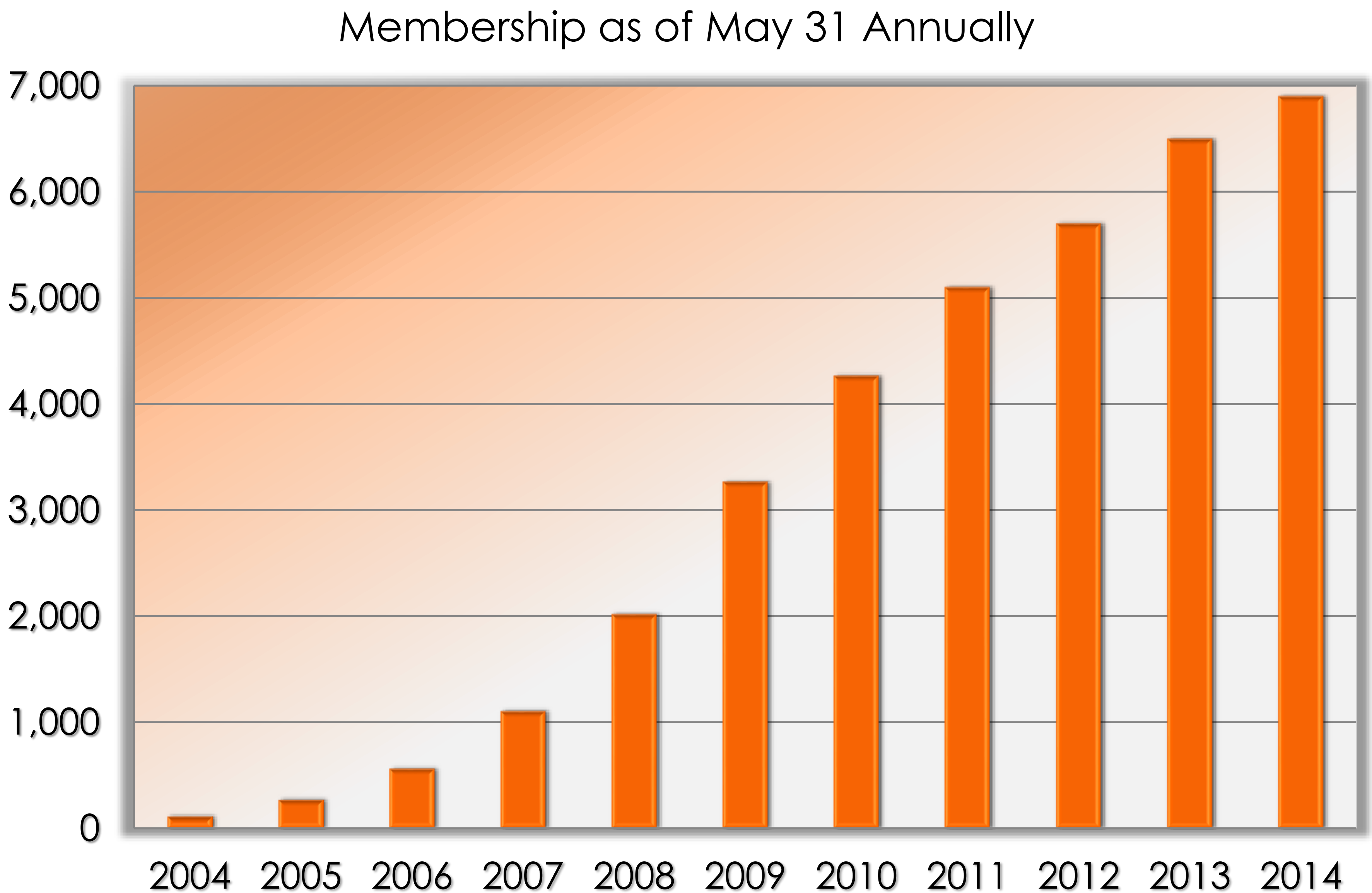
CAIA ASSOCIATION®

The Global Mark of Distinction in Alternative Investments

GLOBAL PRESENCE

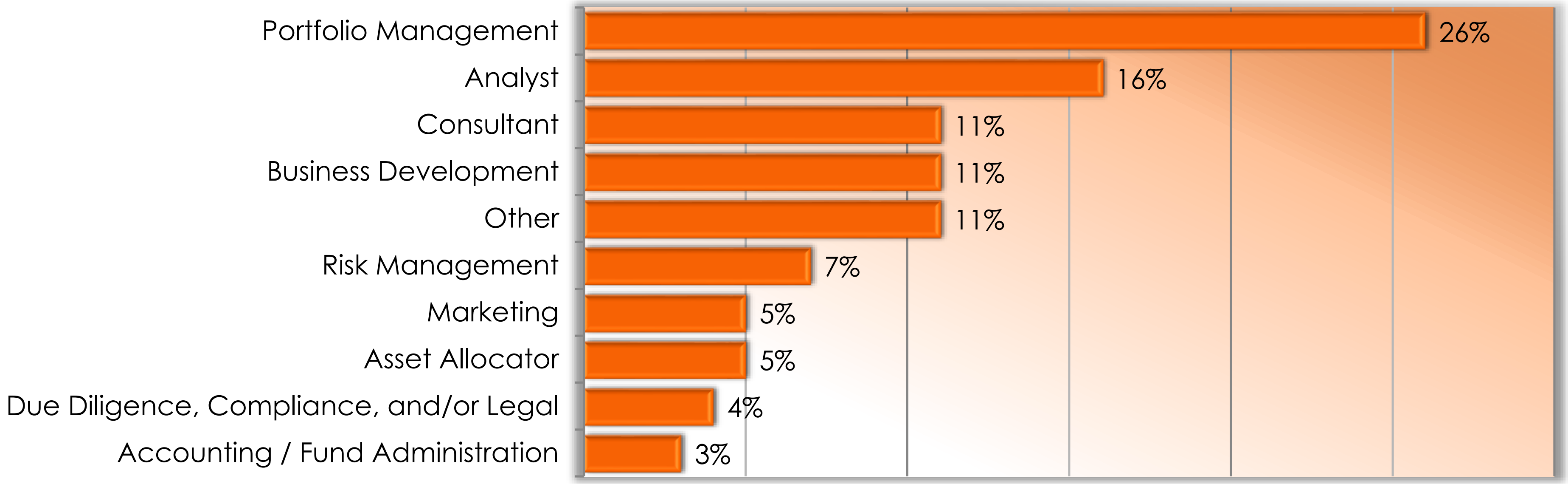


MEMBERSHIP GROWTH

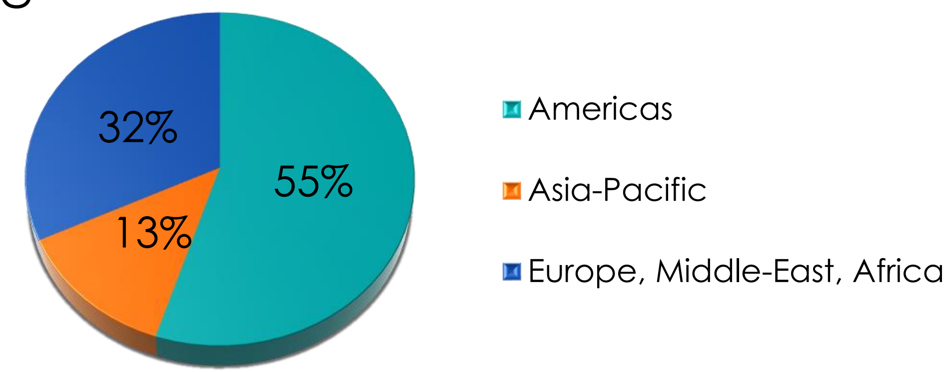


MEMBERSHIP PROFILE

CAIA Members by Profession



Regional Distribution of CAIA Members



From January 2014 CAIA Member Survey with 14% of members responding.

LEVEL I CURRICULUM

CORE CONCEPTS

- Professional Standards & Ethics
- Introduction to Alternative Investments
- Real Assets
- Hedge Funds
- Commodities
- Private Equity
- Structured Products
- Risk & Portfolio Management

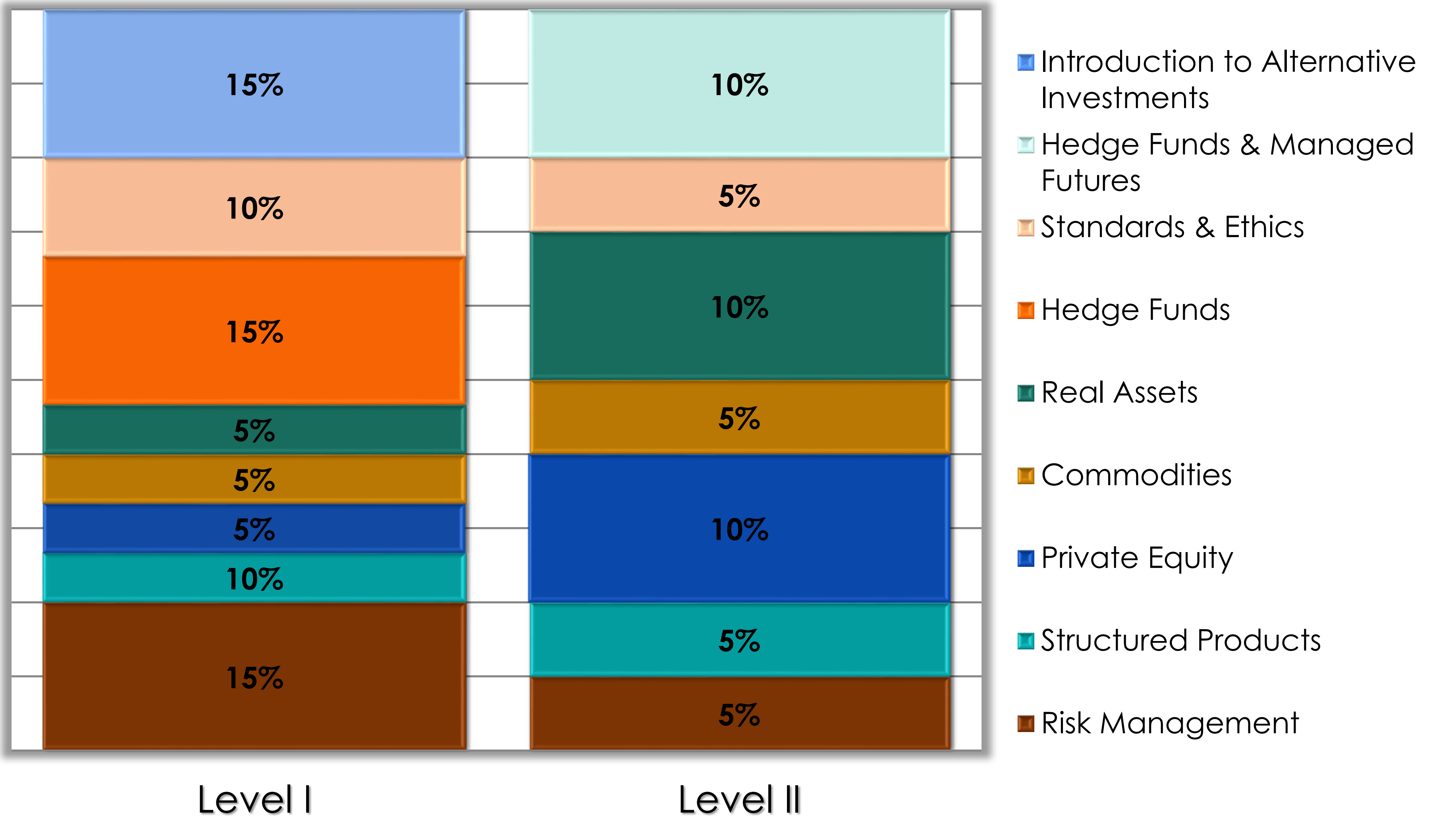
LEVEL II CURRICULUM

ADVANCED CORE CONCEPTS

- Professional Standards & Ethics
- Venture Capital & Private Equity
- Hedge Funds & Managed Futures
- Real Estate/Real Assets
- Commodities
- Structured Products
- Manager Selection, Due Diligence & Regulation
- Research Issues & Current Topics
- Risk & Risk Management
- Asset Allocation & Portfolio Management

EXAM TOPICS

Minimum Weights by Topic per CAIA Exam Level



September 2015 Exam

EXAMINATION FORMAT

LEVEL I

- 200 Multiple Choice Questions
  - Section 1 : 100 questions / 120 minutes
  - Section 2 : 100 questions / 120 minutes
- *SAMPLE:*
  - Consider the case of a non-dividend-paying financial asset where $F > Se^{r(T-t)}$. How, in this case, can the hedge fund manager earn a profit?

LEVEL II

- 100 Multiple Choice Questions + 3 Essays
  - Section 1 : 100 questions / 120 minutes
  - Section 2 : 3 essays / 120 minutes
- *SAMPLE:*
  - Recent studies argue that during tail-risk events, the returns earned by broad equity indices go to extremes. What are the primary forces driving this process?

CANDIDATE SUPPORT/TOOLS

- Study guides outlining keywords and learning objectives
- Workbooks with sample exercises
- Candidate orientation sessions
- Study calculator to plan your course of study
- Third Party Preparatory Course and Programs
- Level I & Level II sample exams

FEES

(in USD)	Level I	Level II
Program Enrollment	$400	
Exam Registration	$1250	$1250
TOTAL	$1650	$1250
Early Registration Discount	*-$100*	*-$100*
Retake Fee	$450	$450

Membership *(annually)*	
Full	$350
Affiliate	$175
Retired	$175

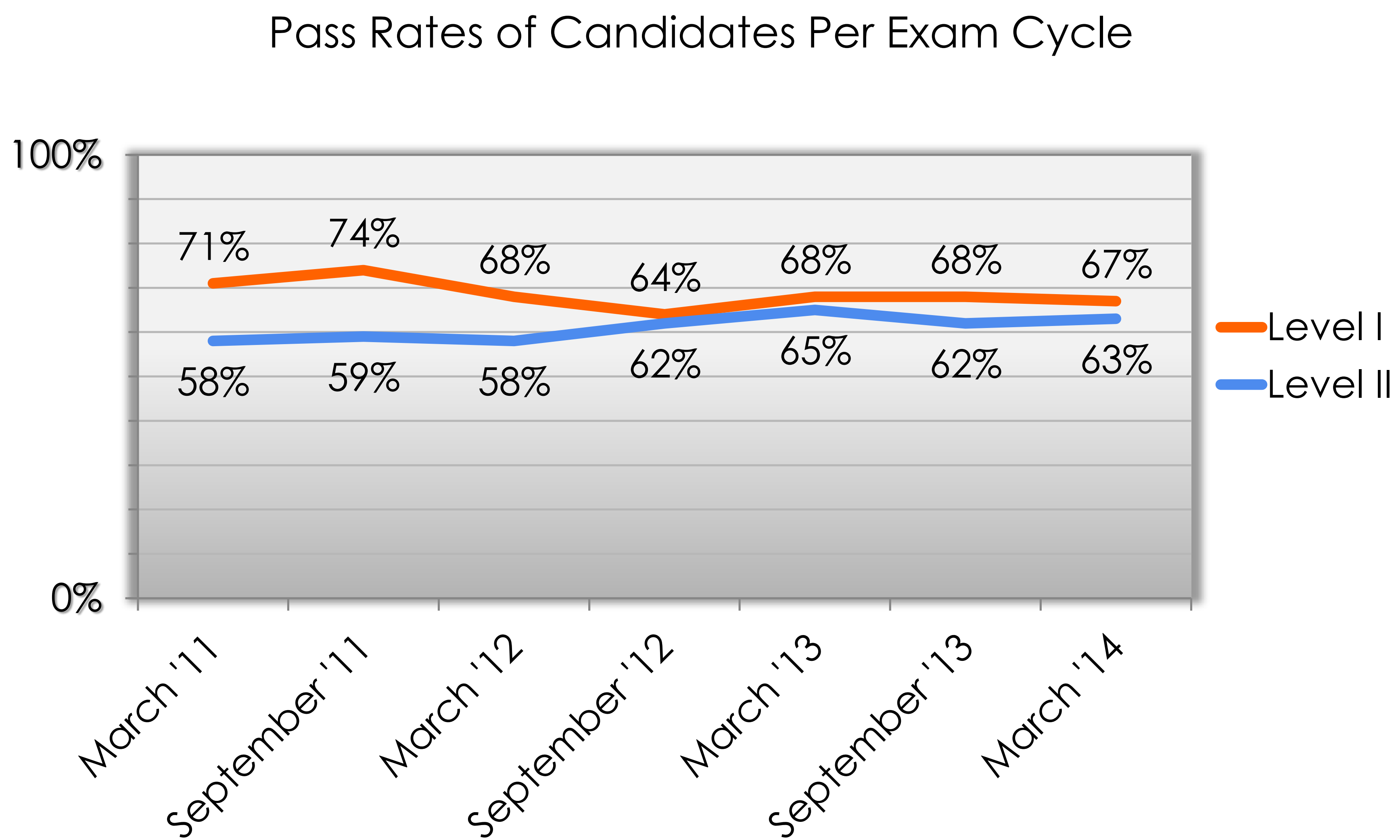
CURRICULUM COST

The CAIA Curriculum is available for purchase through Amazon.com and Wiley.com.

Approximate pricing (in USD):

- Level I Textbook — US $110 - 200
- Level II Textbook & Readings — US $310 - 400
- *Standards of Practice Handbook* — US $30 - 40

PASS RATES



Pass Rates of Candidates Per Exam Cycle
100%
0%
71%
74%
68%
64%
68%
68%
67%
58%
59%
58%
62%
65%
62%
63%
Level I
Level II
March '11
September '11
March '12
September '12
March '13
September '13
March '14

CAIA CHARTER

CAIA ASSOCIATION®

The Chartered Alternative Investment Analyst Association's Board of Directors
does hereby confer the designation of

Chartered Alternative Investment Analyst

upon

Charter Number xxxx

who has successfully completed all the requirements prescribed for this designation.

In Testimony Whereof, this Charter is granted under the seal of the
Chartered Alternative Investment Analyst Association this
Twenty-First day of April, 2015.

Thomas Schneeweis Director	Alexander Ineichen Director	Andrew Baker Director	Robert DeRito Director	M. Jane Buchan Director	Mark Anson Director	William Kelly Chief Executive Officer

ACADEMIC PARTNERSHIPS

CAIA ASSOCIATION

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AUS | American University of Sharjah

ie

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MACQUARIE UNIVERSITY

SMU Singapore Management University

CLARK UNIVERSITY 1887 Graduate School of Management

Unil
UNIL | Université de Lausanne
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IIT Stuart School of Business
ILLINOIS INSTITUTE OF TECHNOLOGY

University of St.Gallen

Cass Business School
City University London

HKUST Business School 香港科大商學院 | World Class in Asia

New York University NYU Stern
Leonard N. Stern School of Business

KAIST College of Business

UCC
University College Cork, Ireland
Coláiste na hOllscoile Corcaigh

NFS
WASEDA University
Waseda Graduate School of Finance, Accounting and Law

NUS National University of Singapore | NUS Business School

清华五道口
TSINGHUA PBCSF

SAIF
Shanghai Advanced Institute of Finance
上海高级金融学院

SDA Bocconi
School of Management

ISENBERG
UMASS AMHERST

USC Marshall
School of Business

University of Amsterdam
Amsterdam Business School

FORDHAM
Gabelli School of Business

UTS

The University of Arizona | Eller College of Management

FRESNO STATE
Craig School of Business

ASSOCIATION PARTNERSHIPS

CAIA ASSOCIATION

bvca

iaqf
INTERNATIONAL ASSOCIATION FOR QUANTITATIVE FINANCE

100 women in hedge funds

SVCA Singapore Venture Capital & Private Equity Association

FWA

CONNECTICUT HEDGE FUND ASSOCIATION

CHFA California Hedge Fund Association

The New York Hedge Fund Roundtable

aima

alfi association of the luxembourg fund industry

NZARA

ilpa INSTITUTIONAL LIMITED PARTNERS ASSOCIATION

APREA

SBIA SMALL BUSINESS INVESTOR ALLIANCE

BAI diversification matters.

SAMPLE OF CAIA MEMBER EMPLOYERS

Banks	HSBC; Citi; Credit Suisse; UBS; Barclays Capital
Consultants	Cambridge Associates; New England Pension Consultants; Mercer; Towers Watson
Fund Management	Blackrock; Goldman Sachs; J.P. Morgan; Morgan Stanley; State Street
Regulators	U.S. SEC; MAS Singapore; SFC Hong Kong; FCA UK; CIMA Cayman
Pension Funds & Endowments	APG; Texas Retirement System; Chicago Teachers; Ontario Teachers; CalPERS; Harvard Management Co.

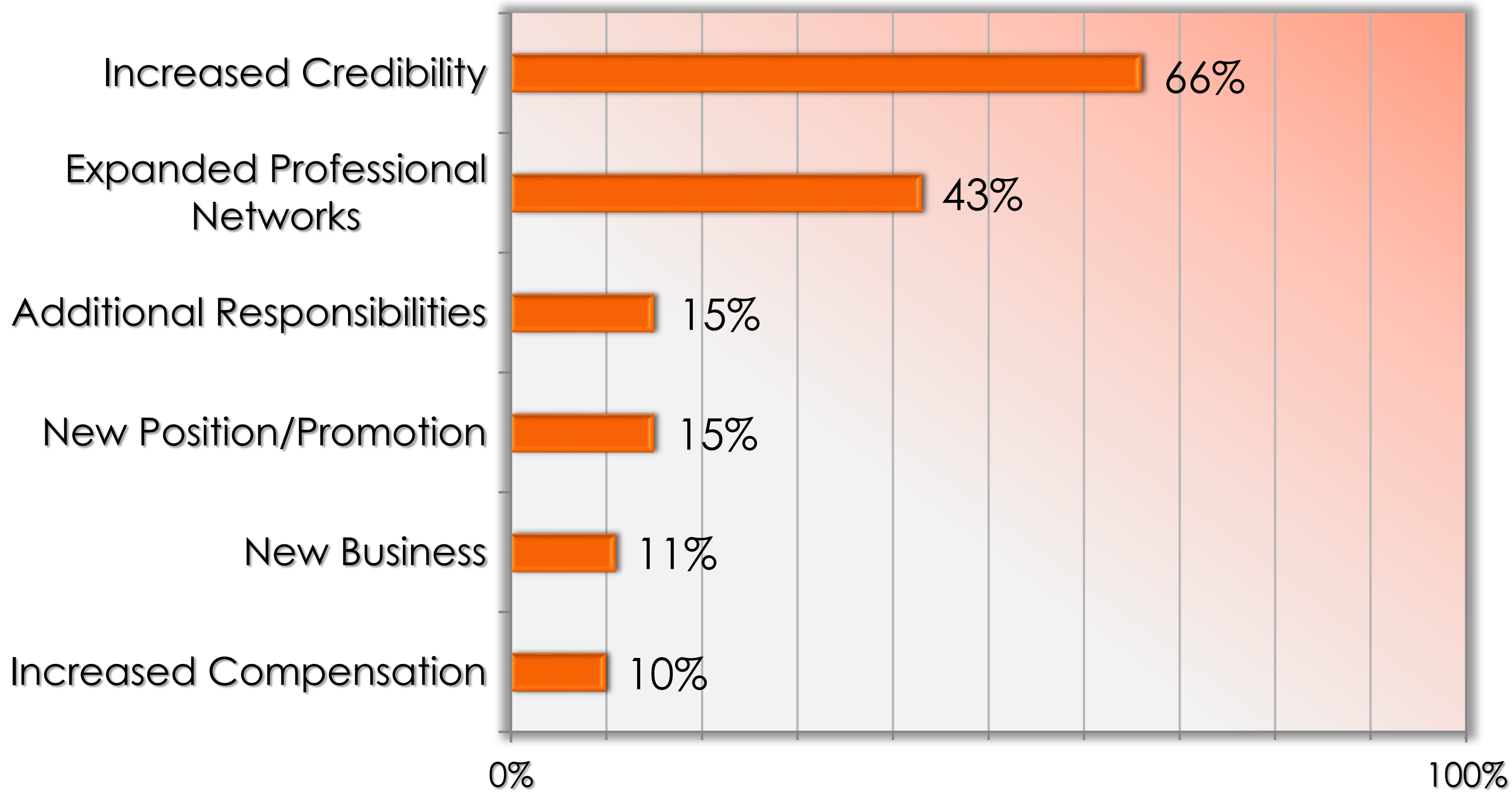
CAIA IS "PREFERRED"

Sample job postings from the CAIA Job Board.
Top companies seek to hire CAIA Charter holders.

CPP Investment Board	***Risk Management - Associate*** Industry certifications, such as a CFA, **CAIA**, or FRM, are a plus.
BNY Mellon	***International Relationship Manager*** CFA, **CAIA** or working toward preferred.
UBS	***Equity Investment Research - Manager*** CIMA, **CAIA,** and/or CFA charter holders or candidates will be looked favorably upon.
Citi	***Senior Credit Specialist*** CFA / **CAIA** / FRM / PRM is considered highly advantageous.
Ameriprise Financial – More Within Reach	***Senior Quantitative Research Analyst*** CFA, **CAIA**, CIMA
BlackRock	***International Trading Manager*** MBA, CFA, **CAIA** or CMT preferred

CAREER VALUE OF THE CAIA CHARTER

CAIA Members Report Positive Career Outcomes
After Earning the CAIA Charter



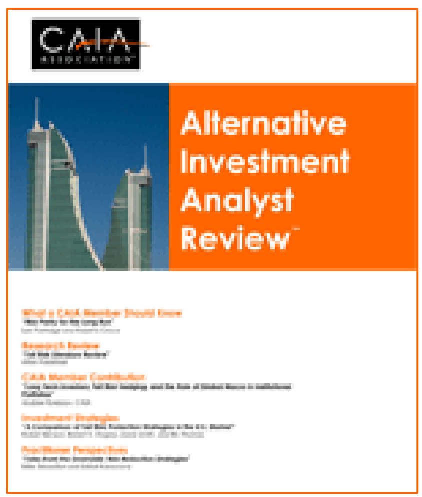
**From October 2013 CAIA Member Survey. Numbers represent approximately 14% of members.*

MEMBER BENEFITS

- **Regular educational and networking events**
- **Connected through social media**
- **Global network of more than 6,900 members**
- **Globally recognized designation**
- **CAIA.org**
  Knowledge Center
- **Self Evaluation Tool**
  Ongoing education
- **Job Board**
  CAIA Preferred
  CAIA Targeted

The Journal of Alternative Investments

AllAboutAlpha.com
Research, Analysis & Opinion on Alternative Investments.


CAIA ASSOCIATION
Alternative Investment Analyst Review

SEPTEMBER 2015 EXAM NOTABLE DATES

- Registration
  - Early: April 1 - May 13, 2015
  - Regular: May 14 – August 5, 2015
- Level I Exam
  - September 14 - 25, 2015
- Level II Exam
  - September 7-18, 2015

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