



# CHINA: CREDIT, COLLATERAL, AND COMMODITY PRICES

KEITH BLACK, PHD, CFA, CAIA

Showcase your knowledge



@CAIA\_KeithBlack  
@CAIAAssociation

# 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 9,000 current charter holders in more than 90 countries
- 30 vibrant chapters located in financial centers around the world
- More than 150 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 \$14 trillion in assets under management and assets in liquid alternatives continue to rise.

## **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<sup>®</sup>, CIMC<sup>®</sup>, CPWA<sup>®</sup>, CFP<sup>®</sup>, CPA<sup>®</sup> designations
- Understand the core concepts in alternative investments
- Gain confidence in discussing and positioning alternatives

# Global Commodities Applied Research Digest



## GLOBAL COMMODITIES APPLIED RESEARCH DIGEST

FALL 2016

### RESEARCH DIGEST ARTICLE

### "CHINA: CREDIT, COLLATERAL, AND COMMODITY PRICES"

THIS DIGEST ARTICLE IS BY

KEITH BLACK, Ph.D., CFA, CAIA,

# Drivers of Commodity Prices

- Historically, the analysis of commodity prices focused on fundamental supply and demand factors
  - Consumption levels
  - Inventory levels
  - Supply levels, often influenced by weather, strikes, or war
  - Carrying costs
- In recent decades, financial markets are playing a stronger role in the determination of commodity prices
  - Use of commodities as collateral for loans
  - Importance of commodity producers and consumers in the stock and bond markets
  - Influence of currencies, interest rates, and monetary policy on GDP growth and global trade
    - Strong USD increases commodity prices and reduces demand
  - Financial market volatility may lead to risk aversion or risk appetite in commodity markets

# Financial Factors in the Energy Sector

- Modeling Superior Predictors for Crude Oil Prices
  - Westgaard, Osmundsen, Stenslet, Ringheim
  - Journal of Energy Markets, 2017
- From 2000 to 2013, the best predictors of oil prices were financial
  - Predict one month change in Brent price using lagged variables
  - High-yield bond spreads (1% significance, negative)
  - Oil service sector stocks (OSX Index) (1% significance, positive)
    - Sentiment reflected in oil stock prices may predict future oil prices
  - Futures-spot spread levels (1% significance, negative)
    - Price increases on futures forward curve often overestimate future spot prices
  - Rig count (5% significance, negative)
  - Inventories (5% significance, negative)
  - Oil prices seem more volatile than the underlying supply-demand dynamics



# Chinese Copper Studies

- China: Credit, Collateral and Commodity Prices
  - Roache and Rousset
  - Hong Kong Institute for Monetary Research, December 2015
- China's demand for copper strongly influences global copper prices, but some of this copper demand is financial
- Global producers added debt to increase copper production to supply Chinese demand
- However, much of this copper is now held in inventory as collateral for loans in the shadow banking system
  - Loan demand in China may predict copper prices
  - Chinese law changed October 2007 allowing commodities to serve as collateral
  - Copper collateral used to borrow in USD and invest at higher CNY rates
  - Warehouses may hold 5% of annual global copper production

# Chinese Copper Studies

- Quantifying “Real” Chinese Copper Demand
  - Hoffman and Gilmartin
  - Bloomberg Intelligence, March 2016
- China’s carry trade inflated demand and led miners to raise output
- How can demand for copper double when cement demand and electrical grid growing at 11% and 6%?
- China actually consumes 36% of the world’s copper, lower than the 50% previously estimated
- Implication is that Chinese demand is overstated and that what was previously considered demand may potentially become supply when warehouse inventories are liquidated
- Liquidation likely when CNY declines or the spread of CNY vs. USD (or other funding currency) interest rates decline

# Chinese Copper Studies

- Copper in China: A Bottom-Up Approach to Long-Term Demand
  - Macquarie Research, 23 June 2015
- Chinese copper demand 1.8 million tons in 2000 and 9.9 million tons in 2014
- Consider use of copper in five sectors to predict future demand
- Infrastructure, construction, transportation, industrial goods, consumer appliances
- By 2020, copper demand growth expected to decline from 13% per year to 3.4% per year
- Credit growth and the use of commodities for collateral had a larger influence on copper prices than industrial demand over the last decade

# Empirical Oil Model

- February 1996 to September 2007
  - Tested 48 variables
    - Fundamentals: Production, Consumption, Inventories, Rig Counts
    - Financials: Interest rates, Inflation, Currencies, GDP, National Capital Expenditures
  - 5% significance
    - Current month: Rig Count, Indian Stocks, Copper Return
    - 1 month lag: Change US Crude Inventory, Rig Count, 1yr US Interest Rates
- October 2007 to March 2016
  - Tested 61 variables
    - Previously tested variables with the addition of Chinese credit data, CNY and carry trade, Chinese domestic investment variables
  - 5% significance
    - Current month: 24 significant variables, including inflation, money supply, equities, Chinese investment variables, high yield bonds, oil service stocks, copper prices
    - 1 month lag: 15 significant variables, including inflation, money supply, Chinese investment variables, high yield bonds, oil service stocks, copper prices, lagged oil prices

# WTI Crude Oil Model (8/1996-9/2007)

<b>August 1996 - September 2007</b>			
Predict 1 month return to WTI Crude Oil			
Using 1 month lagged data			
	Adjusted R-squared	t Statistic	P-value
	0.124		
Change US Crude Inventory		-2.910	0.004
Baker Hughes US Crude Oil Rotary Rig Count		-2.418	0.017
1M Cg US 1yr Swap Rate		2.821	0.006

# WTI Crude Oil Model (10/2007-3/2016)

<b>October 2007 - March 2016</b>			
Predict 1 month return to WTI Crude Oil			
Using 1 month lagged data			
	Adjusted R-squared	t Statistic	P-value
	-0.006		
Change US Crude Inventory		-0.222	0.825
Baker Hughes US Crude Oil Rotary Rig Count		-1.110	0.270
1M Cg US 1yr Swap Rate		-0.961	0.339

<b>October 2007 - March 2016</b>			
Predict 1 month return to WTI Crude Oil			
Using 1 month lagged data			
	Adjusted R-squared	t Statistic	P-value
	0.19		
Barclays US Corporate High Yield 1m Total Return		3.477	0.001
China New Orders PMA SA		2.325	0.022

# Empirical Copper Model

- February 1996 to September 2007
  - Tested 42 variables
    - Fundamentals: Production, Consumption, Inventories
    - Financials: Interest rates, Inflation, Currencies, GDP, National Capital Expenditures
  - 5% significance
    - Current month: Crude prices, equities, inflation, Chinese fixed asset investment
    - 1 month lag: US inflation and money supply, Asian stock markets
- October 2007 to March 2016
  - Tested 56 variables
    - Previously tested variables with the addition of Chinese credit data, CNY and carry trade, Chinese domestic investment variables
  - 5% significance
    - Current month: 16 significant variables, including inflation, money supply, equities, Chinese investment variables, high yield bonds, Chinese hedge fund returns
    - 1 month lag: 12 significant variables, including US inflation and GDP, US and Chinese money supply, Chinese investment variables, high yield bonds, lagged copper prices, change in copper inventories

# Copper Model (3/1996-9/2007)

<b>March 1996 - September 2007</b>			
Predict 1 month return to COMEX Copper			
Using 1 month lagged data			
	Adjusted R-squared	t Statistic	P-value
	0.093		
US CPI XFoodEnergy		-2.452	0.015
US M2 1M Change		-2.828	0.005

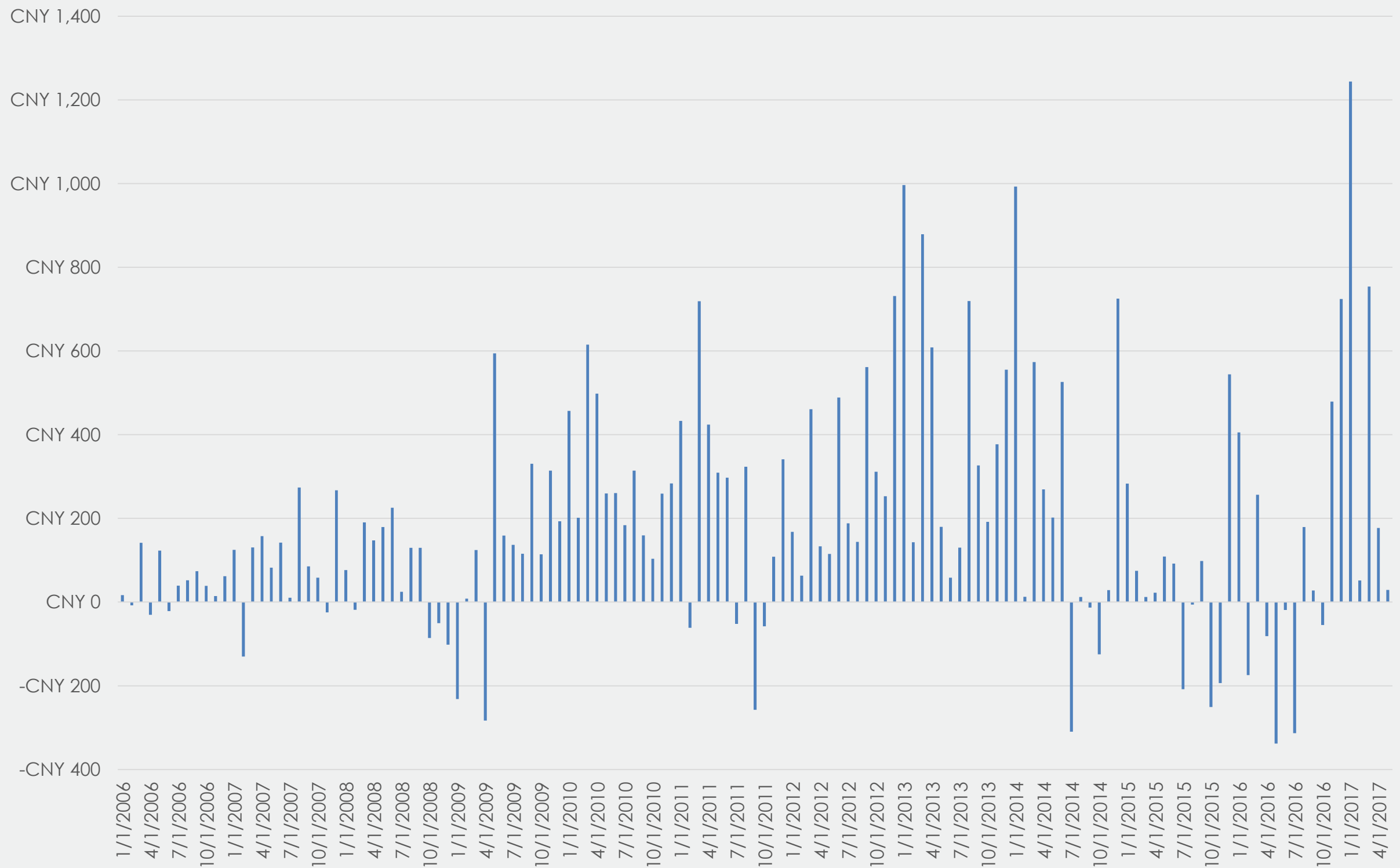


# Copper Model (10/2007-3/2016)

<b>October 2007 - March 2016</b>			
Predict 1 month return to COMEX Copper			
Using 1 month lagged data			
	Adjusted R-squared	t Statistic	P-value
	0.070		
US CPI XFoodEnergy		-1.858	0.066
US M2 1M Change		-2.106	0.038

<b>October 2007 - March 2016</b>			
Predict 1 month return to COMEX Copper			
Using 1 month lagged data			
	Adjusted R-squared	t Statistic	P-value
	0.197		
China M2 Change		2.474	0.015
US CPI		-3.115	0.002
COMEX Copper Inventory 1m Cg		-3.029	0.003

# China Shadow Banking (Aggregate Monthly Loans)

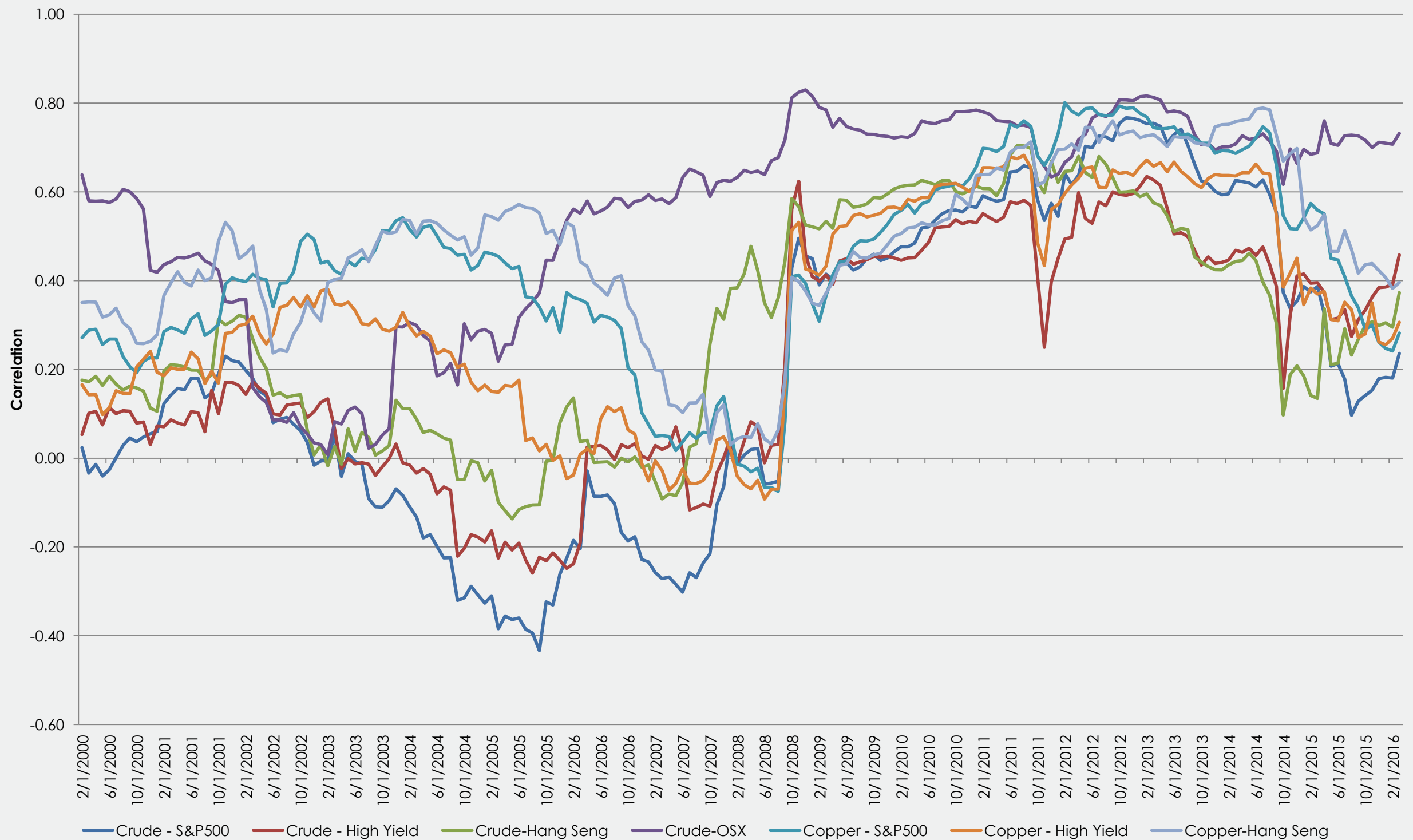


Source: Bloomberg: Data from January 2006 through May 2017. China Shadow Banking tracks the aggregate of Entrusted Loans, Trust Loans and Undiscounted Bankers Acceptances

# Shadow Banking and the Carry Trade

<b>Predict 1m Copper Change</b>						
<b>Jan 2010 to March 2016</b>	<b>Concurrent R-Squared</b>	<b>Concurrent T-stat</b>	<b>Concurrent P-value</b>	<b>1m Lag R-Squared</b>	<b>1m Lag T-stat</b>	<b>1m Lag P-value</b>
China Shadow Banking Social Financing YoY	0.014	1.021	0.311	0.001	(0.319)	0.750
China Entrusted Loans	0.012	0.966	0.337	<b>0.041</b>	<b>(1.760)</b>	<b>0.083</b>
China Trusted Loans	0.007	(0.735)	0.465	<b>0.042</b>	<b>1.788</b>	<b>0.078</b>
China Undiscounted Bankers Acceptances	0.007	0.722	0.472	0.001	(0.271)	0.787
Entrusted+Trusted+Bankers Acceptances	0.002	(0.344)	0.732	0.000	(0.048)	0.962
1YR Carry CNY-USD	0.001	(0.200)	0.842	0.005	(0.590)	0.557
China New Orders PMA SA	0.017	1.118	0.267	0.000	(0.056)	0.955
China Property - Total Sales of Buildings YoY	0.000	(0.114)	0.910	0.000	(0.099)	0.921
CNY 1M Change	<b>0.068</b>	<b>(2.319)</b>	<b>0.023</b>	0.003	0.452	0.653
China Steel Production 1m Change	0.000	0.179	0.858	0.012	(0.954)	0.343
China M2 Change	0.034	1.622	0.109	0.014	1.030	0.306
China Value Added of Industry YoY	0.015	1.048	0.298	0.006	0.646	0.520
China Fixed Asset Investment (Excluding Rural Households) 12m %Cg	0.009	0.797	0.428	0.008	0.773	0.442
IMF China Industrial Production YOY	0.008	0.775	0.441	0.001	0.207	0.837
China Fiscal Expenditure (12m %Cg)	0.015	1.049	0.298	0.011	0.901	0.371

# Increasing Correlations Reduce Diversification



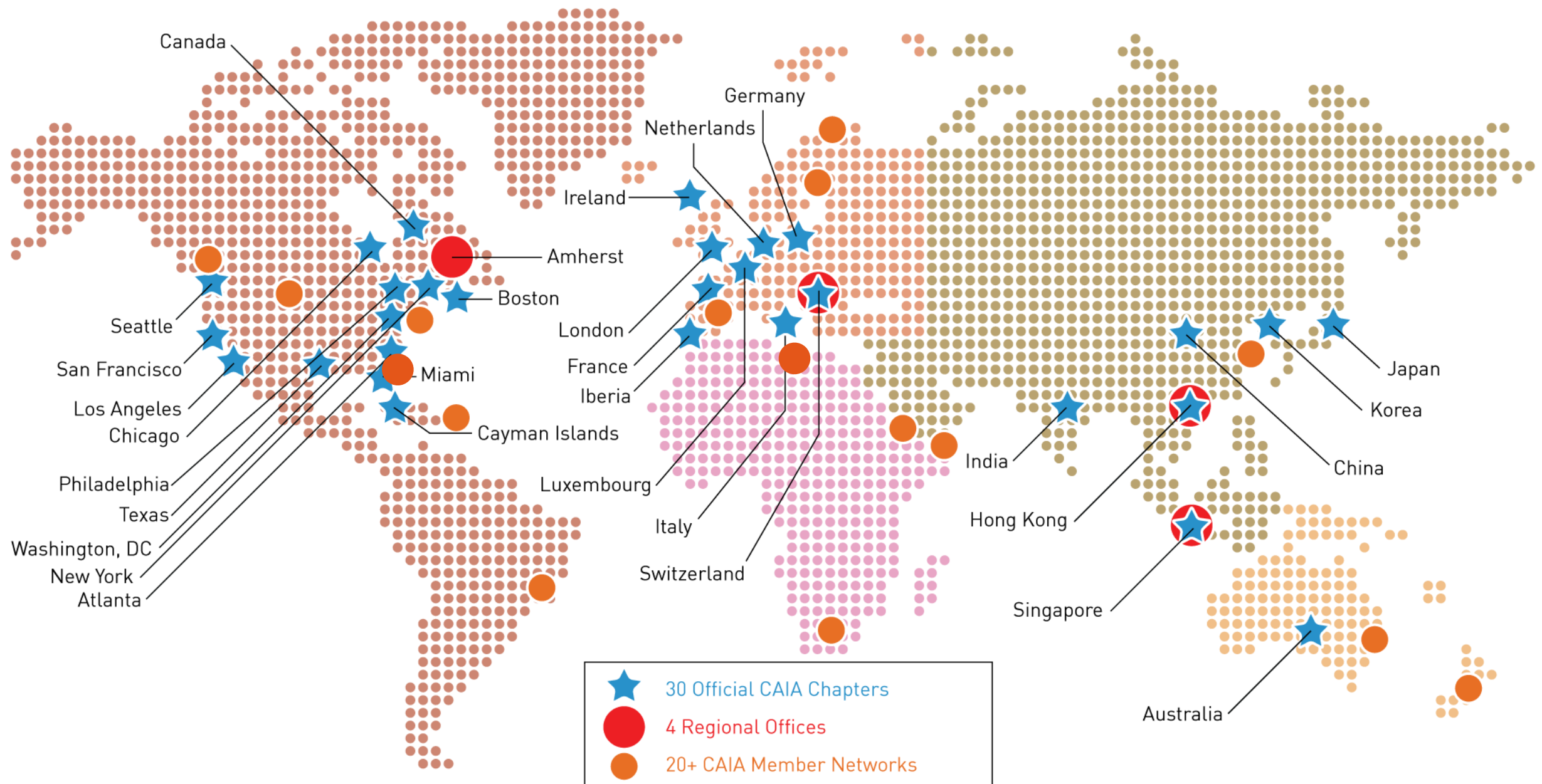
Source: CAIA and Bloomberg



# The CAIA Charter

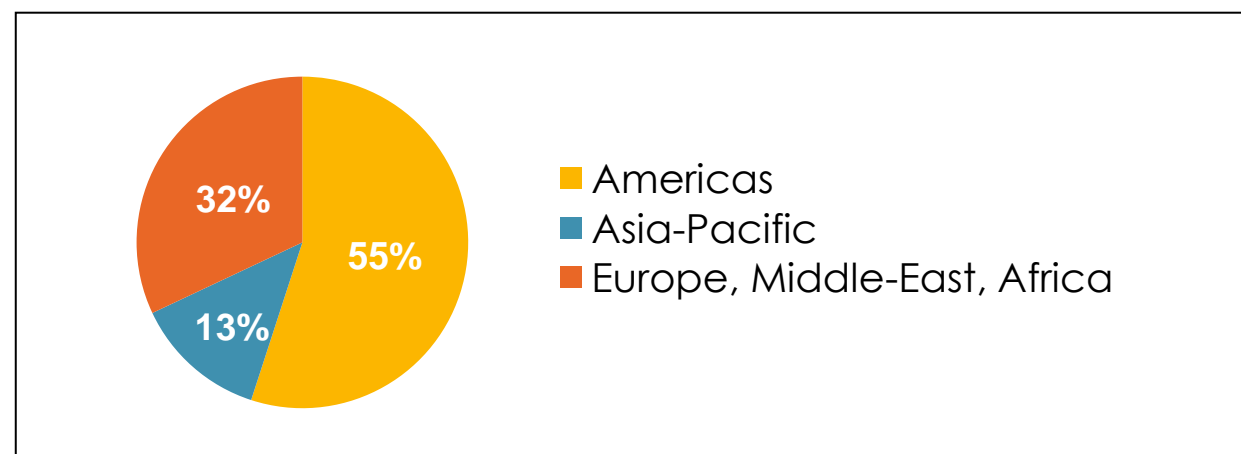
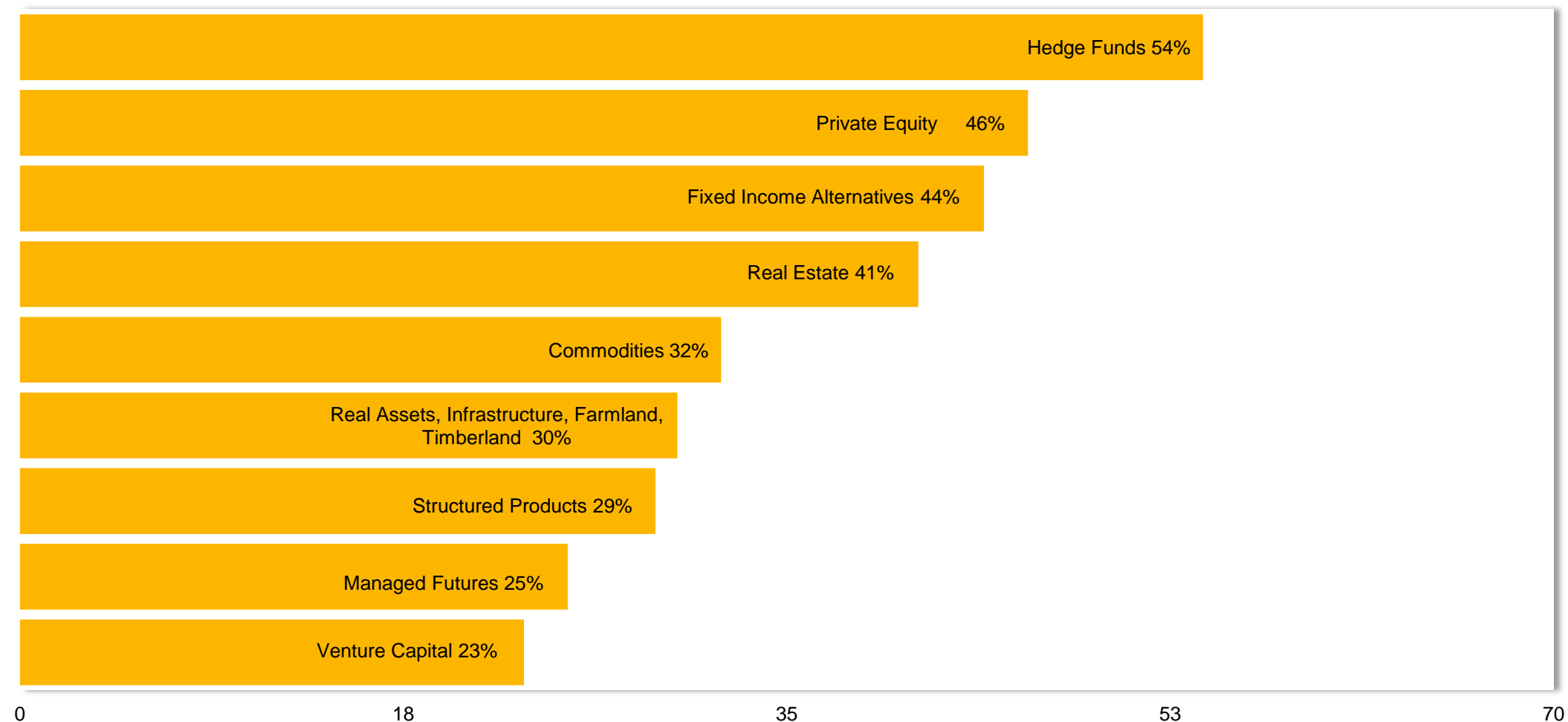
The Global Benchmark In Alternative  
Investment Education

# Global Presence

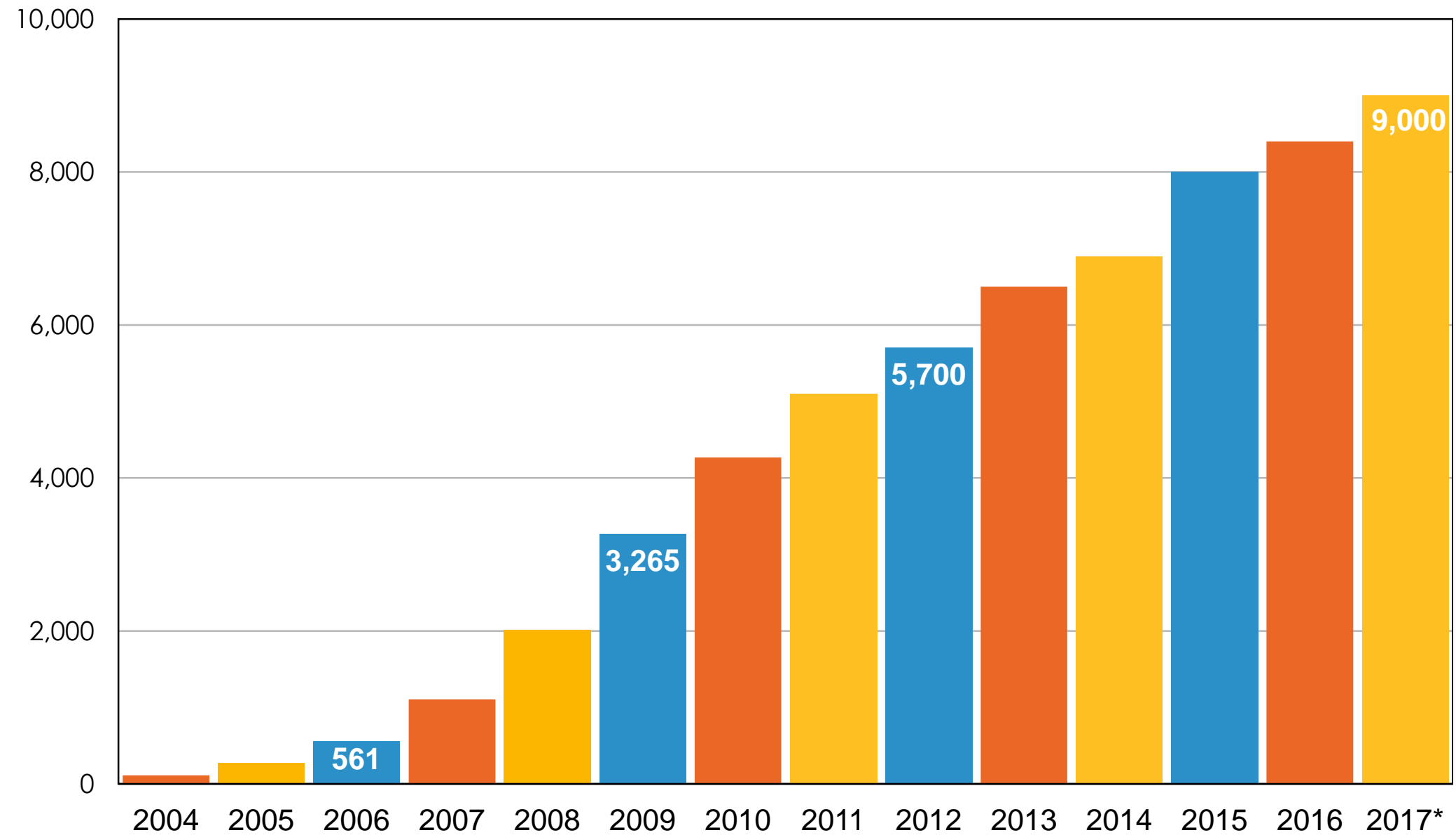


# Member Asset Class Focus and Regional Distribution

CAIA Members work across a variety of asset classes globally.



# Membership Growth



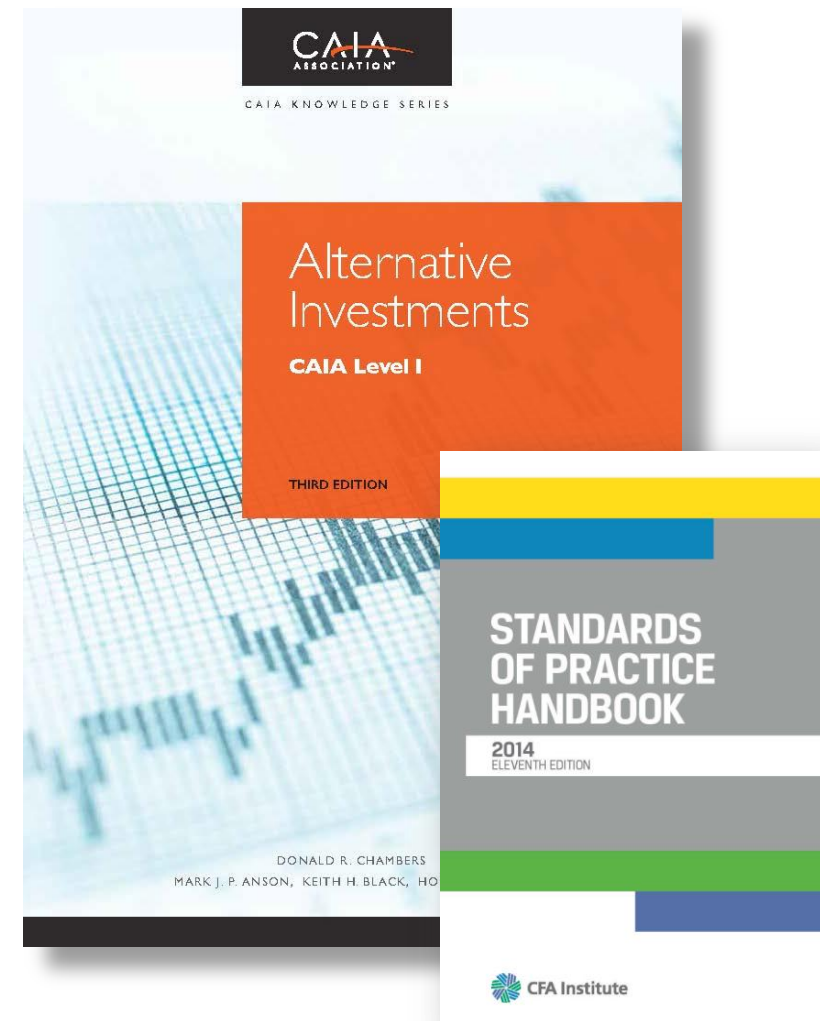
\*2017 Data through May 2017



# Level I Curriculum – Third Edition

## Core Concepts

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



# Level II Curriculum – Third Edition

## 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



# Level II Curriculum 2016 Changes

The 3<sup>rd</sup> Edition of the CAIA Level II textbook provides comprehensive data models, due diligence processes, analysis, and strategies to keep you current and relevant in the field of alternative investments.

## Updated Topic Areas

Enhanced coverage of:

- Family offices and sovereign wealth funds.
- Alternative investment groups, such as structured products and infrastructure
- Private equity
- Real assets
- Hedge funds including credit strategies and operational due diligence
- Structured products – featuring two sections focused on fixed-income derivatives and asset-backed securities, and insurance-linked products and hybrid securities

# Level I Exam Topics

Level I Topic	Approximate Exam Weight
Professional Standards and Ethics	15% – 20%
Introduction to Alternative Investments	20% – 25%
Real Assets including Commodities	10% – 20%
Hedge Funds	10% – 20%
Private Equity	5% – 10%
Structured Products	10% – 15%
Risk Management and Portfolio Management	5% – 10%

# Level II Exam Topics

Level II Topic	Approximate Exam Weight	
	Multiple Choice	Constructed Response
Professional Standards and Ethics	0%	10%
Current and Integrated Topics	0%	10%
Asset Allocation and Institutional Investors	8-12%	0-10%
Private Equity	11-15%	0-10%
Real Assets	13-17%	0-10%
Commodities	5-7%	0-10%
Hedge Funds and Managed Futures	18-22%	0-10%
Structured Products	5-7%	0-10%

# Examination Format and Scheduling

## Level I

Section 1: 100 questions / 120 minutes  
Section 2: 100 questions / 120 minutes

Both CAIA exams are administered internationally in computerized format exclusively at proctored Pearson VUE test centers.

## Level II

Section 1: 100 questions / 120 minutes  
Section 2: 3 essays / 120 minutes

Once you have purchased your Level I or Level II exam, you will receive a confirmation email with a link that will allow you to schedule your exam appointment.

# 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



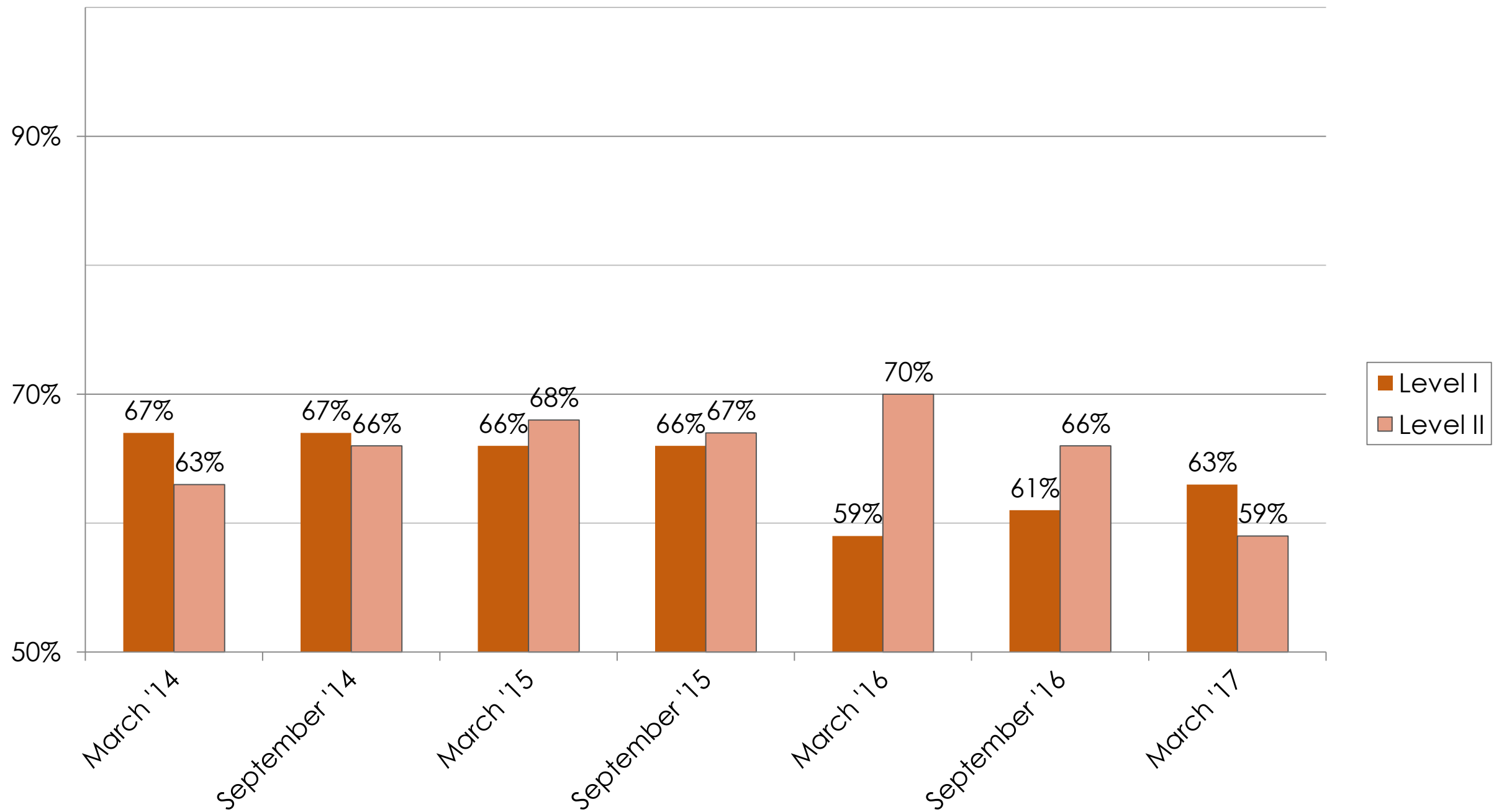
# Fees

Fees (in USD)			Annual Membership (in USD)	
	Level I	Level II		
Program Enrollment	\$400		Full	\$350
Exam Registration	\$1,250	\$1,250	Affiliate	\$175
TOTAL	\$1,650	\$1,250	Retired	\$175
			Emerging Market*	\$100
Early Registration Discount	-\$100	-\$100	2-Year Full	\$650
Retake Fee	\$450	\$450		
Curriculum cost (in USD)				
	Level I	Level II		
Textbook & readings	\$125	\$125		
Standards of Practice handbook	\$0	\$0		

\*Based on MSCI Emerging Market Indices



# Pass Rates





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

# Chartered Alternative Investment Analyst

upon

*Jonathan Sample Name IV*

Charter Number 12345

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  
seventh day of June, 2017.



*Mark Anson*  
Mark Anson  
Director

*Andrew Baker*  
Andrew Baker  
Director

*Robert DeRito*  
Robert DeRito  
Director

*David George*  
David George  
Director

*Alexander Ineichen*  
Alexander Ineichen  
Director

*Jack Inglis*  
Jack Inglis  
Director

*Melissa J. Ma*  
Melissa J. Ma  
Director

*Thomas Robinson*  
Thomas Robinson  
Director

*Thomas Schneeweis*  
Thomas Schneeweis  
Director

*Valerie J. Sill*  
Valerie J. Sill  
Director

*M. Jane Buchan*  
M. Jane Buchan  
Chair

*William Kelly*  
William Kelly  
President & CEO

# Academic Partnerships - Americas



HEC MONTRÉAL



USC Marshall  
School of Business



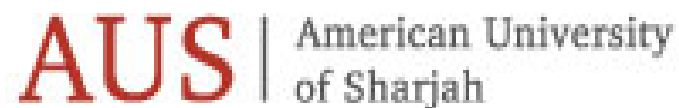
School of Business  
**D'Amore-McKim**  
Northeastern University



# Academic Partnerships - EMEA

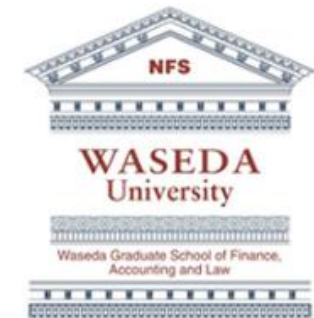


Amsterdam Business School



A complete list of CAIA's academic partners globally can be found at [caia.org](http://caia.org).

# Academic Partnerships - APAC



A complete list of CAIA's academic partners globally can be found at [caia.org](http://caia.org).



# Association Partnerships

**bvca**



**SVCA** *Singapore Venture Capital  
& Private Equity Association*



**The New York  
Hedge Fund  
Roundtable**

NZARA



# Sample Employers

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

# CAIA is Preferred

Top companies seek to hire CAIA Charterholders.  
*Sample job postings from the CAIA Career Center*



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.



Senior Quantitative Research  
Analyst. CFA, **CAIA**, CIMA



Equity Investment Research -  
Manager. CIMA, **CAIA**, and/or  
CFA charter holders or candidates  
will be looked favorably upon.

BLACKROCK

International Trading Manager  
MBA, CFA, **CAIA** or CMT preferred



Senior Credit Specialist  
CFA / **CAIA** / FRM / PRM is  
considered highly advantageous.



# Career Value of the CAIA Charter

Why maintain an active CAIA membership? Top 5 reasons from Members:

- 1 To use the CAIA designation.
- 2 To take advantage of CAIA Chapters' educational and social events.
- 3 To maintain my knowledge of alternatives and stay current in the industry through CAIA publications and research.
- 4 To position myself for future career opportunities and access the CAIA Career Center.
- 5 To access CAIA benefits through Member News and volunteer opportunities.

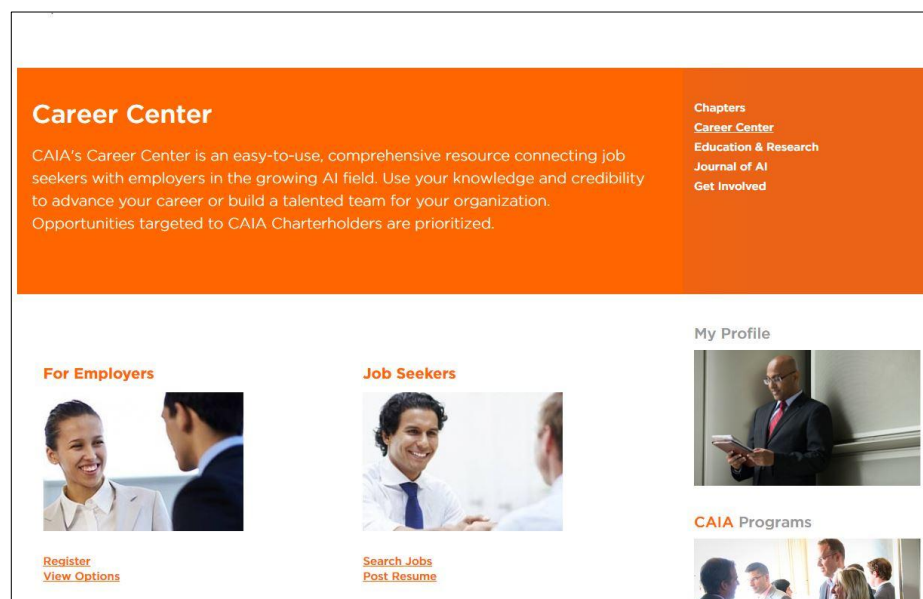
# Member Benefits

- Use of CAIA marks in professional documents
- Chapter educational and networking events
- Global network of more than 9,000 Members
- Globally-recognized designation
- Education and Research at CAIA.org
- Self-evaluation Tool
- Ongoing Education
- CAIA Career Center

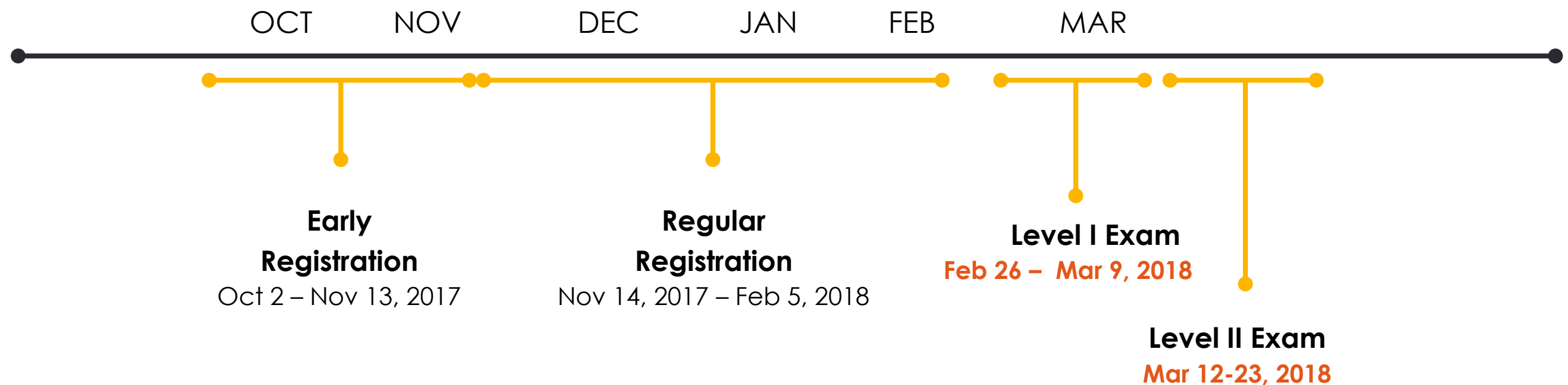


The Journal of  
**Alternative**  
Investments

 **AlAboutAlpha.com**  
Research, Analysis & Opinion on Alternative Investments.



# Exams March 2018 – Notable Dates



# Global Business Development Contacts

## AMERICAS

Millissa Allen, CAIA  
Amherst  
Managing Director of  
Business Development  
direct: +1 413 549 3324  
[mallen@caia.org](mailto:mallen@caia.org)

Cody Durant  
Amherst  
Business Development Manager  
direct: +1 413 549 3313  
[cdurant@caia.org](mailto:cdurant@caia.org)

## ASIA-PACIFIC

Joanne Murphy  
Hong Kong  
Managing Director, APAC  
direct: +852 3752 0495  
[jmurphy@caia.org](mailto:jmurphy@caia.org)

Wendy Leung  
Hong Kong  
Assistant Director, APAC  
direct: +852 3752 0495  
[wleung@caia.org](mailto:wleung@caia.org)

Peter Douglas, CAIA  
Singapore  
Principal  
direct: +65 6536 4241  
[pdouglas@caia.org](mailto:pdouglas@caia.org)

## EUROPE, MIDDLE-EAST, AFRICA

Laura Merlini, CAIA  
Geneva  
Managing Director of Business Development  
direct: +41 796 154 491  
[lmerlini@caia.org](mailto:lmerlini@caia.org)

Tammy Johnston  
London  
Global Business Development Associate  
[tjohnston@caia.org](mailto:tjohnston@caia.org)



# The CAIA Charter

The Global Benchmark In Alternative  
Investment Education