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**OCERS BOARD OF RETIREMENT**  
**2018 STRATEGIC PLANNING WORKSHOP**



*Embassy Suites by Hilton Santa Ana Orange County Airport*  
*1325 E Dyer Road,*  
*Santa Ana, CA 92705*

**AGENDA**  
**Wednesday, September 12, 2018**

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<b>BREAKFAST</b>	<b>7:15 – 8:00</b>
<b>WELCOME &amp; INTRODUCTORY COMMENTS</b> <i>Steve Delaney, CEO</i>	<b>8:00 – 8:15</b>
<b>A. STAKEHOLDER VIEWS ON OCERS PENSIONS</b> <i>Presentations by Michelle Aguirre, CFO, County of Orange; Tom Dominguez, President, Association of Orange County Deputy Sheriffs (AOCDS); and Tim Deutsch, General Manager, Orange County Cemetery District.</i>  <b>Goal:</b> Understand how plan sponsors and member organizations will address their pension needs and obligations given current economic climate.	<b>8:15 – 9:15</b>
<b>B. OCERS INVESTMENT DEPARTMENT: YEAR IN REVIEW</b> <i>Presentation by Molly A. Murphy, CFA, CIO, OCERS</i>  <b>Goal:</b> Review the accomplishments of OCERS investment department over the past year.	<b>9:15 – 9:45</b>
<b>REFRESHMENT BREAK</b>	<b>9:45 – 10:00</b>

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**C. ESG DISCUSSION** **10:00 – 11:00**

*Presentation by Molly A. Murphy, CFA, CIO, OCERS; Stephen P. McCourt, Managing Principal, Co-Chief Executive Officer, Meketa; and Harvey Leiderman, Partner, Reed Smith*

**Goal:** Panel will discuss what it means to be an ESG investor and provide perspectives for OCERS consideration.

**D. GLOBAL REAL ESTATE MARKETS DISCUSSION** **11:00 – 12:00**

*Presentation by Martin Rosenberg, Principal, Townsend and Jennifer Stevens, Principal, Townsend*

**Goal:** Townsend will discuss their view of global real estate markets and their due diligence process.

**LUNCH** **12:00 – 1:00**

**E. OCERS ACTUARIAL ISSUES** **1:00 – 2:30**

*Presentation by Paul Angelo, Senior Vice President, Actuary, Segal Consulting*

- *Sensitivity Analysis outcomes*
- *UAAL Amortization: history and mechanics (change in discount rate)*
- *UAAL contribution methodology, including impact on volatility*

**Goal:** Discussion by Paul Angelo, Segal Consulting on topics and issues of concerns to the Orange County Board of Retirement.

**REFRESHMENT BREAK** **2:30 – 2:45**

**F. THE OCERS HQ BUILDING INTO THE FUTURE** **2:45 – 3:30**

*Presentation by Brenda Shott, Assistant CEO, OCERS; Jaimelynn Shah and Wendy Ellis, Gensler*

**Goal:** Gensler will lead a discussion on the current status of the Wellington building space planning project.

**ADJOURNMENT**

The Investment Committee will convene in Open Session at 3:30 p.m. or upon adjournment of the Board of Retirement Strategic Planning Workshop, whichever is later.

Please see the Agenda for the September 12, 2018 meeting of the Investment Committee for more information.

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**OCERS BOARD OF RETIREMENT**  
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*1325 E Dyer Road,*  
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**AGENDA**  
**Thursday, September 13, 2018**

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<b>BREAKFAST</b>	<b>7:15 - 8:00</b>
<b>WELCOME &amp; INTRODUCTORY COMMENTS</b> <i>Steve Delaney, CEO and Molly A. Murphy, CFA, CIO, OCERS</i>	<b>8:00 – 8:15</b>
<b>A. PRIVATE EQUITY DISCUSSION</b> <i>Discussion led by David Fann, President, CEO, TorreyCove</i>	<b>8:15 - 9:15</b>
<b>Goal:</b> TorreyCove will discuss its due diligence process and views of global private equity.	
<b>B. PORTFOLIO CONSTRUCTION: WHERE’S THE ALPHA?</b> <i>Discussion led by Molly A. Murphy, CFA, CIO, OCERS and Shanta Chary, Director of Investment Operations, OCERS</i>	<b>9:15 - 9:45</b>
<b>Goal:</b> OCERS investment staff will describe the alpha and beta potential for the next ten years.	
<b>C. ASSET ALLOCATION DISCUSSION</b> <i>Discussion led by Laura B. Wirick, CFA, CAIA, Principal, Meketa and Holly Heiserman, CFA, Vice President, Meketa</i>	<b>9:45 - 10:15</b>

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**Goal:** Meketa will lead a discussion of the current and suggested OCERS asset allocation model.

**REFRESHMENT BREAK**

**10:15 - 10:30**

**D. WHAT'S NEXT FOR RMS**

**10:30 - 11:00**

*Discussion led by Alan Emkin, Managing Director, Pension Consulting Alliance, Colin Bebee, Senior Vice President, CFA, Pension Consulting Alliance, and David Beeson, Investment Officer, OCERS*

**Goal:** PCA and OCERS investment staff will preview the next phase of implementation for Risk Mitigating Strategies.

**E. CTA/ALT RISK PREMIA EDUCATION**

**11:00 - 12:00**

*Discussion led by Scott Metchick, Managing Director, AQR*

**Goal:** AQR will provide education in the areas of CTA/Trend-following and Alt Risk Premia strategies.

**LUNCH**

**12:00 - 1:00**

**F. TAFT HARTLEY PLANS – A COMPARATIVE REVIEW**

**1:00 - 2:00**

*Presentation by Sally Choi, Consultant, Agile Progress*

**Goal:** Discussion comparing public pensions to the Taft Hartley pension world for lessons that may be applicable at OCERS.

**G. SAN BERNARDINO CERA EMPLOYEES – A CASE STUDY**

**2:00 - 3:00**

*Presentation by Christie Porter, Chief Operating Officer, San Bernardino Employees Retirement Association (SBCERA)*

**Goal:** Discussion of lessons learned at SBCERA from their recent move of County employees to direct employment with the association.

**REFRESHMENT BREAK**

**3:00 - 3:15**

**H. PRELIMINARY 2019 – 2021 OCERS STRATEGIC PLAN**

**3:15 - 3:30**

*Presentation by Steve Delaney, CEO, OCERS*

**Goal:** Review tentative strategic plan and benchmarks and provide direction for developing final strategic plan for 2019-2021.

**I. PRELIMINARY 2019 OCERS BUSINESS PLAN**

**3:30 - 4:30**

*Presentation by Steve Delaney, CEO, and OCERS Management Team*

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**Goal:** Review tentative business goals and provide direction for developing the final business plan and budget for 2019.

It is OCERS' intention to comply with the Americans with Disabilities Act ("ADA") in all respects. If, as an attendee or participant at this meeting, you will need any special assistance beyond that normally provided, OCERS will attempt to accommodate your needs in a reasonable manner. Please contact OCERS via email at [adminsupport@ocers.org](mailto:adminsupport@ocers.org) or call 714-558-6200 as soon as possible prior to the meeting to tell us about your needs and to determine if accommodation is feasible. We would appreciate at least 48 hours' notice, if possible. Please also advise us if you plan to attend meetings on a regular basis.

A

## Memorandum

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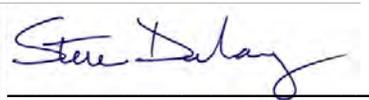
DATE: September 7, 2018  
TO: Members of the Board of Retirement  
FROM: Steve Delaney, Chief Executive Officer  
SUBJECT: **STAKEHOLDERS VIEW ON OCERS PENSIONS**

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As has been the case each year for ten years, we begin The Strategic Planning Workshop with presentations by various representatives of OCERS' Stakeholder Community.

If a speaker has slides or materials, we allow them to bring those to the workshop on the day of their presentation.

**Submitted by:**



Steve Delaney  
Chief Executive Officer



# OCERS 2018 STRATEGIC PLANNING WORKSHOP

Michelle Aguirre  
County of Orange  
Chief Financial Officer

# Board Priorities



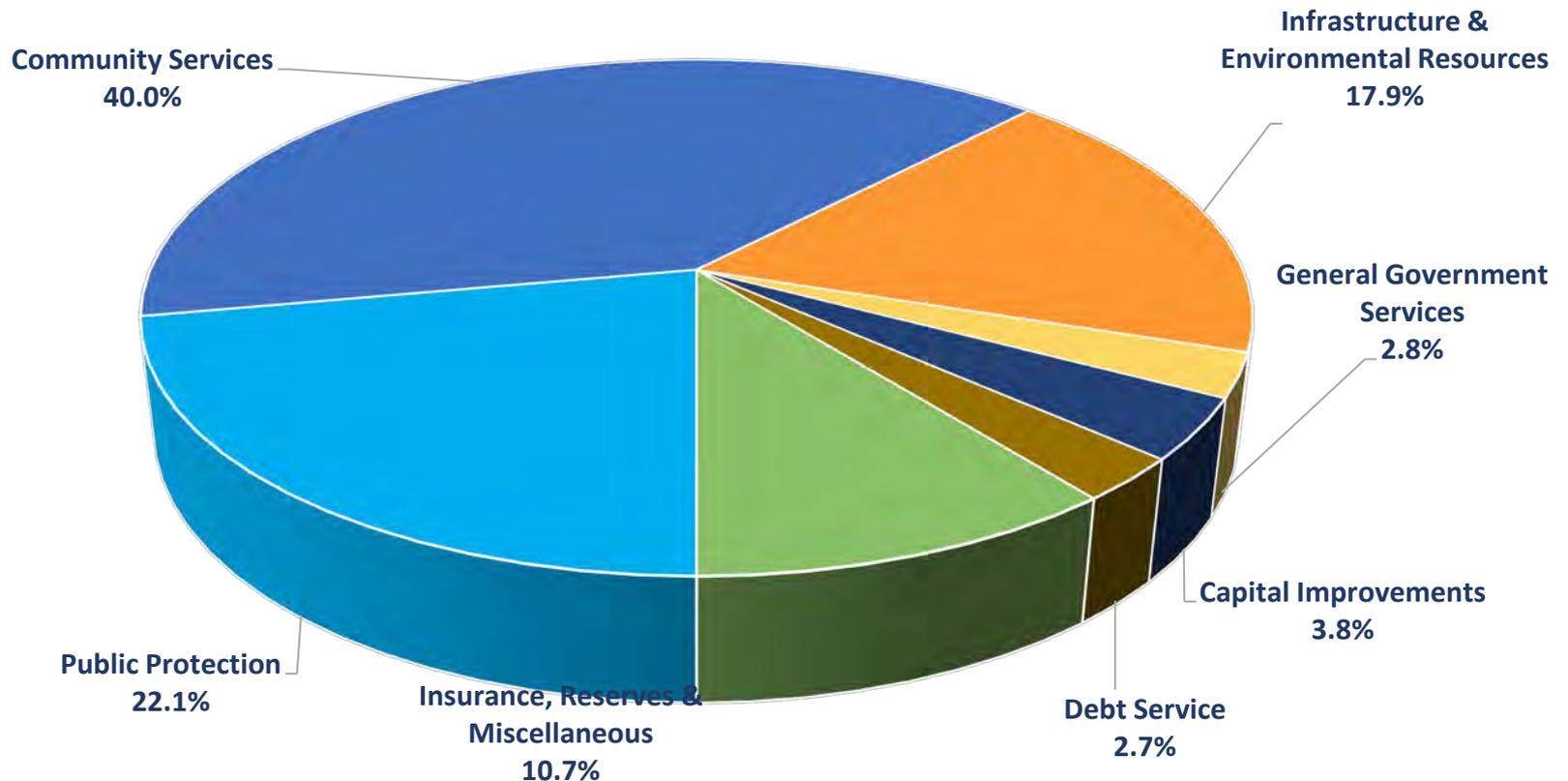
- **Stabilize the Budget**
- **Prepare for Contingencies**
- **Address & Fund Agency Infrastructure**

**Final VLFAA Payment FY 2018-19**

# Total County Appropriations by Program



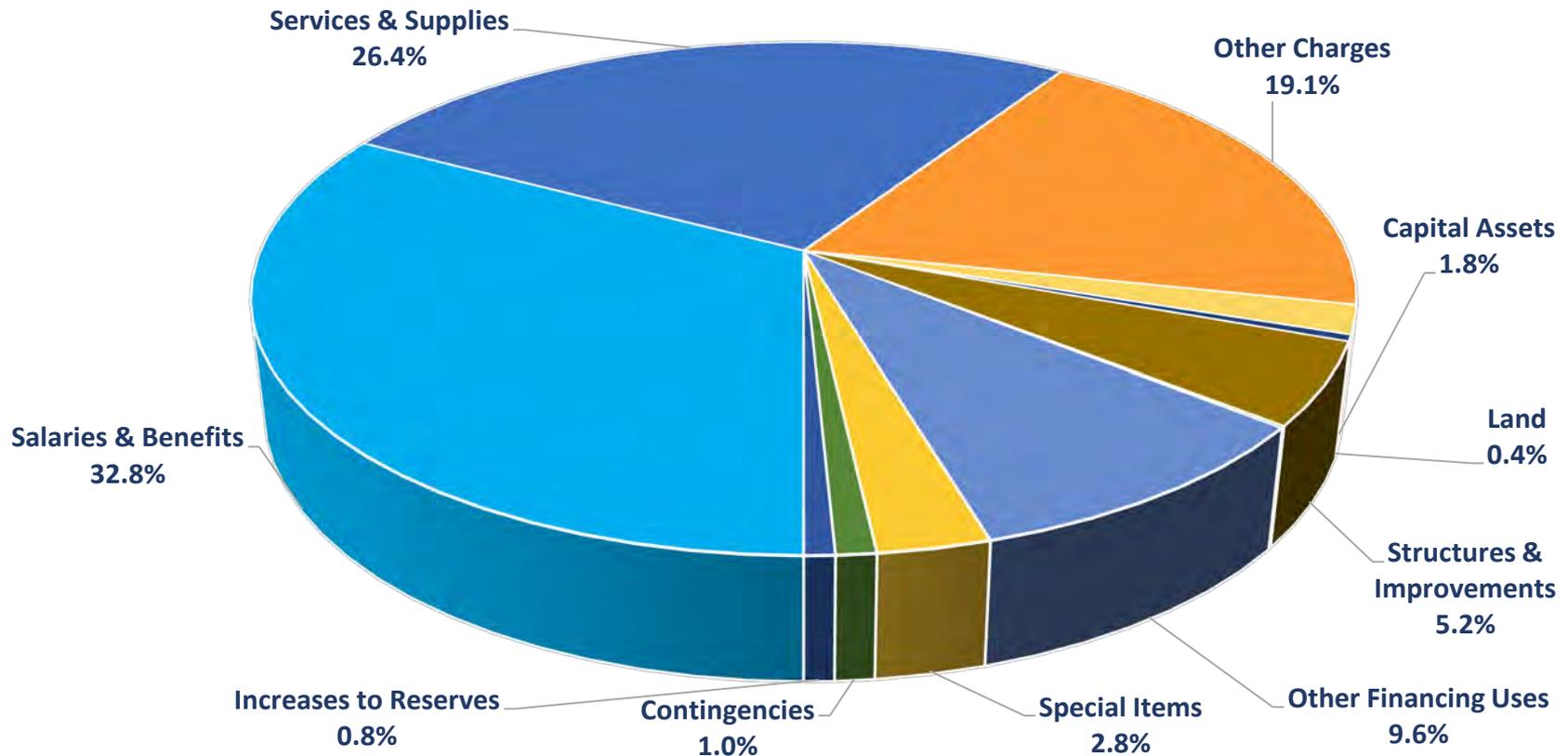
**FY 2018-19 Recommended Budget Total = \$6.5 Billion**



# Total County Appropriations by Expenditure Category



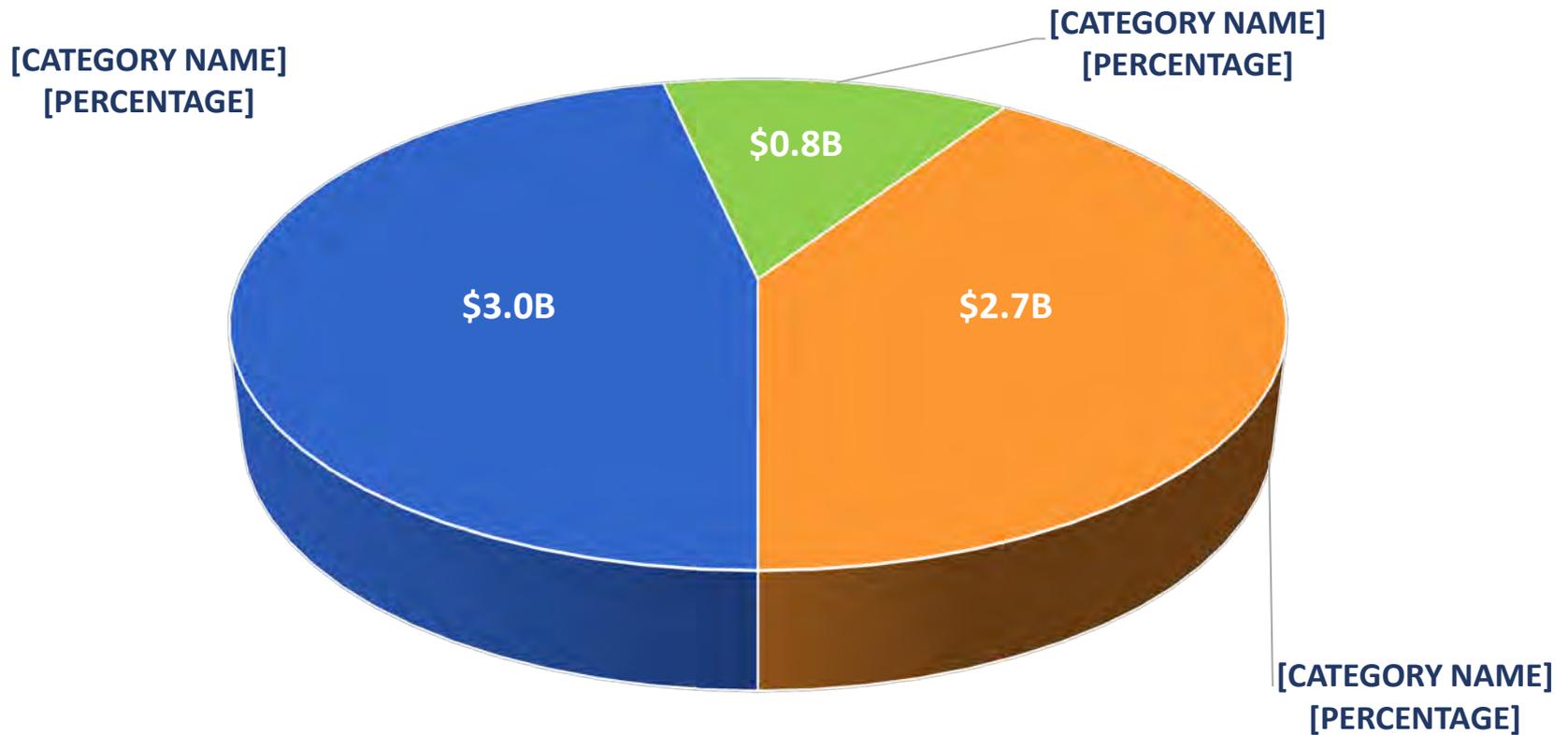
**FY 2018-19 Recommended Budget Total = \$6.5 Billion**



# Total County Revenue Budget



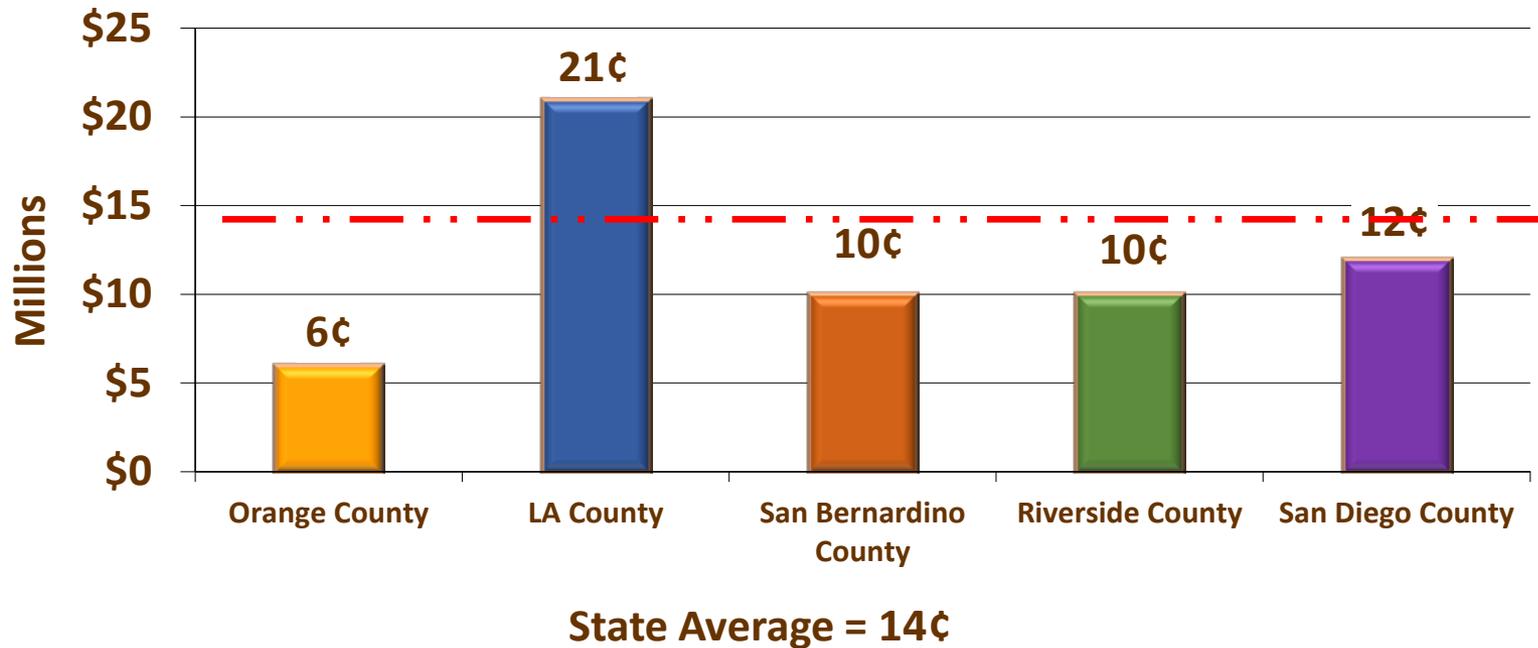
**FY 2018-19 Recommended Budget Total = \$6.5 Billion**



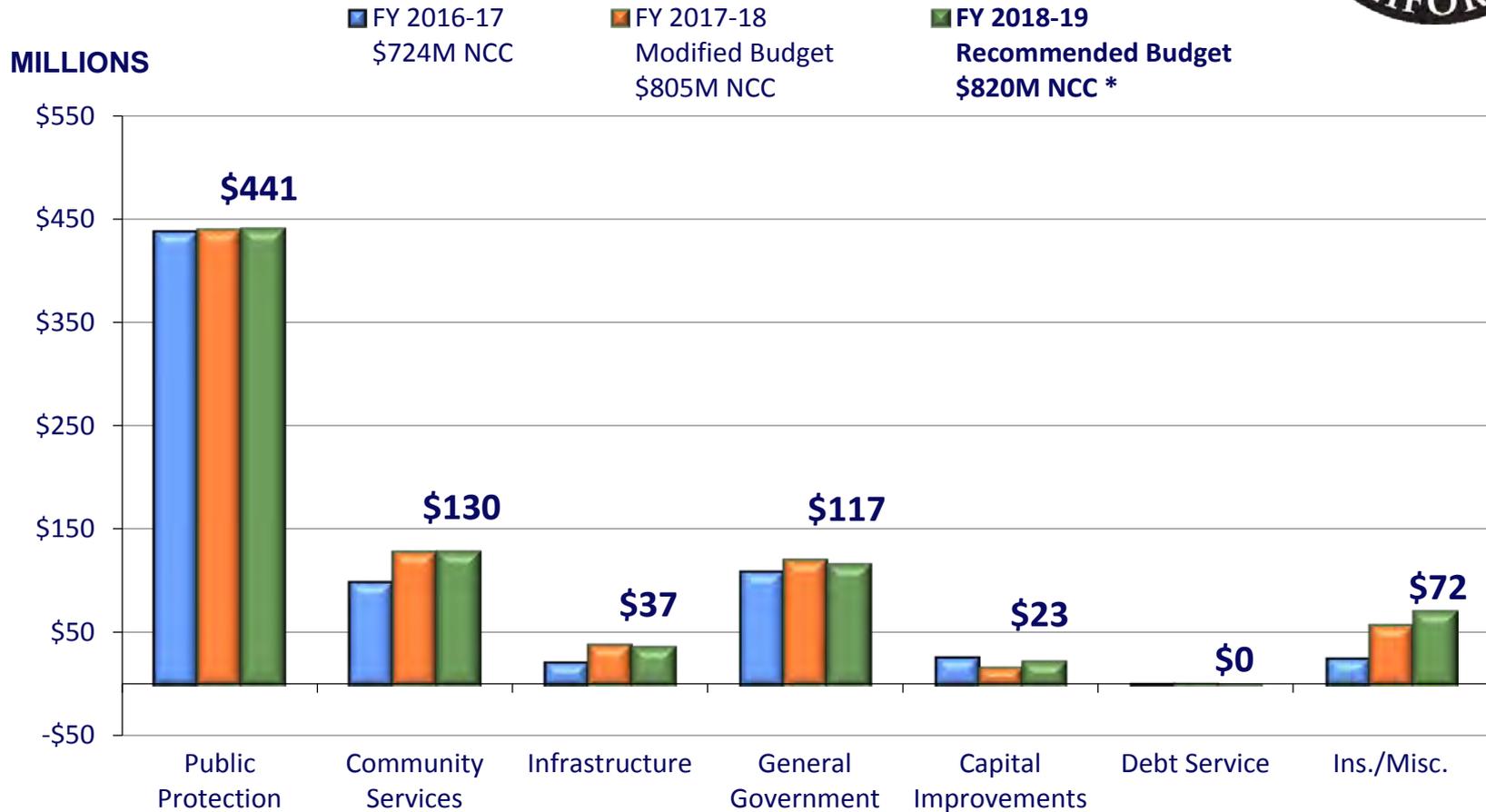
# Percent of Property Tax Allocated to County Government



## Orange County Receives the Lowest Property Tax Revenue of all 58 Counties

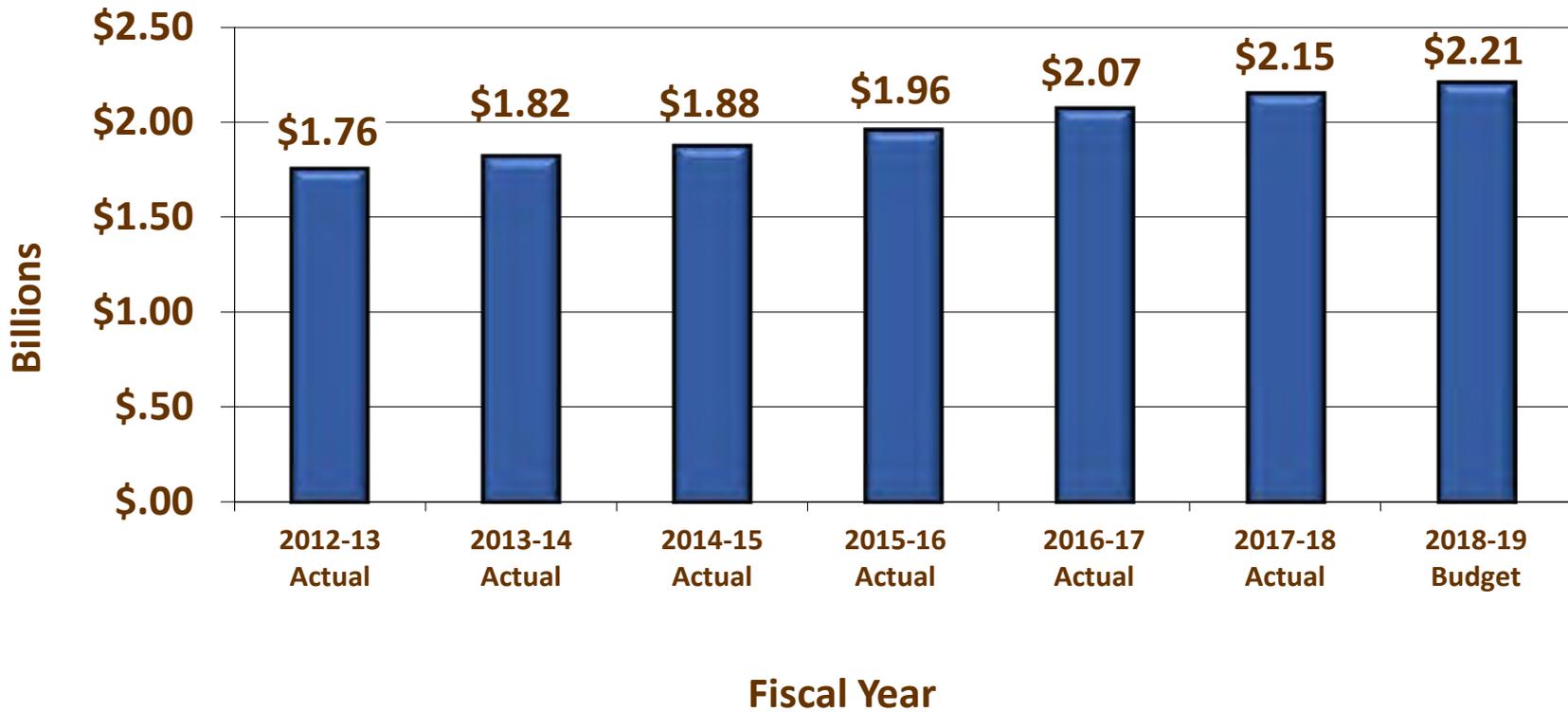


# Net County Cost Allocation by Program

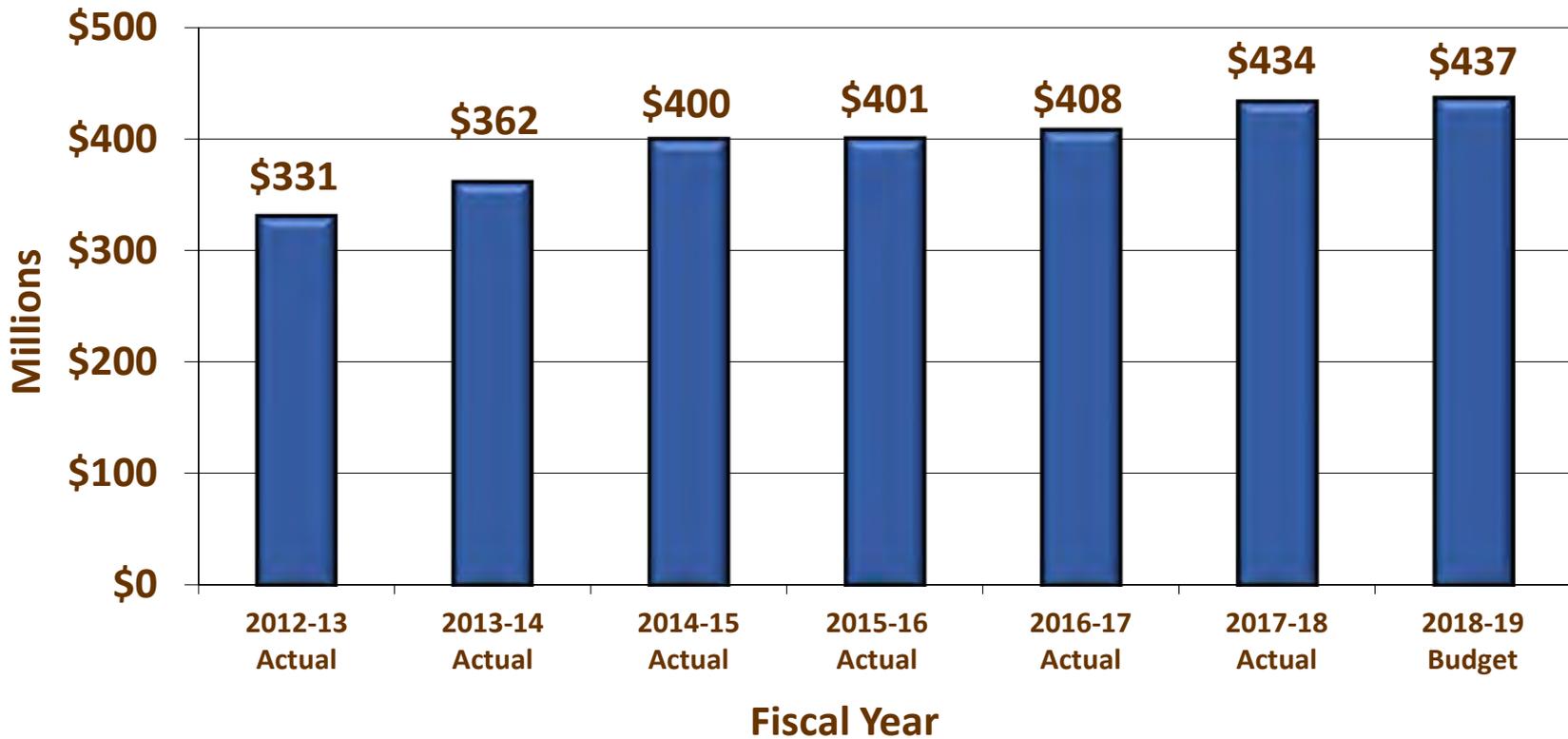


\* Includes Recommended Augmentations

# Growing Costs for Salaries & Benefits



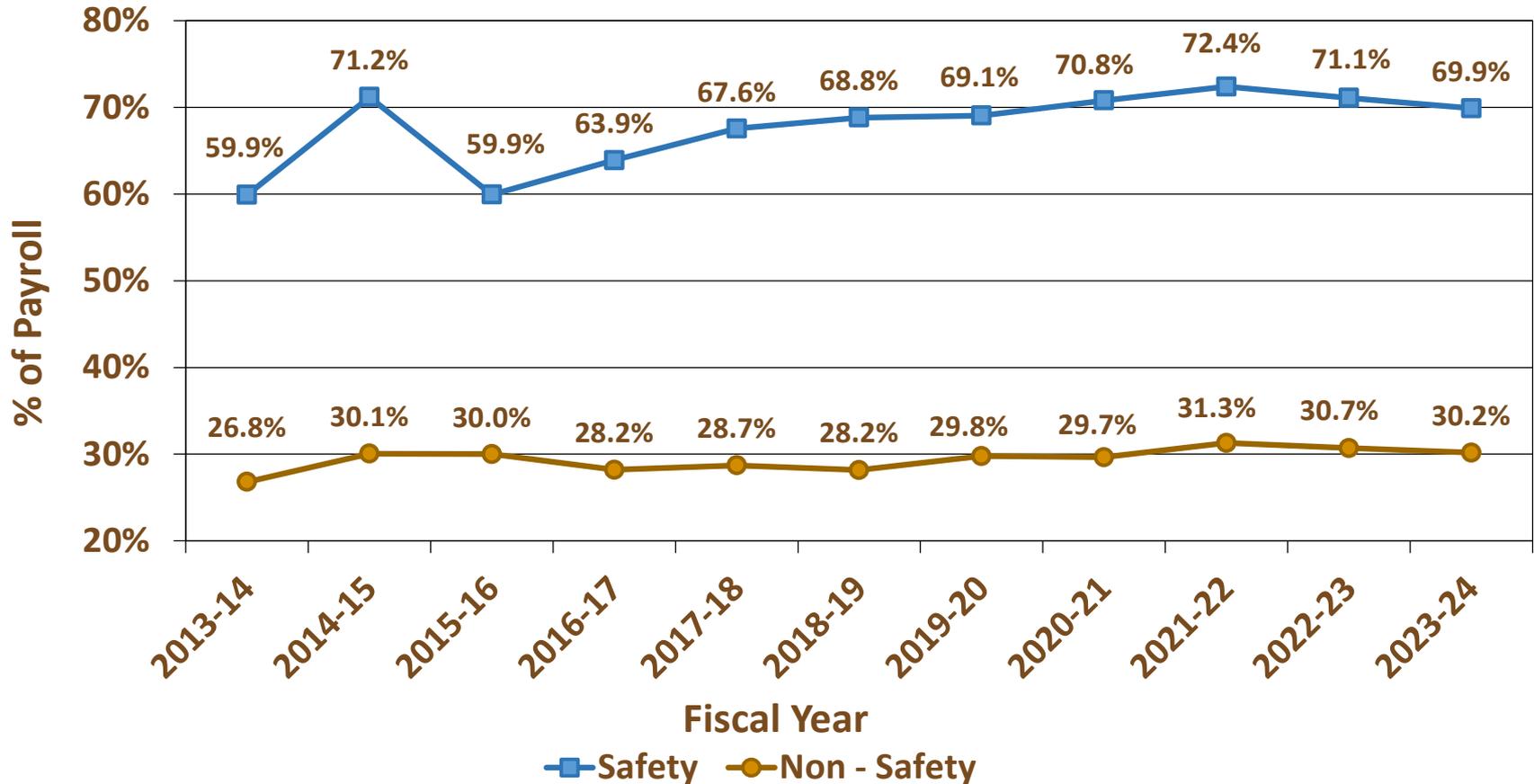
# Growing Pension Costs



# Higher Retirement Rates

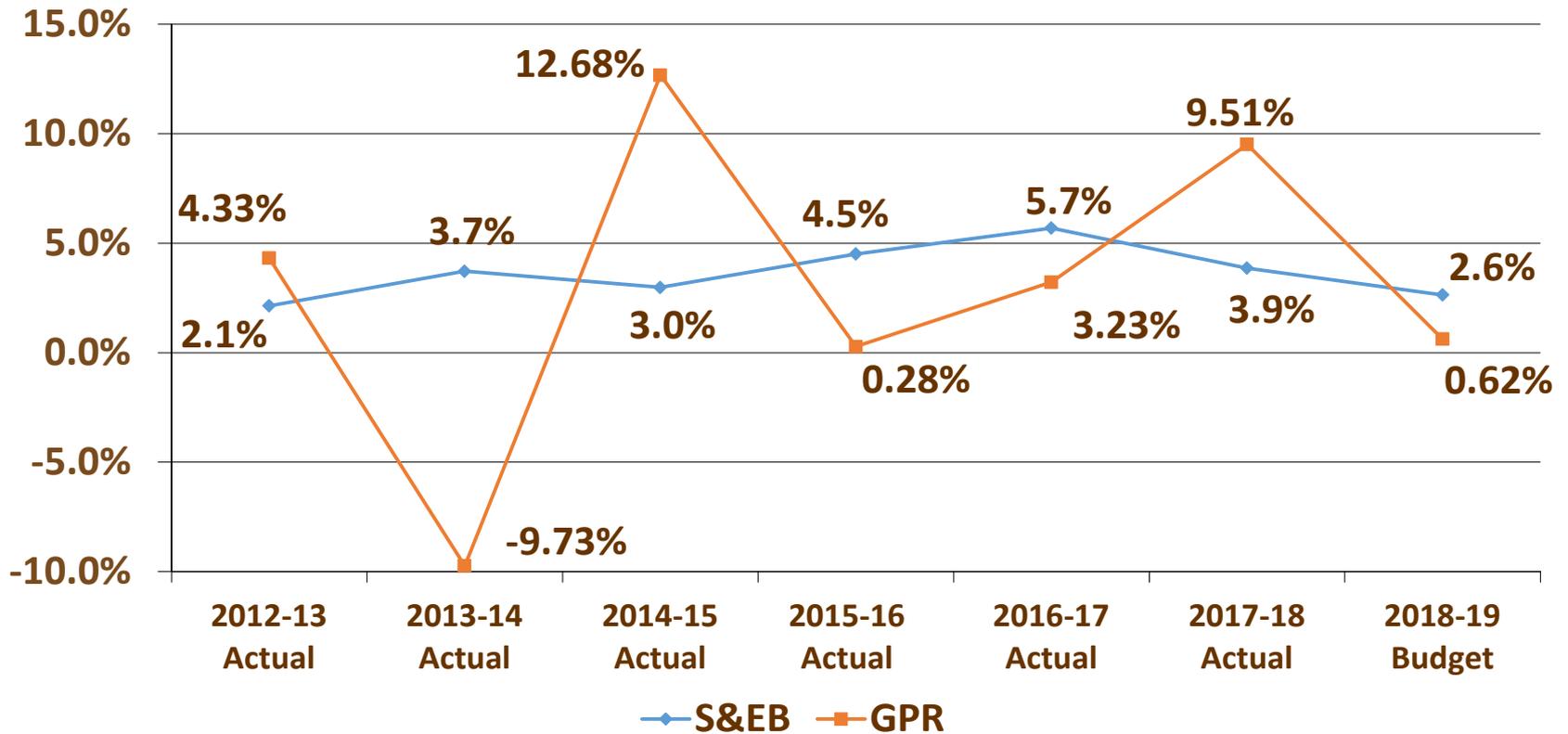


County Contribution Rates (Tier II)



The 2017 Actuarial Valuation resulted in an estimated increase of -0.93 to 4.52% in FY 2019-20

# Growing Costs for S&EB vs Growth in GPR



# FY 2018-19 Augmentations



Program	Restore Augmentations		Expand Augmentations	
	Requested NCC	Recommended NCC	Requested NCC	Recommended NCC
I. Public Protection	\$ 57,417,020	\$ 32,097,581	\$ 4,588,375	\$ 3,721,443
II. Community Services	-	-	200,000	200,000
III. Infrastructure & Environmental Services	397,252	397,252	566,116	566,116
IV. General Government	1,171,116	585,558	175,000	175,000
V. Capital Improvements	-	-	4,492,650	4,492,650
<b>TOTAL</b>	<b>\$ 58,985,388</b>	<b>\$ 33,080,391</b>	<b>\$ 10,022,141</b>	<b>\$ 9,155,209</b>

**FY 2019-20 RESTORE AUGMENTATIONS FORECASTED AT \$97M  
IN 2017 STRATEGIC FINANCIAL PLAN**

# General Fund Reserves



Amounts In Millions

	Projected Balance at 6/30/2018	Projected Balance at 6/30/2019	Projected Balance at 6/30/2020
<b>Total General Fund (GF) Reserves</b>	<b>\$ 648.6</b>	<b>\$ 639.8</b>	<b>\$607.0</b>
Target Reserve (Budget Stabilization)	425.1	480.1	480.1
Contingencies (Catastrophic Events)	65.0	65.0	65.0
Reserve for Operations (VLFAA)	60.0	5.0	5.0
Reserve for Capital Projects (e.g. Facilities, ROV, CAPS+)	56.9	48.1	15.3
Reserve for Maintenance & Construction (Probation)	11.6	11.6	11.6
Teeter Loss Reserve (Economic Downturn)	30.0	30.0	30.0
Guideline for Target Reserve (Two Months)	\$ 488.8	\$ 508.5	\$ 523.8
<b>Under Target</b>	<b>(\$ 63.7)</b>	<b>(\$ 28.4)</b>	<b>(\$ 43.7)</b>

# Conclusion



- **Limited Resources for Competing Needs**
  - Board Priorities
    - Stabilize budget
    - Prepare for contingencies
    - Infrastructure
  - Homelessness
  - State Impacts – IHSS, Court Security
  - Increasing cost of doing business
- Pension Pre-Payment Option
- Stability and Phase-In

# ORANGE COUNTY CEMETERY DISTRICT

Tim Deutsch, *General Manager*  
Brenda Manriquez, *Accountant*



# What is the Orange County Cemetery District?

- An independent special district
- Governed by an appointed Board
- Operate three public cemeteries
- Provide affordable interment options
- Consolidated 3 districts to 1 in 1985

# Why do Cemetery District's exist?

- Established to maintain & operate un-kept cemetery grounds (1909 Enabling Act)
- Provides affordable and essential interment (burial) options and services
- Maintain the grounds in perpetuity
- Promote community awareness & education

# Public vs. private cemetery?

- Public cemeteries:
  - More affordable costs, due to property tax revenue
  - Can only sell spaces and provide interment services
  - No mortuary services
  - No sales of markers or benches
  - Maintain historical landmarks
- Private cemeteries:
  - Higher costs – for profit
  - May offer cemetery & mortuary service combined
  - Can sell all products and services

## Where are the District's cemeteries?

- Anaheim Cemetery
  - 1400 E. Sycamore Street, Anaheim 92805
- Santa Ana Cemetery
  - 1919 E. Santa Clara Ave., Santa Ana 92705
- El Toro Memorial Park (District Office)
  - 25751 Trabuco Road, Lake Forest 92630



- Founded in 1866
- First Interment in 1867
- 15-acres
- Over 12,000 Interments
- Commemorated 150 years of service in July 2017
- Historical Landmark - Home to the oldest Mausoleum on West Coast (Built in 1914) Early pioneers names as Langenberger, Kraemer, Dwyer & Yorba
- Only cremation-based options available
- Annual hosts events for Memorial Day, Dia de Los Muertos and miscellaneous historical walks
- Over 500 Veterans are buried at Anaheim Cemetery

## Anaheim Cemetery

# Anaheim Cemetery



- Founded in 1870
- 29-acres
- Over 17,500 interments
- 200-250 services annually
- Only 2 years of full casket inventory remaining
- Burials include pioneers
  - McFadden, Spurgeon, Taft & Tustin Families
- Hosts annual Memorial Day Program and Historical Tour
- Over 700 Veterans are buried at Santa Ana Cemetery



## Santa Ana Cemetery

# Santa Ana Cemetery



- Founded in 1896
- 25-acres
- 400-500 services annually
- Over 22,000 Interments
- Many interment options
  - 6,000 full casket spaces remaining
- Burials include early settlers
  - Whiting, Serrano and Stevens families
- **Host Veterans Programs (Memorial Day and Veteran's Day), Angel of Hope Memorial Service & Historical Tours**
- Over 600 Veterans are buried at El Toro Memorial Park



## El Toro Memorial Park

# El Toro Memorial Park





# District Community Events

# District Finances

- Projected Revenue - \$5,564,992

◦ Property Tax	\$2,227,866	40.0%
◦ Interment Space Sales	\$2,066,898	37.1%
◦ Interment & Other Serv.	\$ 765,000	13.8%
◦ Taxable Sales	\$ 255,000	4.6%
◦ Interest	\$ 166,650	3.0%
◦ Misc. Revenue	\$ 83,578	1.5%

SOURCE: 2018-19 District Annual Budget

# District Finances

- Projected Operating Expense - \$3,928,324
  - Salaries \$1,803,213 45.9%
  - Health/Misc. Insurance \$ 404,125 10.3%
  - Retirement \$ 231,930 5.9%
  - Services & Supplies \$1,124,850 28.6%
  - Economic Uncertainty \$ 178,206 4.5%
  - Equipment \$ 186,000 4.7%
- Capital Improvement Projects \$1,440,000

SOURCE: 2018-19 District Annual Budget

# Plan Sponsor Info

- Retirement Plans (active)
  - Plan N (2%@55) –Legacy – 18 employees
  - Plan U (2.5%@67) – PEPRA – 7 employees
- Retirees (9)
  - 5 service retirements
  - 3 beneficiaries
  - 1 QDROS

# Retirement System Highlights

- No Unfunded Actuarial Accrued Liability – Paid \$1,663,292 on July 1, 2014
- 4 Years of Only Paying Normal Cost
- Assisted Employees Transition to 100% Employee Contribution with One-Time Annual Stipends (2014-2017)
- Board of Trustees Desires to Pay Off future UAAL in 2019 created by recent assumption changes

# Information or questions?

- Orange County Cemetery District

25751 Trabuco Road, Lake Forest, CA 92630

(949) 951-9102

[t.deutsch@orccd.com](mailto:t.deutsch@orccd.com)

[b.manriquez@orccd.com](mailto:b.manriquez@orccd.com)

[occemeterydistrict.com](http://occemeterydistrict.com)

B

# OCERS Year in Review



September 12, 2018

# OCERS Investment Team

Instituted a collaborative culture that emphasizes communication, knowledge sharing and cooperation.

Staff Meetings	Marketable Alternatives Meetings	Strategy/ Rebalancing Meeting	Birthday Lunches	Strategic Planning Session
Bi-weekly	Monthly	Monthly	Varies	Annual
				

# Professional Development and Team Growth

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## Development

Staff to attend at least one general content investment conference per year

Staff incentives to seek CFA certification

Two-day private equity due diligence training at Torrey Cove offices



## Growth

Julius Cuaresma– promoted to Investment Analyst

Brittany Cleberg – promoted to Investment Staff Specialist



## New Hires

Tarek Turaigi – new Investment Officer

Managing Director – Pending



# External Collaboration

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## Conducted RFP for Illiquid Investment Advisors

- Selected Torrey Cove for private equity and private real assets
- Selected Townsend for real estate

## Joint Planning Sessions

- Meketa and PCA: Risk Mitigating Strategies
- Meketa and Torrey Cove: Real Assets

## Expanded Pool of External Legal Counsel Options

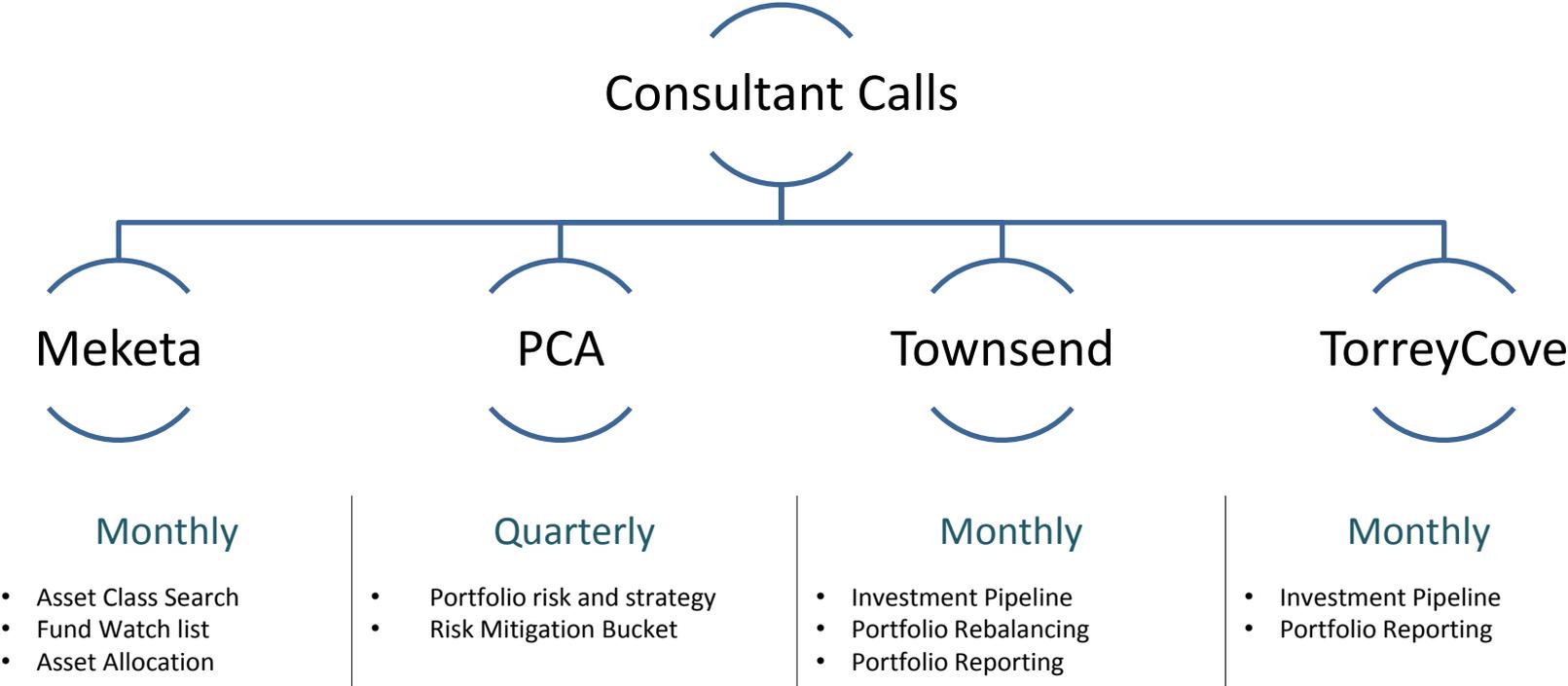
- In coordination with OCERS Legal team
- Hired Foster Pepper and Nossaman as new counsel
- Retained Foley & Lardner

## Engaged with Global Pension and Investment Community

- Monthly CERL System CIO calls
- Quarterly LA area CIO meetings
- Quarterly Global Capital Markets Advisory Council calls

# Working with OCERS' Consultants

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# Community Outreach

CIO and Staff actively participated in community outreach initiatives to enhance existing efforts that anchor OCERS in the communities where they serve.

## OCERS CIO



One-on-one meetings with all Investment Committee members



Charter Cities presentation



Meeting with County Supervisors' Chief of Staff/EA group



Presented at SACRS (Fall 2017, Spring 2018)



Presented at NASRA (2018)

## OCERS Staff



Plan Sponsors monthly financial update meeting



All staff attended SACRS Spring 2018

# Promoting OCERS

## Speaking Engagements



## Networking



## Awards

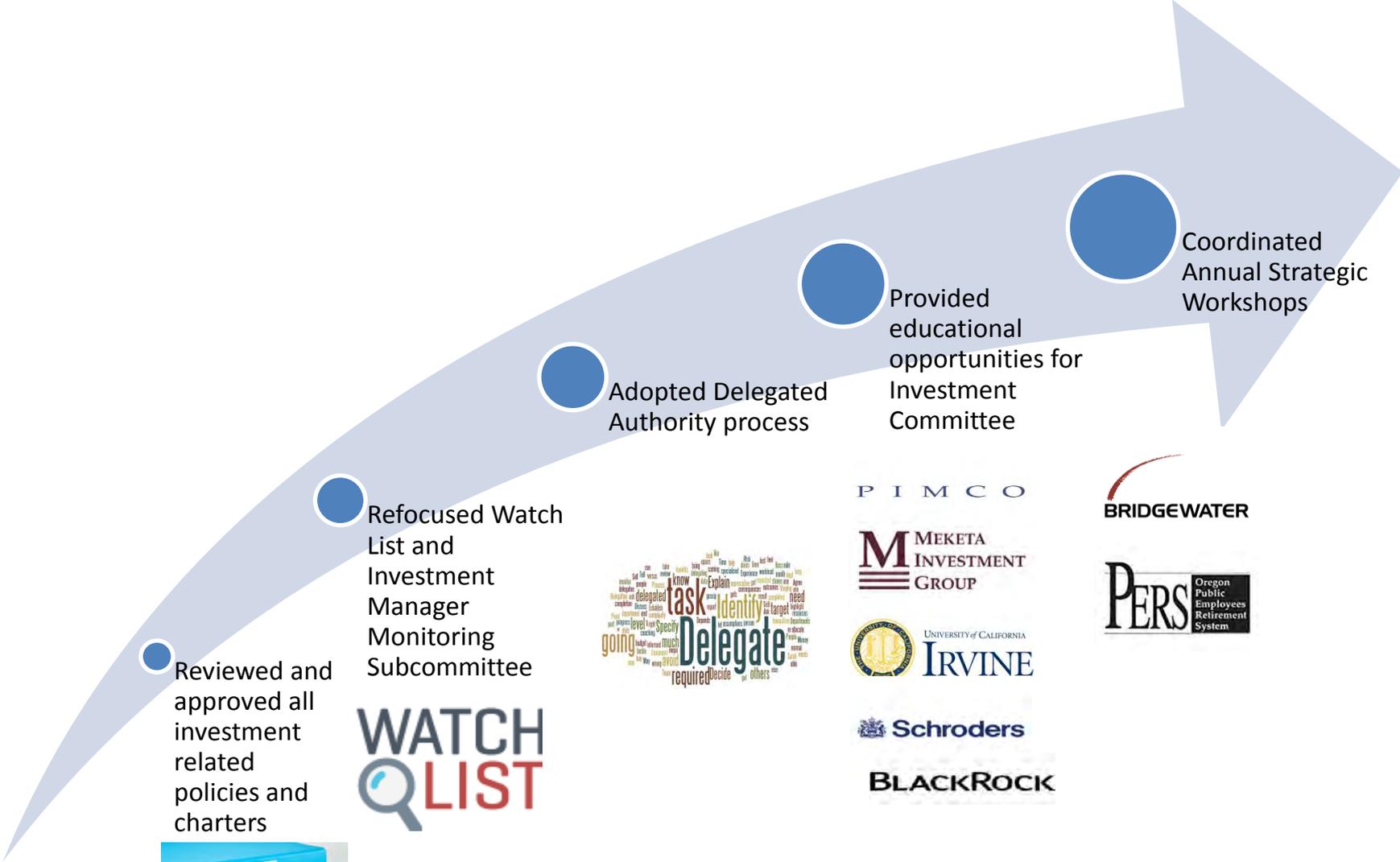


## Article Mentions



Proactively engaged with various industry stakeholders to promote OCERS.

# Governance Initiatives



**WATCH LIST**



PIMCO



# Investment Activities and Due Diligence

## Redesigned Portfolio

- Part of the 2017 asset allocation study
- Re-categorized, repositioned, terminated managers
- Rebalanced cash overlay to reflect new asset allocation

## Policy Benchmarks

- Evaluated the Plan's multiple benchmarks
- Consulted peers and investment advisors
- Sought benchmarks that are appropriate, investable and measurable
- Approved Benchmarks for the total fund, asset classes and sub-asset classes.

## Sub-Asset Class Structure Reviews

- Core Fixed Income: increase active to core
- Real Estate: approved a new structure and rebalancing open end funds
- Private Equity: new structure covering geographies, sub classes and deployment pace.
- Credit: re-up with a small number of high conviction managers and capture fee breaks

# Enhanced Operational Activities

Staff enhanced the annual fee report by incorporating additional elements that emphasize relative analysis, asset allocation and trends.



## Peer Comparisons

- Evaluate different approaches.
- Understand common themes.
- Identify best practices.



## Fee trends and asset allocation impact analysis

- Implemented a portfolio wide exercise to understand fees paid.
- Identified fee trends and fee impact by asset class.



## Policy/Reporting Disclosures

- Updated policy/reporting as part of adoption of Government section 7514.7.

# Portfolio Management and Due Diligence

The investment team participated in many meetings and calls to actively monitor existing fund investments and source new opportunities.

**384**

*Meetings in total*

**127**

*Conference Calls*

**51**

*Offsite Meetings*



Watch List



New Investments



50/358

# Expanded Operations Infrastructure

Leveraged existing and prospective relationships to expand OCERS operational infrastructure and resources in an optimal way.

## Risk

**BLACKROCK**

Blackrock – implementing desktop version of Aladdin for enhanced risk analysis



State Street Bank – negotiating Service Level Agreement and evaluating ART risk management tool



Repository for all investment manager due diligence, meeting notes, legal documents, etc.

**BRIDGEWATER**

Bridgewater – implementing proprietary risk/factor analysis tool



Bloomberg – expanding use to support global economic discussion in monthly performance and rebalancing meetings



Proxy Voting Services – RFI process scheduled to conclude Q4 2018



Paraport – developing new reporting to estimate real time portfolio performance

C

# ESG: WHICH SIZE FITS OCERS?

Board of Retirement  
Orange County Employees  
Retirement System

Strategic Planning Workshop  
September 12, 2018

Harvey L. Leiderman  
Reed **Smith** LLP



# FUNDAMENTAL FIDUCIARY DUTIES

## 1. Exclusive Benefit Rule

May not sacrifice returns for other goals

## 2. Primary Loyalty Rule

May not serve others

## 3. Prudence and Care

Must prudently administer and incur only reasonable expenses

## 4. Duty to Diversify

Unless clearly not prudent to do so

# ENVIRONMENTAL, SOCIAL AND GOVERNANCE ISSUES

- A/K/A socially responsible investing, economically targeted investing, sustainable investing
- Examples: Boycott South Africa, Turkey; divest from tobacco, Iran, Sudan, handguns, thermal coal, private prisons; hire responsible contractors paying living wages and assuring labor neutrality
- Shareholder governance activism – corporate board diversity, disclosures of campaign contributions, climate change risks, behaviors that threaten public health or exploit labor
- Risks whose economic impact is not easily measured (*e.g.*, investing in countries with repressive regimes)

# ENVIRONMENTAL, SOCIAL AND GOVERNANCE ISSUES

- Adds policy element to the “efficient frontier”
- Expected ancillary benefits
- Expected economic consequences
- Dept. of Labor ERISA guidance for private funds – pushme/pullyu
- Difference with public funds – public officials sworn to protect public welfare

# APPROACHES

- Engagement/divestment policies
- Alternative investment options
  - ESG-based index funds
- Club clout – CII, Ceres, UN PRI, proxy voting
- SASB disclosures
- Investment manager expectations
- Record-keeping and measurement

# OCERS - SPECIFIC

- Portfolio impact – is *de minimis* enough to divest?
- OCERS' market clout
- Available resources – money, time and staff
- Consider:
  - Adopting policies to recognize that ESG can impact long-term risk-adjusted returns and commitment to promote sustainable practices
  - Requiring manager disclosure of ESG-related practices
  - Joining like-minded investors to leverage impact

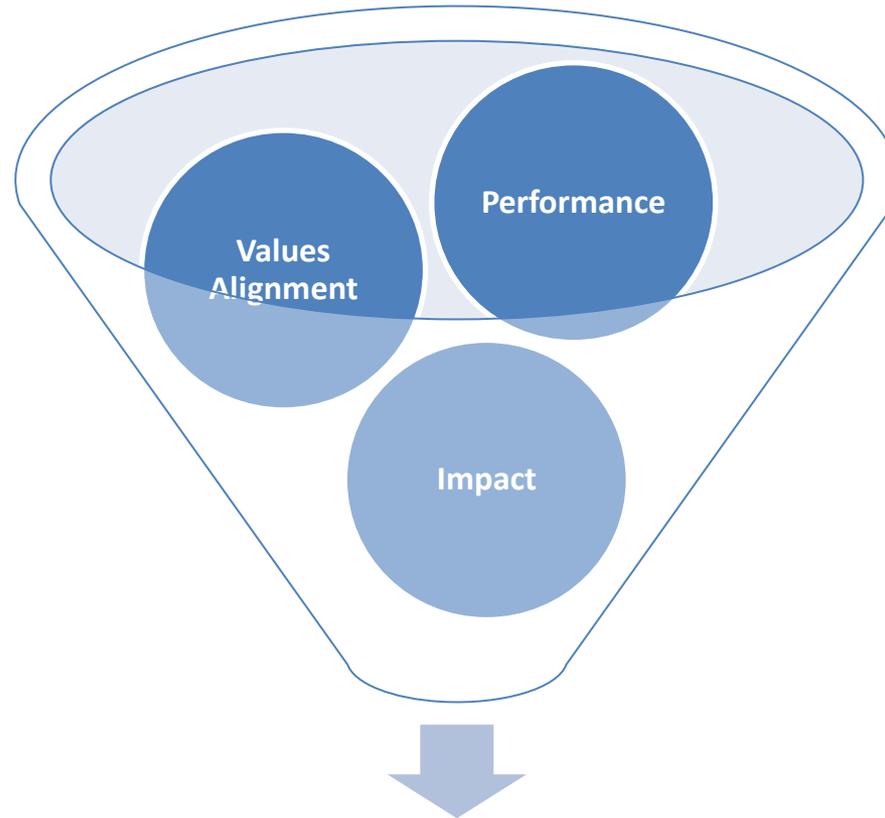
# ESG: Environmental, Social and Governance



September 12, 2018

# What Do Most Investors Seek?

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**Investment Portfolio**

# The ESG Debate: Common Statements

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## Proponents

- Impacting the world positively, beyond just making personal choices
- Positively influencing corporate behavior is easier for large asset allocators
- Mitigating long-term risks to society will not impair long-term performance

## Opponents

- Pension's role is to fund the retirement of members; members should make their own ESG decisions
- Member beliefs and preferences are too varied to fully represent through an ESG policy
- Limiting investment options will lead to lower investment performance

# Developing an ESG Policy

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## *Purpose*

- Mission Statement
- Values and Core Beliefs

## *Priorities*

- Goals
- Aspirations

## *Principles*

- Position Statements
- Actionable Steps

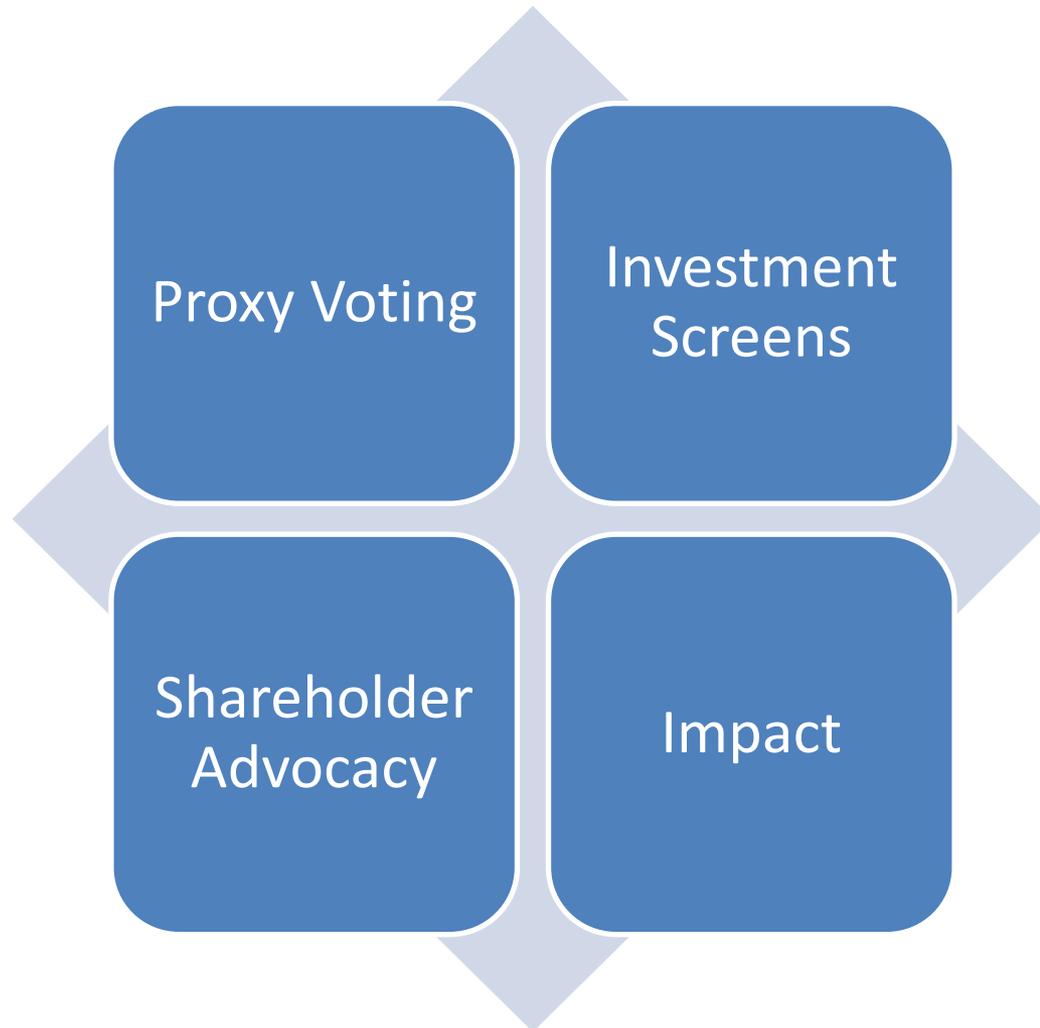
# Common Priorities: UN Sustainable Development Goals

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- No Poverty
- Zero Hunger
- Good Health and Well-Being
- Quality Education
- Gender Equality
- Clean Water and Sanitation
- Affordable and Clean Energy
- Decent Work and Economic Growth
- Industry, Innovation and Infrastructure
- Reduced Inequalities
- Sustainable Cities and Communities
- Responsible Consumption and Production
- Climate Action
- Life Below Water
- Life On Land
- Peace, Justice and Strong Institutions

# Activities of an ESG Institutional Investor

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# Activities of an ESG Institutional Investor

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- Proxy Voting
  - Consistent with adopted ESG policy
  - Often outsourced
- Investment Screens
  - Negative: removing investments inconsistent with mission/values/core beliefs
  - Positive: emphasizing/overweighting investments to promote mission/values/core beliefs
  - Implemented by investment managers; commingled investment products may limit use
- Shareholder Advocacy
  - Private: dialogue with corporate leaders to advocate for position and behavior change
  - Public: shareholder resolutions and letter campaigns
  - Achieve scale through investor networks such as Ceres, ICCR, etc.
  - Activities are typically handled by dedicated, internal staff
- Impact
  - Investments made with the intention to generate *measurable* social and environmental impact alongside a financial return
  - Examples: renewable energy, social impact bonds, affordable housing, microfinance
  - Activities are typically handled by internal investment staff

# United Nations Principles for Responsible Investment

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1. We will incorporate ESG issues into investment analysis and decision-making processes.
2. We will be active owners and incorporate ESG issues into our ownership policies and practices.
3. We will seek appropriate disclosure on ESG issues by the entities in which we invest.
4. We will promote acceptance and implementation of the Principles within the investment industry.
5. We will work together to enhance our effectiveness in implementing the Principles.
6. We will each report on our activities and progress towards implementing the Principles.

*The decision to become a signatory is separate from the decision to invest within an ESG construct.*

# OCERS and ESG

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- Proxy Voting
  - Institutional Shareholder Services (ISS) since YYYY
  - Adopted ISS proxy benchmark as OCERS' proxy voting policy
  - 926 shareholder meetings in 2017
  - 1,060 ballots and 13,868 proposal votes in 2017
- Investment Managers
  - 52% are UN PRI signatories
  - 78% have an internal ESG policy

D



View of The World 2018  
**The Townsend Group**

PROPRIETARY & CONFIDENTIAL  
May 2018

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### GLOBAL OUTLOOK

#### INVESTMENT THEMES:

- United States
- Europe
- Asia Pacific

## Global Economies Continue to Grow

- Growth is expected across all the major countries, but a few like the U.S., Australia, India and Brazil are likely to witness an acceleration of growth
- Growth is likely to fuel higher inflation and, consequently, higher interest rates
- Growth and inflation are likely to be positive for real estate, especially higher quality real estate in desirable locations
- A rising interest rate environment will extend investor appetite for yield in investments with income growth potential
- Investors can leverage diversification by focusing on growth-driven opportunities in the U.S. as well as Australia, a higher current income profile in the Eurozone, and any future distress opportunities in the U.K.
- Emerging markets are also likely to offer improving fundamentals, albeit execution opportunities might be limited

	Real GDP (YoY%)			
	2016	2017	2018F	2019F
<b>United States</b>	1.5%	2.3%	2.7%	2.4%
<b>Eurozone</b>	1.8%	2.5%	2.3%	1.9%
<b>United Kingdom</b>	1.9%	1.7%	1.5%	1.5%
<b>Japan</b>	0.9%	1.6%	1.3%	1.0%
<b>Australia</b>	2.6%	2.3%	2.8%	2.8%
<b>China</b>	6.7%	6.9%	6.5%	6.3%
<b>India</b>	8.2%	7.1%	6.6%	7.4%
<b>Brazil</b>	-3.5%	1.0%	2.5%	2.7%

	Inflation (CPI YoY%)			
	2016	2017	2018F	2019F
<b>United States</b>	1.3%	2.1%	2.3%	2.2%
<b>Eurozone</b>	0.2%	1.5%	1.5%	1.6%
<b>United Kingdom</b>	0.7%	2.7%	2.5%	2.1%
<b>Japan</b>	-0.1%	0.5%	1.0%	1.0%
<b>Australia</b>	1.3%	1.9%	2.2%	2.3%
<b>China</b>	2.0%	1.6%	2.3%	2.3%
<b>India</b>	5.0%	3.3%	3.7%	4.6%
<b>Brazil</b>	8.8%	3.5%	3.7%	4.2%

## Real Estate Yields Are Low, But Economic Outlook is Positive

- Fundamentals remain strong, but valuations across real estate and other asset classes are rich. Long-term return expectations have normalized back to historical norms. Prefer investments that offer relatively strong rental income growth, or value-add potential with near-term income generation potential
- Critical to identify sub-sector and sub-market driven themes in the current environment; Unlike the last 6-7 year period, assets are no longer trading at deep discounts to replacement value
- Rising interest rates have led to asset value correction fears across various asset classes; within real estate, investors can mitigate these risks by shifting preference to investments that can participate and benefit from economic growth, with downside protection offered by current income
- Despite growth and low cost of debt, supply is generally limited to select regions and sectors, typically those most in need of product to replace tired assets or accommodate shift in desired specs; supply has been constrained by rising construction cost, risk avoidance and banks' reluctance to back speculative developments
- Uncertainties surrounding global political and economic events are concerning some investors, but real estate specific risks relating to over-supply and over-leverage remain muted. Examples of suggested execution alternatives include:
  - Seek levers of NOI growth that are not predicated on continued market uplift, by tilting portfolios towards sectors benefiting from secular changes (e.g. Industrial and e-commerce), acquiring in-place rents below current market terms, and improving operational efficiency
  - Acquire with appropriate capital structure which typically includes a conservative advance rate, no recourse or interim covenant tests, term and re-financeable, and the willingness to hold for longer time horizons
  - Focus on investments generating a substantial portion of the projected return from income and avoiding deals with binary risk, e.g. delivering new condos into a less favorable economic backdrop
  - Aggregate capital in order to access favorable investment dynamics such as pre-specified portfolios with embedded value, lower management fees and investor friendly legal terms
  - Investing in debt structured with downside protection preferably with potential upside participation
  - Internationally, leverage low cost of debt to generate high cash-on-cash yields on stable operating properties, and/or invest in high-growth regions

## Returns Continue to Moderate



- High-quality real estate income generation has been very resilient, even during the toughest of economic times
- Over the period 2000 – 2016, around 70% of the total return generation of quality Core real estate has been through income
- During the current period, since cap rates are low, investors may benefit from focusing on high-quality assets
- Given that income is so stable, Core-Plus strategies that invest in high-quality real estate with higher leverage levels may produce higher returns especially due to the low cost of debt

# Valuations Stretched Across Asset Classes

**Bonds**  
Investment Grade Yields



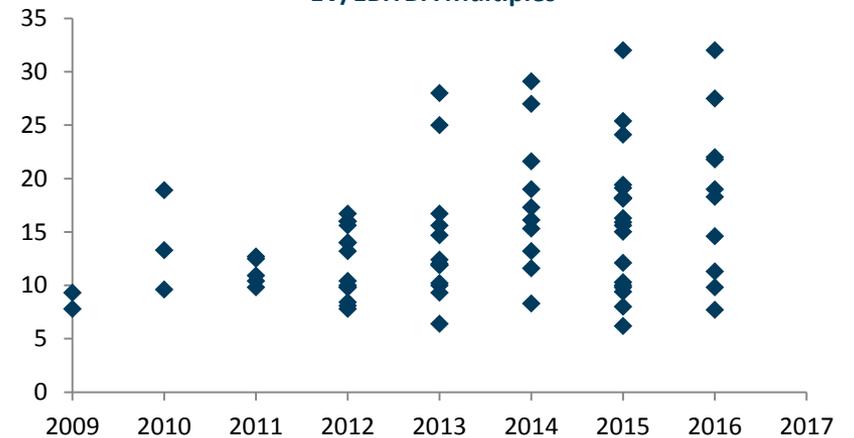
**Real Estate**  
Avg. Transaction Cap Rates



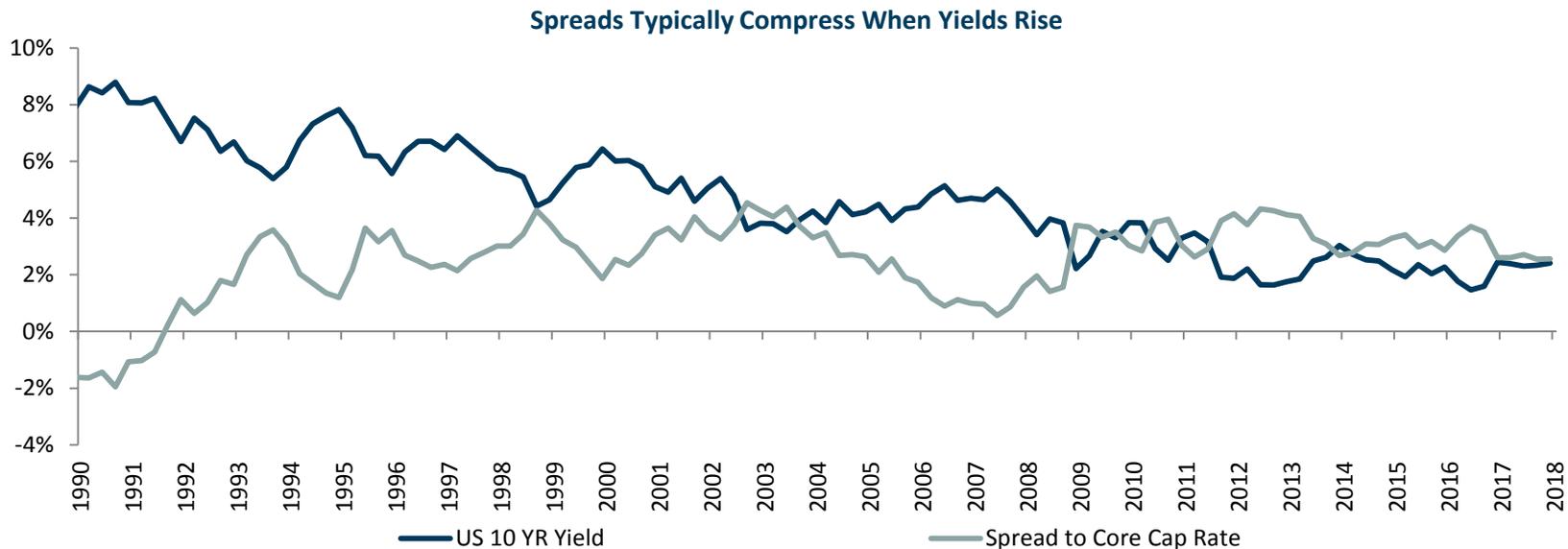
**S&P 500**  
Shiller P/E Ratio\*



**Core Infrastructure**  
EV/EBITDA Multiples



## As Rates Rise, Investors Prefer Real Estate Due to Income Growth Potential



- Real estate investments offer attractive characteristics in a period of rising interest rates
  - Ability to benefit from inflation by growing rents unlike other fixed income investments
  - Current income generation that offers downside support to valuations
  - Strong diversification to listed equities, a feature highly desirable during a period of overall valuation uncertainty when rates rise
  - Potential to invest in sectors like senior housing, student housing, and self-storage that offer returns with low correlation to the broader economy, an attractive quality over a period when rising rates may introduce economic growth uncertainty

# Global Economic Outlook and Real Estate Investment Opportunities

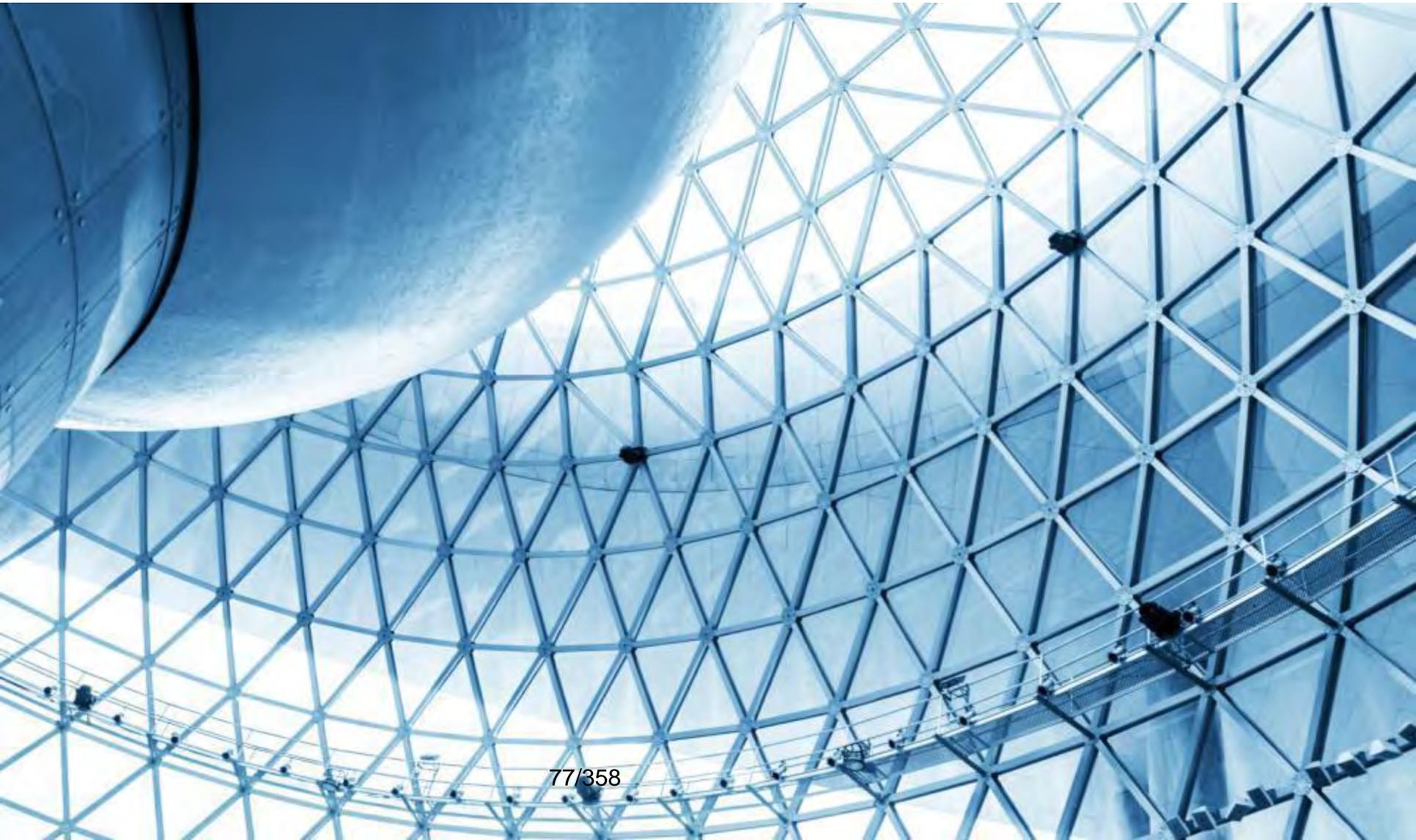


Macro Factors	U.S.	Europe	China	Japan
GDP ('18)	2.7%	2.3% (U.K. 1.5%, DE 2.4%, FR 2.1%)	6.5%	1.3%
Unemployment ('18)	3.9%	8.4% (U.K. 4.3%, DE 5.4%, FR 9.1%)	4.0%	2.7%
Key Real Estate Themes	<p>Fundamentals diverge significantly across sectors and submarkets</p> <p>Core offers good income and protection against a potential slowdown</p> <p>Non-Core selectively mispriced</p>	<p>Income returns typically higher than in the U.S., but lower growth</p> <p>Repositioning opportunities attractive</p> <p>Low debt cost offers good leverage, without adding much risk</p>	<p>Slowing growth raising oversupply risks, but continued strong urbanization</p> <p>Focus on Tier I and II cities</p> <p>Leverage preferred equity/mezz structure to lower risk</p>	<p>Low growth despite easing</p> <p>Existing stock old, provides attractive repositioning opportunities</p> <p>Low debt cost offers good leverage, without adding much risk</p>
Office	<p>Select markets offer good rent growth; southern markets witnessing net migration likely to benefit</p> <p>Repositioning and high income-producing investments likely to outperform low cap rate opportunities</p>	<p>Recovery in continental Europe providing modest rent tailwind; attractive income generation potential</p> <p>In the U.K., Brexit-related demand slowdown and significant new supply to limit returns</p>	<p>High supply, credit risk, and slowing economy could lead to pockets of oversupply</p> <p>Prefer asset repositioning opportunities at attractive basis</p>	<p>Modestly rising rent growth outlook</p> <p>Old stock in good locations in Tokyo/Osaka offers attractive upgrading opportunities</p>
Industrial	<p>E-commerce and imports driving demand at record high level</p> <p>Supply rising in hotbeds, requiring focus on quality assets in neglected markets</p>	<p>Strong demand from logistic players and e-commerce</p> <p>Stable fundamentals offer attractive cash returns boosted by low-cost debt</p>	<p>Strong demand for industrial properties conforming to modern standards</p> <p>Limited deal flow due to delay in land availability</p>	<p>Strong demand for modern logistics assets driven by 3PLs</p> <p>Supply building in town peripheries that is likely to limit rent growth</p>
Retail	<p>E-commerce reshaping landscape leading to shrinkage in per capita space</p> <p>Neighborhood retail presents interesting side play</p>	<p>E-commerce driven reshaping will put retail at risk</p>	<p>Shift to consumer economy leading to strong demand for productive sites</p> <p>Oversupply in central locations, but Non-Core locations still undersupplied</p>	<p>Select repositioning opportunities appear attractive given poor existing asset quality</p> <p>E-commerce likely to be a headwind</p>
Residential	<p>Rent affordability remains stretched in higher-end apartments; supply glut is being worked through</p> <p>Refurbishing Class B attractive, prefer debt oriented entry point</p>	<p>Most large cities undersupplied with dwellings, but still limited opportunities</p> <p>Select condo conversion and repositioning plays attractive</p>	<p>Urbanization trend driving strong demand albeit very volatile</p> <p>Favor preferred equity/mezz structures to limit risk</p>	<p>Attractive residential development opportunities in high-growth cities like Tokyo and Osaka</p> <p>Secular demand growth for aged care</p>

Actively Pursuing
  Neutral
  Selectively Pursuing

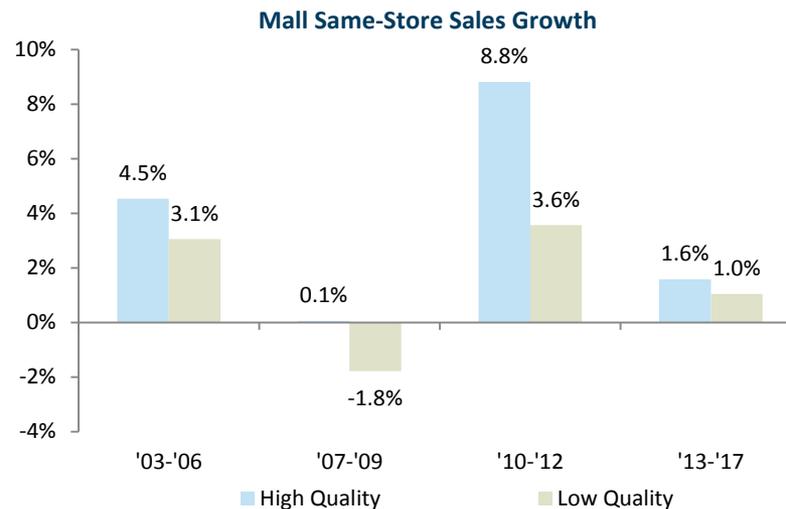
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## United States: Investment Themes



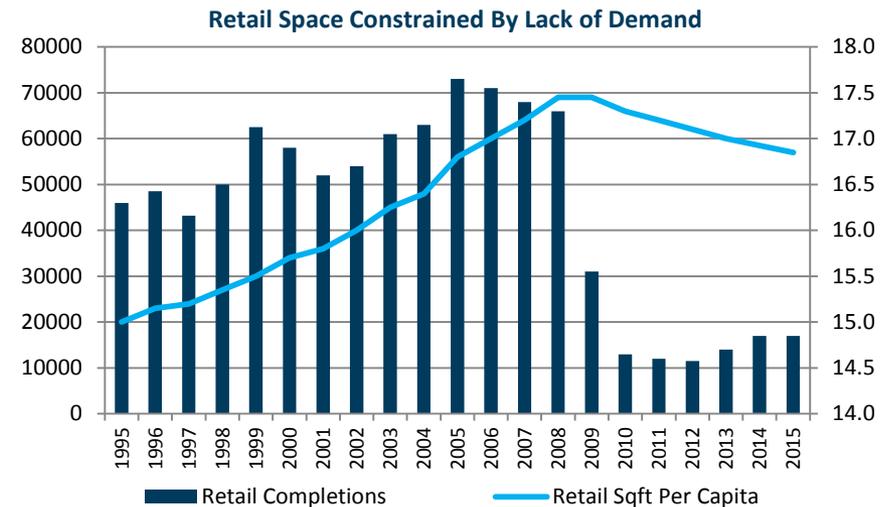
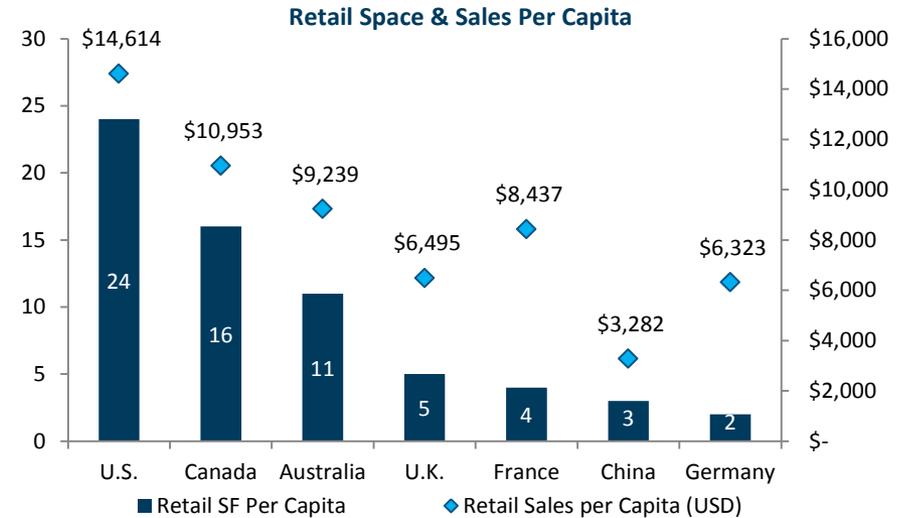
## E-Commerce Continues to Be a Drag on Retail Rent Growth

- U.S. households are less levered today, and therefore, an improving economy has translated into rising consumer spending
- Wage growth has lagged overall GDP growth, and rising apartment rents and healthcare costs could limit overall retail sales growth
- Additionally, a rising interest rate environment could make the cost of servicing some types of personal debt more expensive and encourage savings, further dampening retail sales growth
- It is not a surprise that the pace of buying online has continued to be high
- As development and innovation in logistics networks continues to improve the e-commerce offerings to consumers, even high-quality malls have witnessed a sharp slowdown in sales growth

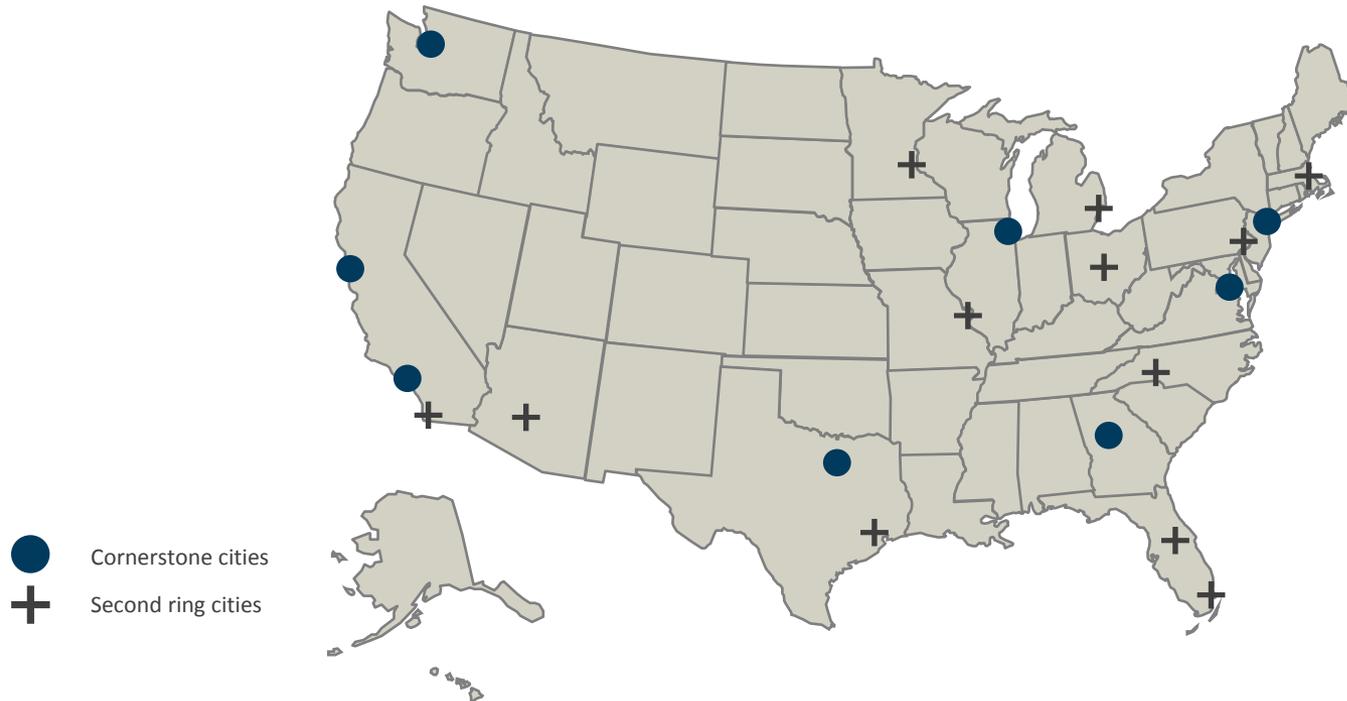


## These Headwinds Are Likely to Strengthen

- U.S. retail space per capita is one of the highest in the world, this was in part justified by much higher retail sales per capita
- However, the U.S. is also witnessing the fastest development and innovation in logistics, fueling long-term e-commerce growth
- Consequently, retail space has been shrinking in the U.S. post-GFC
- Retailers' initial reaction was to focus on high-productivity sites which has led to a very rapid declining demand for lower-productivity sites
- We expect this process of consolidation of space on the part of retailers to continue
- Select retail opportunities around new, up-and-coming, live-and-work neighborhoods and select high-productivity sites are likely to escape further consolidation and perform better



# On the Flip Side, Logistics Development Continues to Gain Momentum

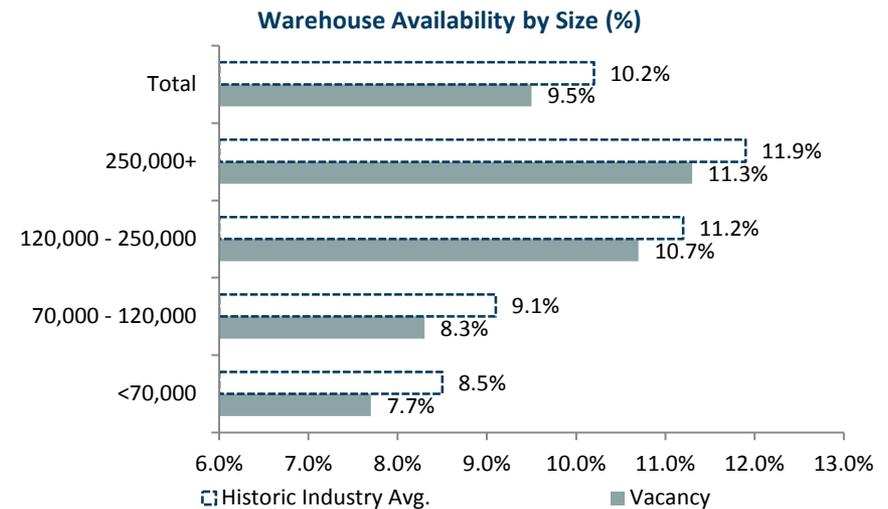


- Today, 80% of the U.S. is covered by one-day delivery, up from 50% just four to five years ago
- This is made possible by a large number of mega-warehouses around cornerstone cities like New York, Los Angeles, San Francisco, Dallas, etc., and significant development around second-ring cities like Charlotte, Boston, Philadelphia, Miami, etc.
- It is estimated that around 70-80% of construction activity in the industrial sector over the last four to five years was for large warehouses

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# Industrial Landscape Evolving Rapidly Creating Lucrative Opportunities

- Industrial construction activity is likely to continue as the demand for such space is rising at a very rapid rate
- Initial construction activity supported the roll-out of retail innovators like Amazon, while current activity is also supporting retail followers like Wal-Mart and other established retailers
- While large warehouse demand is still expected to grow, demand for smaller warehouses serving the last mile and located in population-dense locations are expected to rise rapidly
- Vacancy rates of smaller warehouses are already very low, which is expected to lead to rent growth and also attract new supply
- Acquiring well-located smaller warehouses and repurposing them for e-commerce will be an attractive investment opportunity



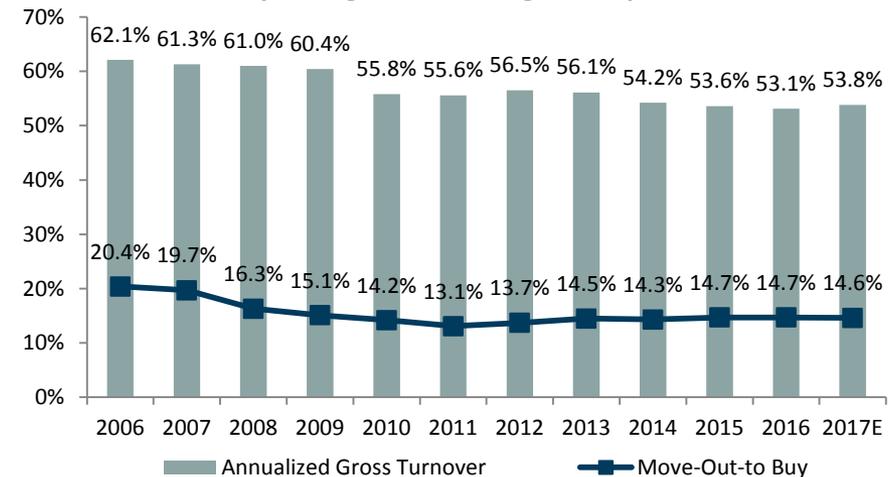
# Multifamily Rent Growth Hindered by Supply

- The home ownership rates that declined post-GFC have started to stabilize, but the rise in mortgage rates is likely to limit growth in ownership in the long run
- Over the last four to five years, the supply of apartments, especially at the higher-end, has been elevated, but millennials and seniors have shifting preferences towards apartments over houses
- Growing rents have stretched the affordability of apartments, and, given that over 40% of disposable income is currently servicing rent, we expect rent growth to moderate
- B-grade apartments with lower rents have become more attractive to renters due to affordability issues
- Given the stability of the income, we expect low cap rates to be justified and we continue to favor the sector, albeit with lower return expectations for the near term

30 Year Fixed Mortgage Rates



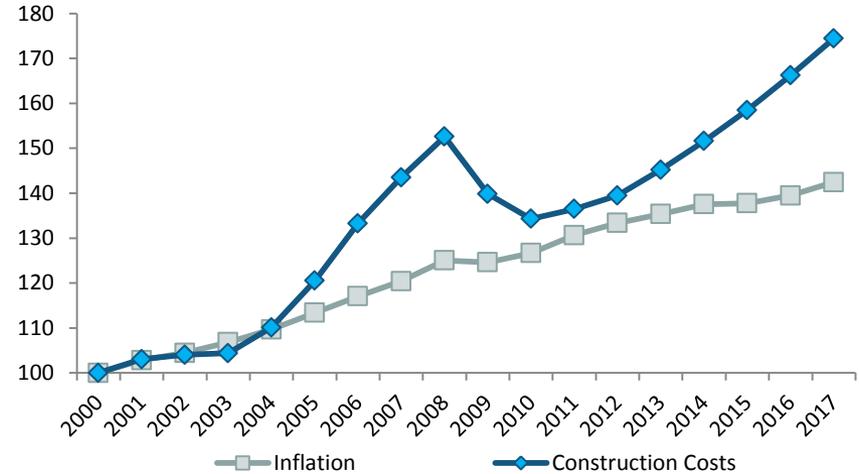
Mobility Among Renters Has Significantly Declined



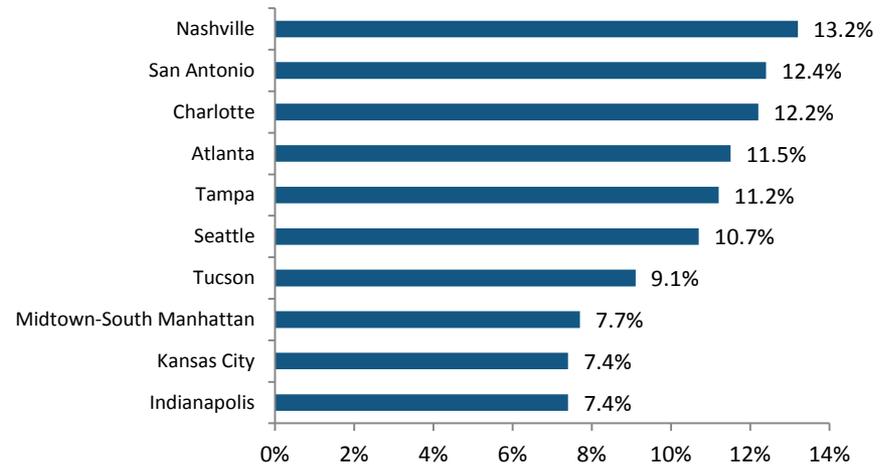
# Office Market Recovery Extends to Non-Traditional Markets

- Improving economic growth expectations are likely to favor job creation and demand for office space
- Given that the property type is cyclical, investors benefit from acquiring assets in the sector at the right time in the cycle
- However, the opportunity is very regional and sub-market dependant with certain cities like San Francisco witnessing very high rents and valuations, while many non-traditional markets like Nashville, San Antonio, Charlotte, etc., are witnessing impressive rent growth
- A gradual population migration to cities with better weather and taxes continues, which will fuel office demand in those cities
- However, we continue to favor strategies with a four to six year exit time horizon and those that develop cash flow at the onset as they offer better risk-return tradeoff

Construction Costs Outpacing Inflation

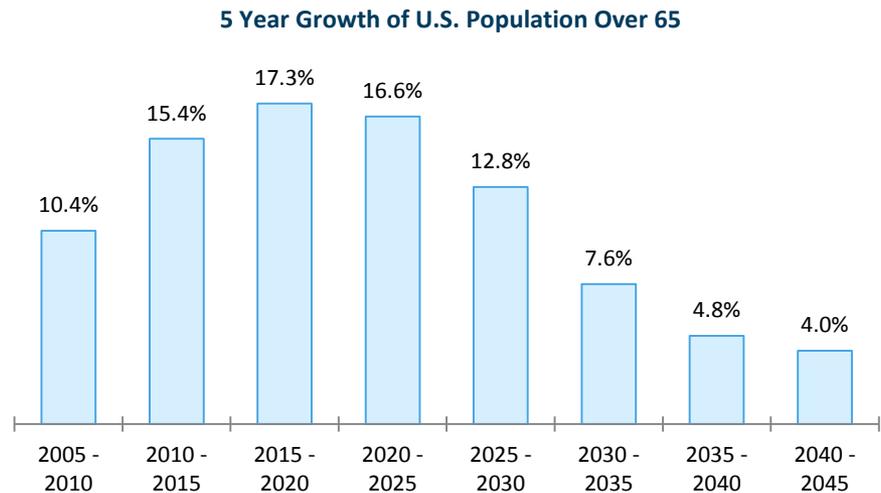
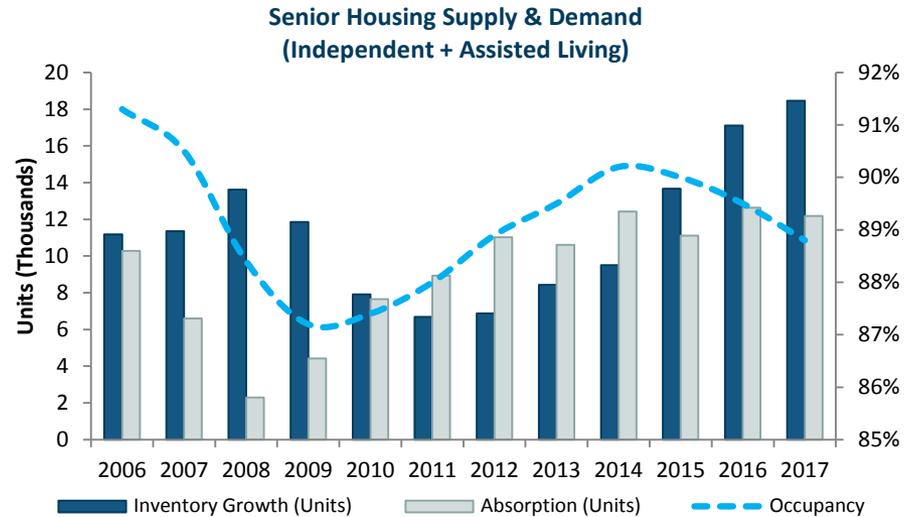


Rent Growth (YoY %)

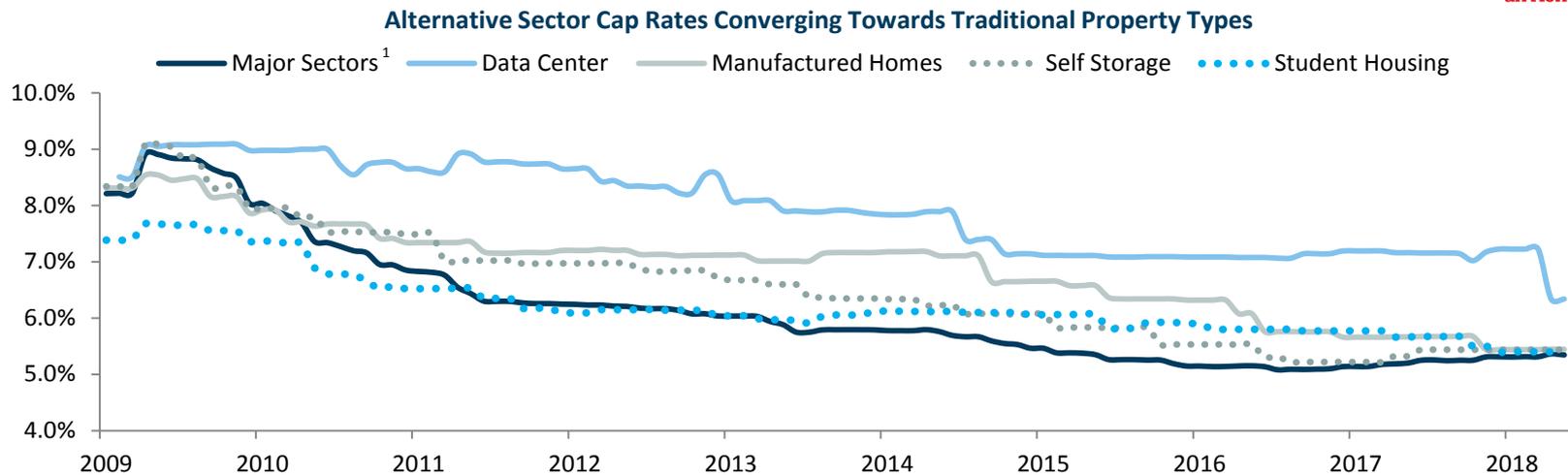


# Senior Housing: Benefitting From Long-Term Demographic Trend

- The senior population growth rate in the U.S. will continue to remain high in the coming years, providing a very attractive demand tailwind
- There has been considerable innovation in the product for seniors with locations near town centers and a number of age-appropriate amenities
- A good economic outlook continues to allow seniors to achieve the change in lifestyle that they desire especially by being able to sell their existing houses
- The rising demand has attracted a lot of supply; therefore, investors need to carefully select the right locations and product, as we expect older product and new developments in less desirable locations to underperform

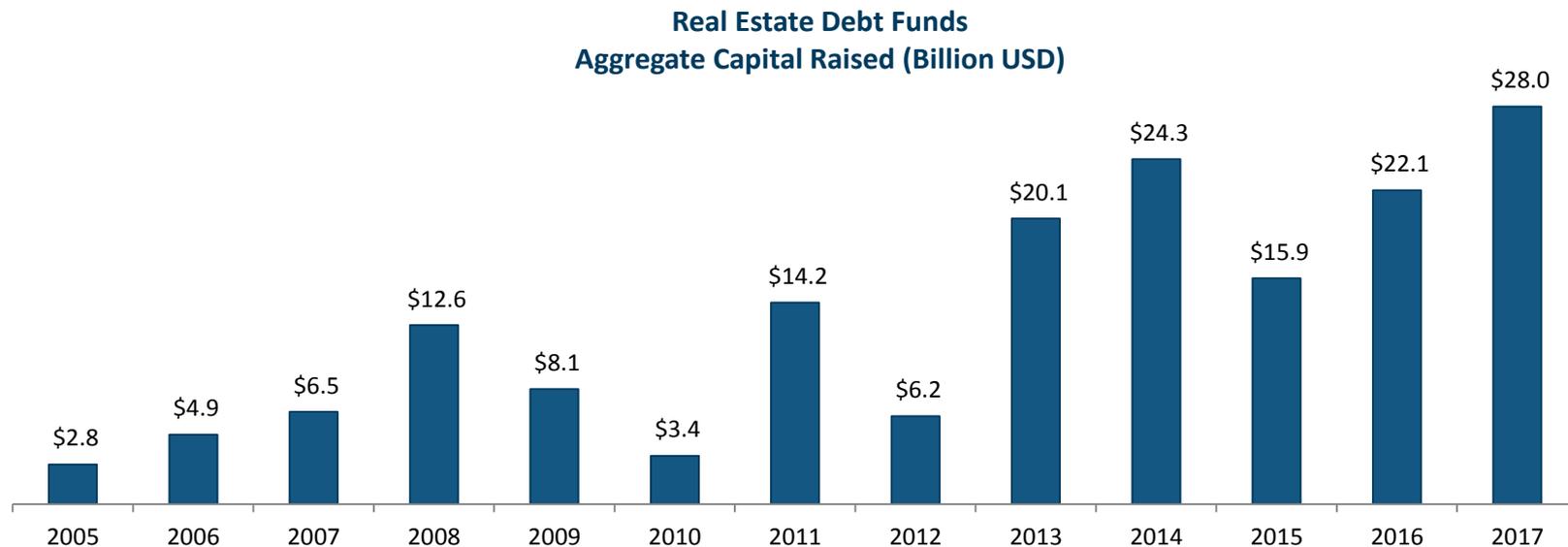


## Additional Alternative Sector Themes



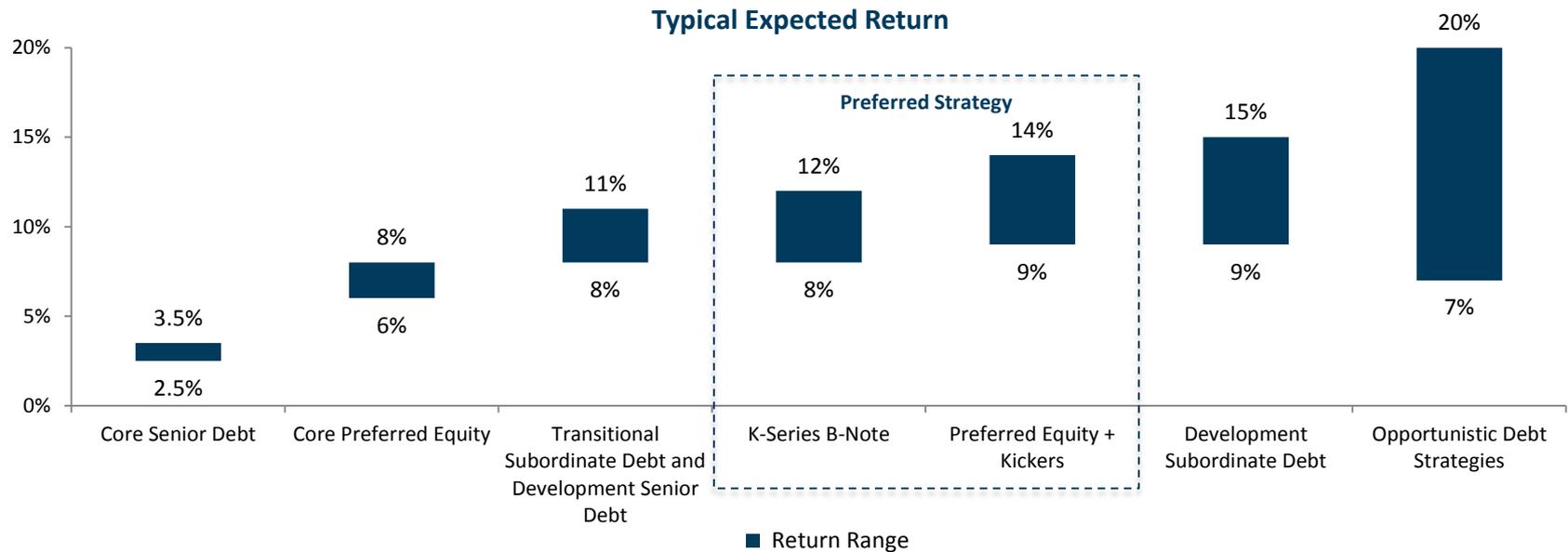
- **Self storage** is facing supply headwinds in select markets. Townsend’s preference has shifted to outside of the U.S., investing in less developed self-storage markets with strong demand growth and limited supply, such as Singapore, Japan, and Australia
- **Data Centers** are benefiting from the strong demand tailwind supported by the digitalization of the economy. Valuations have risen, as in other property types, but total return expectations are above traditional property types. Overall, there are limited execution options
- **Student Housing’s** yield premium to multifamily has compressed over this cycle. With pockets of temporary over-supply, there are significant fundamental divergences across universities
- **Manufactured Housing** is an emerging sector in the institutional space, with limited deal flow and execution opportunities to date

## Proliferation of Debt Strategies Late in the Cycle



- The market has witnessed a proliferation of debt strategies in the real estate universe competing for two separate pools of capital:
  - Senior debt strategies offering downside protection
  - High-yield debt strategies offering higher return expectations
- The market perception of debt strategies seems to downplay the inherent risk of leveraged debt strategies, e.g., putting fund-level leverage on transitional debt, as investors have grown more yield-focused in an environment with abundant cheap capital
- Volatility negatively impacts the implied value of debt strategies, given limited participation in the upside, with partial to full participation in downturns; investors must recognize there is a narrow range of scenarios in which debt strategies are optimal
  - The optimal scenario involves low growth, low inflation, and low volatility
- While debt strategies have their place within a portfolio, Core equity positions will continue to be the favored strategy long term

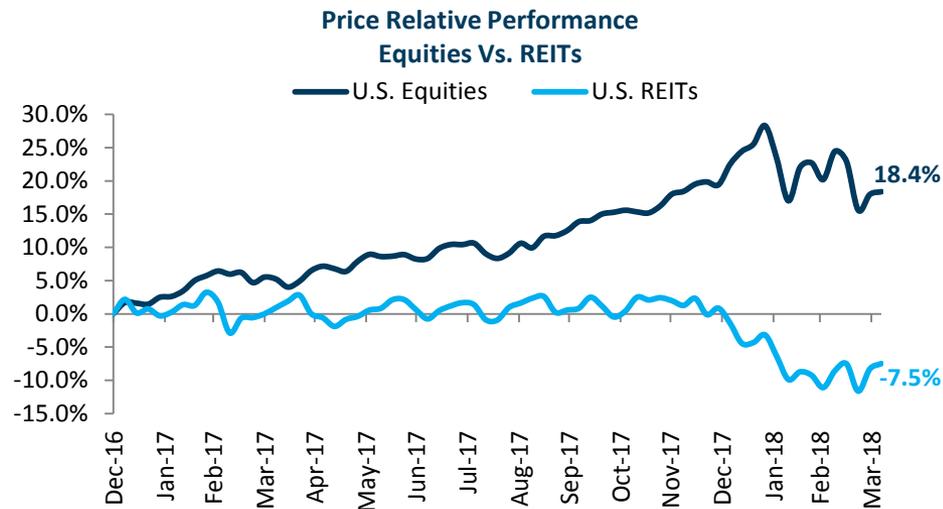
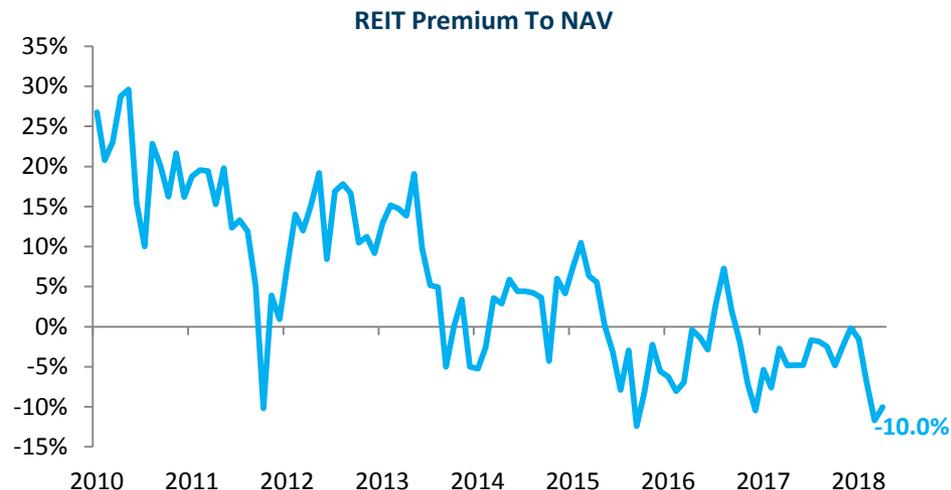
## Hybrid Strategies Offers Attractive Risk Return Tradeoff



- In a low interest rate environment, real estate debt offers attractive alternatives with reasonable risk given that U.S. real estate is experiencing an upward cycle of rent growth
- Debt for transitional assets offers attractive returns given that CMBS issuance is scaling back amid very high levels of expiries and banks are unwilling or unable to increase real estate exposure; however, poor asset selection could result in downside in the event of an unexpected slowdown
- Senior debt for development also offers attractive returns as banks are not that active, but caution is needed to avoid good assets in poor locations with elevated leasing risk
- Preferred equity with kickers is a good way to enhance returns without full equity risk, but such options are typically only possible on transitional assets or assets that require major renovations
- Opportunistic debt strategies could have a wide range of outcomes; execution options could be very limited

## REITs Downtrodden by Rising Interest Rates

- Rising interest rates have negatively impacted sentiment amongst public REIT investors
- REITs are trading at a discount to NAV estimates made by analysts; this discount/premium varies across sectors e.g., the retail sector is trading at a discount in the public market, while the senior housing sector is trading at a premium
- The REIT sector continues to be volatile despite aggregate leverage on the MSCI US REIT index now closer to 30%; which, is much lower than the pre-GFC period
- REITs have also underperformed the broader equities market
- Investors looking to add exposure to REITs should take into account continued volatility in the sector on account of further interest rate rises
- Private real estate investors will benefit from select managers who are likely to focus efforts on taking REITs private and/or making asset purchases from the public REITs



# Europe: Investment Themes



## Europe Execution Strategies

### United Kingdom

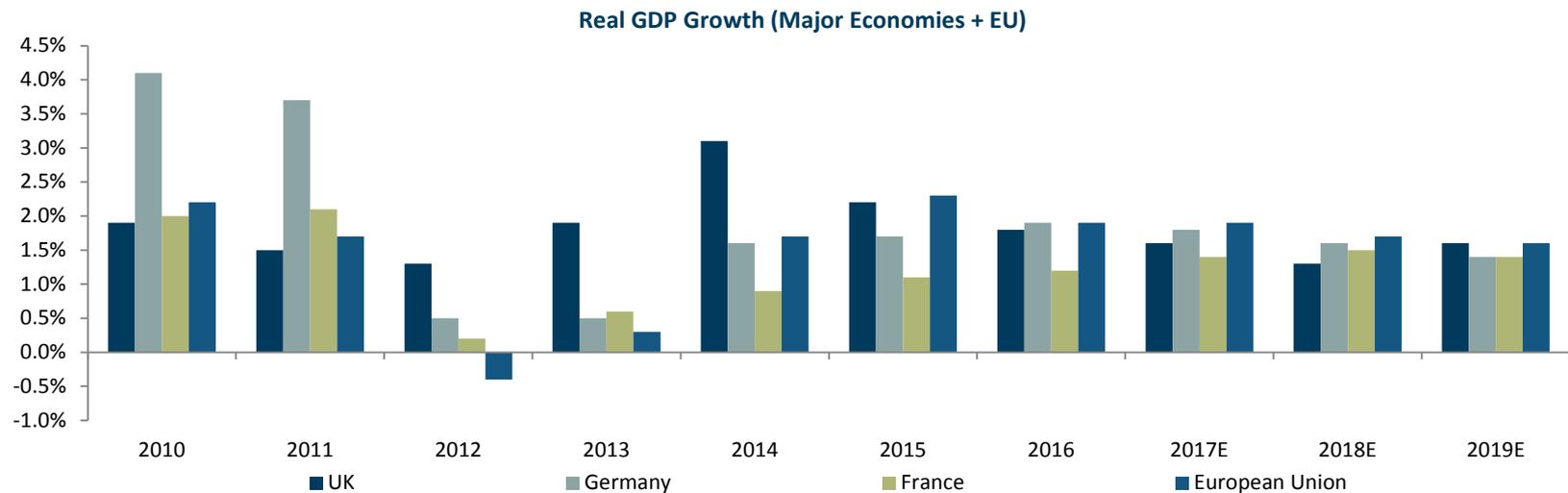
- Brexit-related concerns coupled with elevated supply have tempered U.K. investment opportunities
- Valuations remain elevated and do not fully reflect the uncertainty surrounding Brexit

### Continental Europe

- Demographic trends across developed continental Europe remain weak and result in lower long-term interest rate expectations
- Low cost of debt provides a strong positive leverage effect to equity; unlevered yields have compressed, but levered income return is very attractive
- Core properties are experiencing high interest from domestic and international investors and, therefore, are priced in line with core U.S. properties
- The office sector is witnessing healthy fundamentals, with growth expected to be in 1-3% p.a. and limited supply on the horizon, creating attractive value-add opportunities
- The industrial sector continues to be very attractive, considering yields are higher relative to office or retail assets, and e-commerce and positive economic growth are providing rent growth tailwinds
- Rental housing offers attractive alternative low-risk investment, as most major European cities continue to suffer from chronic undersupply of housing
- Emerging real estate sectors like senior housing and student housing are becoming institutionalized and offer attractive returns, but execution opportunities remain limited

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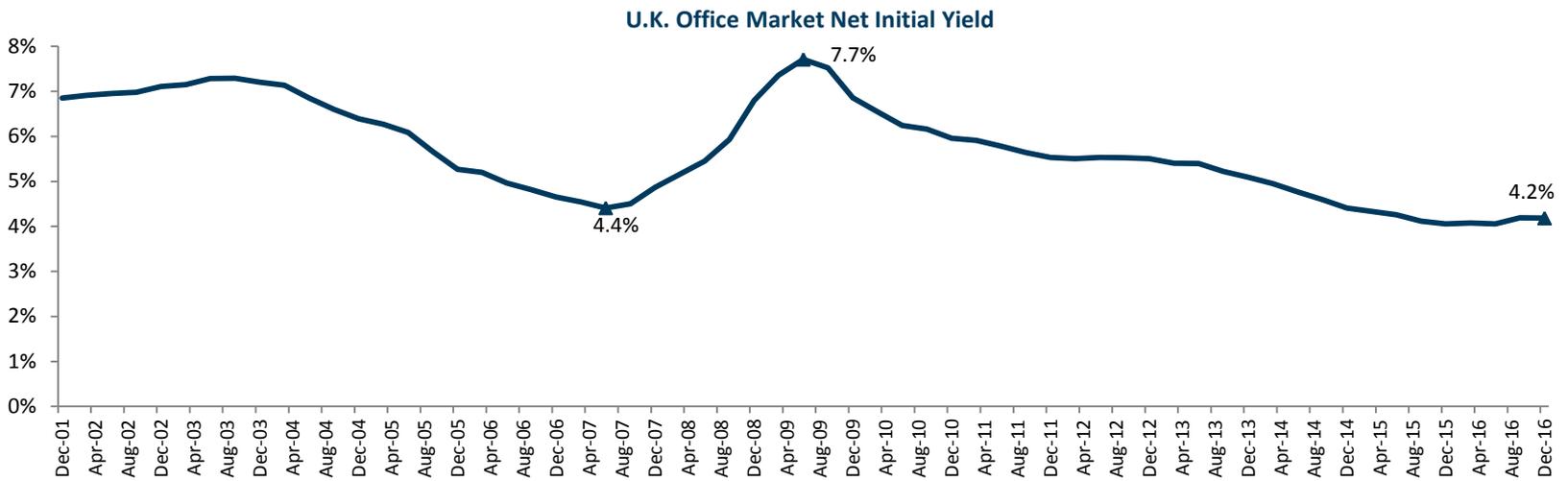
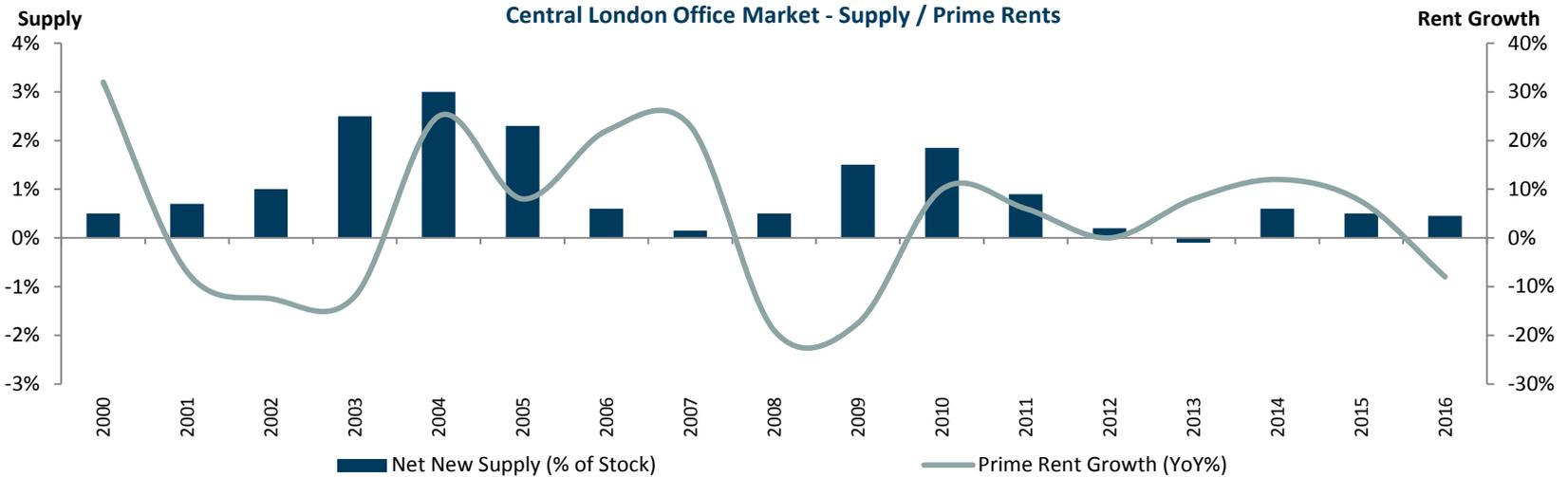
## Positive Gradual Real GDP Recovery in Europe Expected to Continue



- Growth in the UK, continues to be weighed down by Brexit concerns with 2018 expected to witness another pull back in growth
  - Concerns of a sharp decline in growth rate have subsided, but Townsend continues to remain cautious due to economic uncertainty
- Continental Europe has been experiencing low but steady growth which is expected to continue; a few economists also expect this growth to pick up slightly
- Inflation is expected to rise slightly but remain low keeping the interest rates low despite ECB scaling back its program
- Long-term demographic trends of an aging society is likely to keep overall long-term growth expectations and interest rates low; however, major cities across Europe will do better due to continued urbanization trend

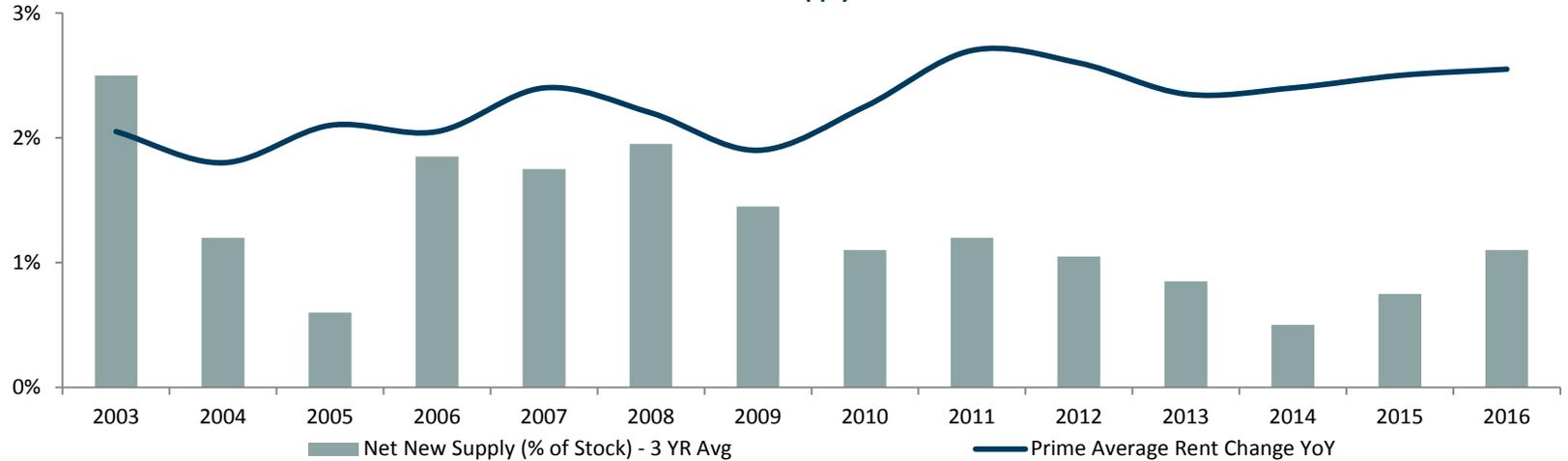
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# Office: London Faces Elevated Risk from Brexit, but No Signs of Distress

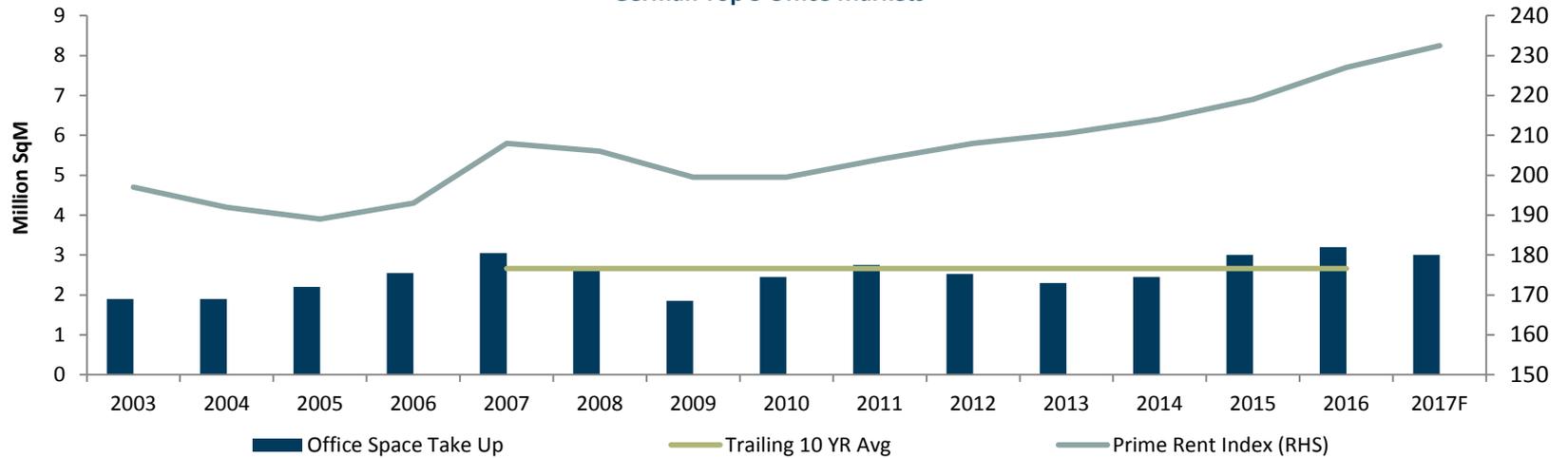


# On the Contrary, Continental European Office Fundamentals Healthy

Paris Office Market: Supply & Rent Growth

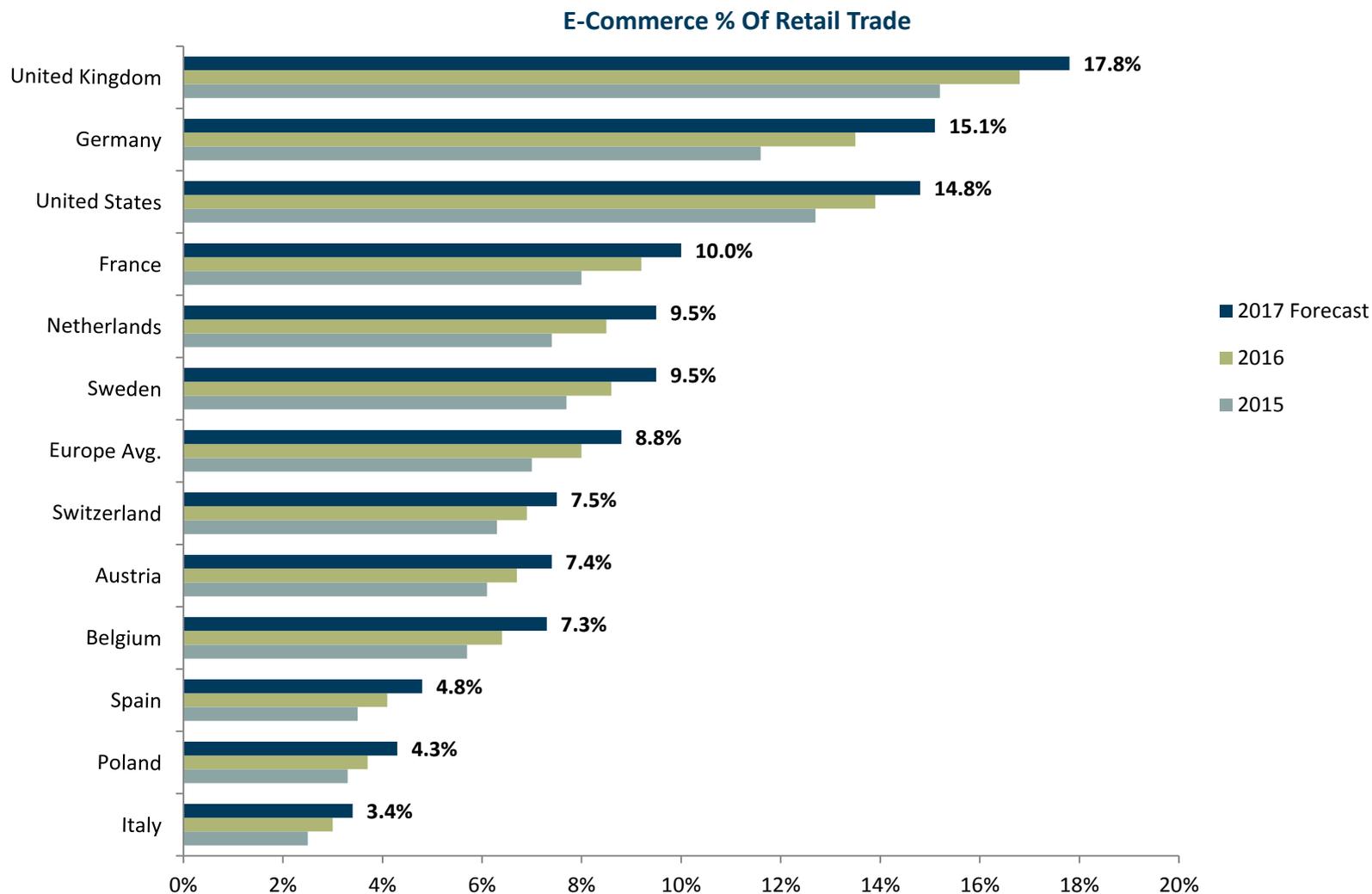


German Top 5 Office Markets



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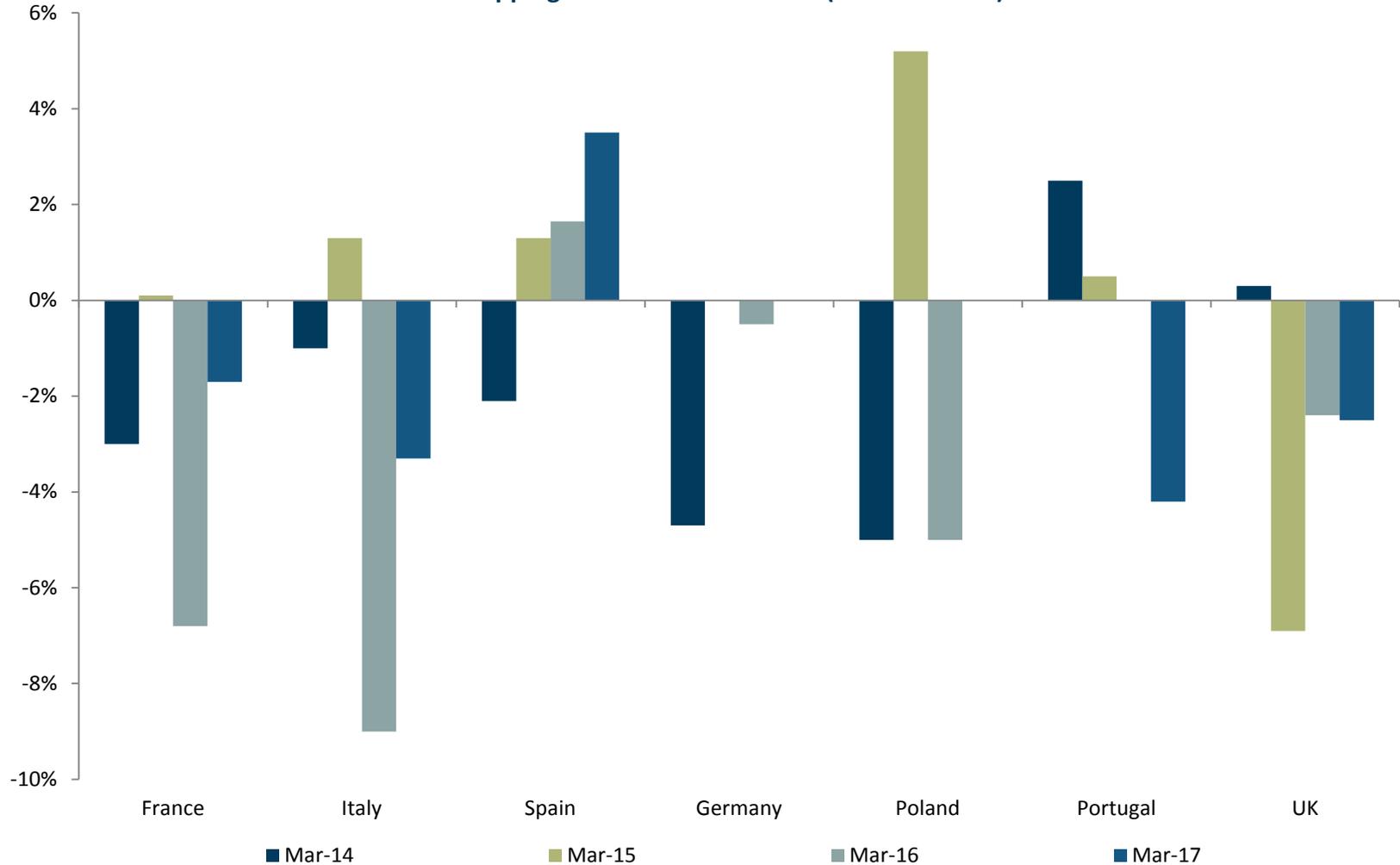
## Retail: E-Commerce Gaining Ground in Europe



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# Retail: Leading to Shopping Center Footfall Reduction Across Most Countries

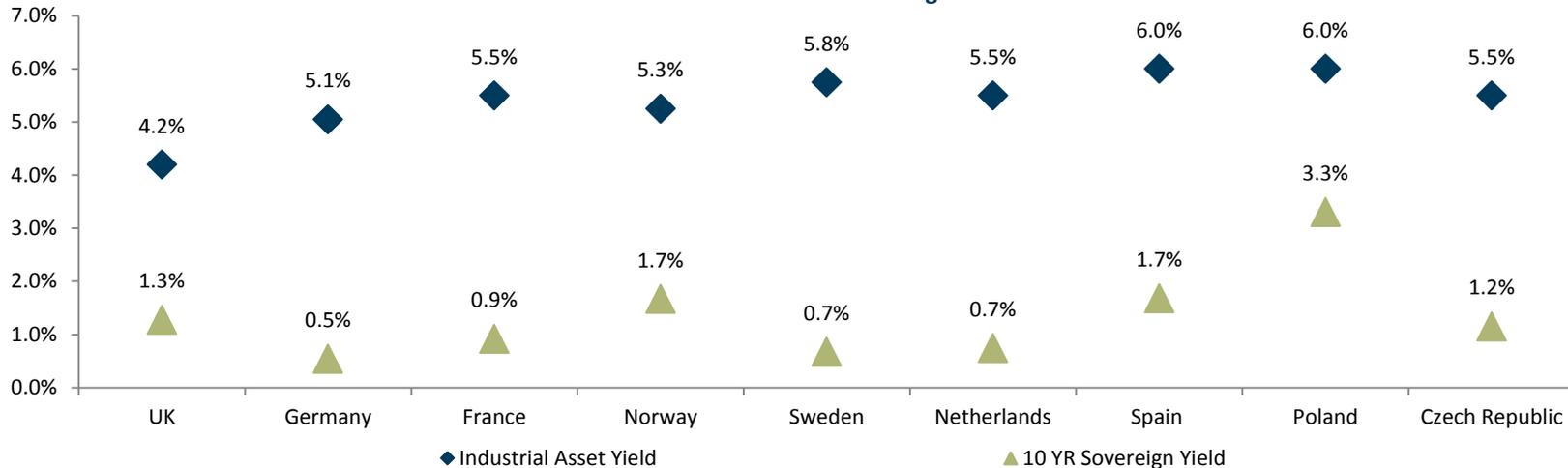
Shopping Center Footfall Trends (YoY % Growth)



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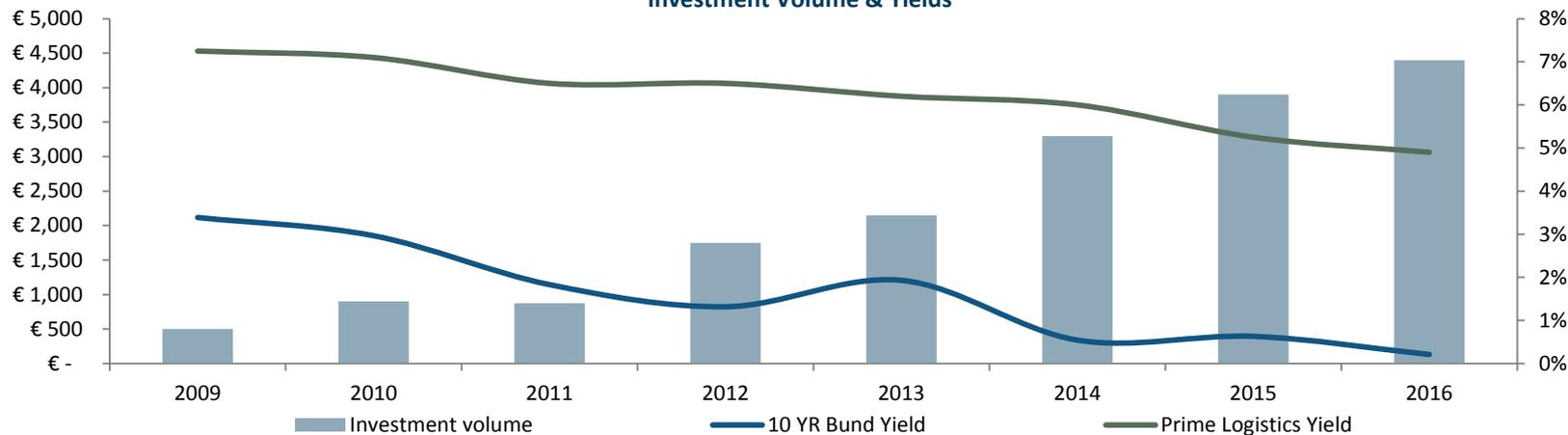
# Industrial Sector is Offering an Attractive Premium to Interest Rates

Industrial Asset Yields Vs. Sovereign Yields



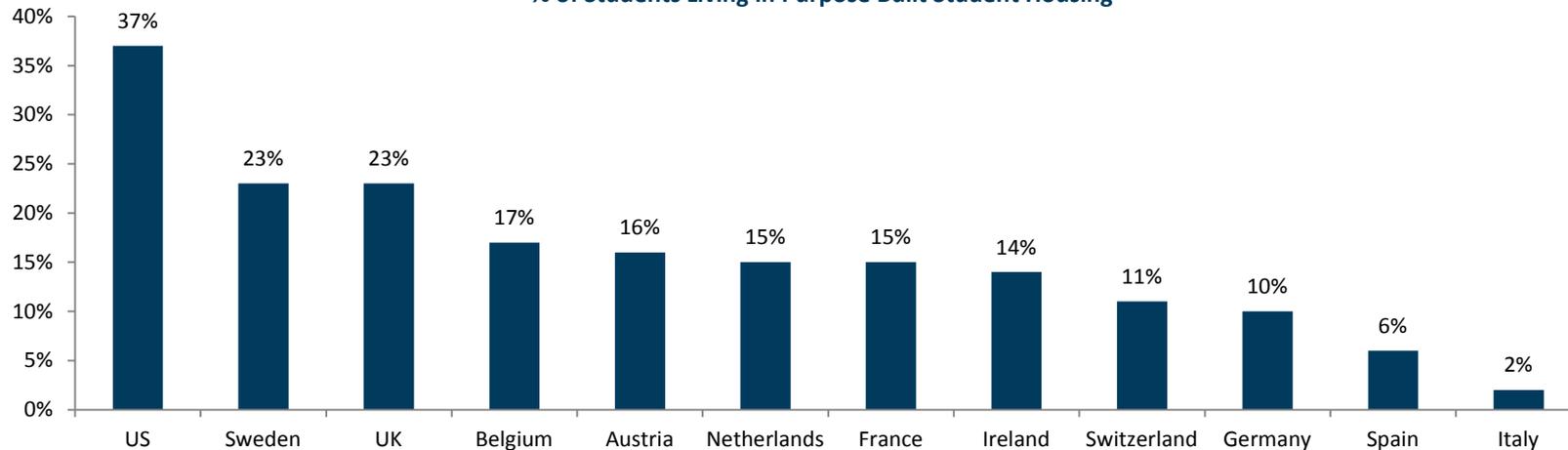
Millions

German Industrial Market:  
Investment Volume & Yields

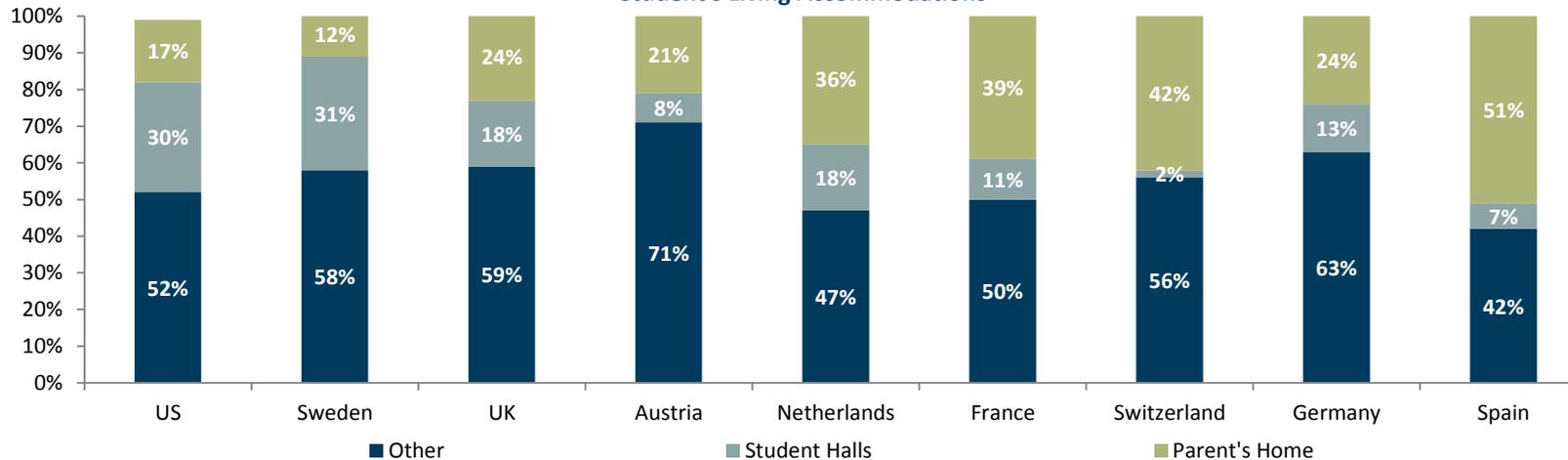


# Across Most Markets in Europe, Student Housing Remains Under-Supplied

% of Students Living in Purpose Built Student Housing

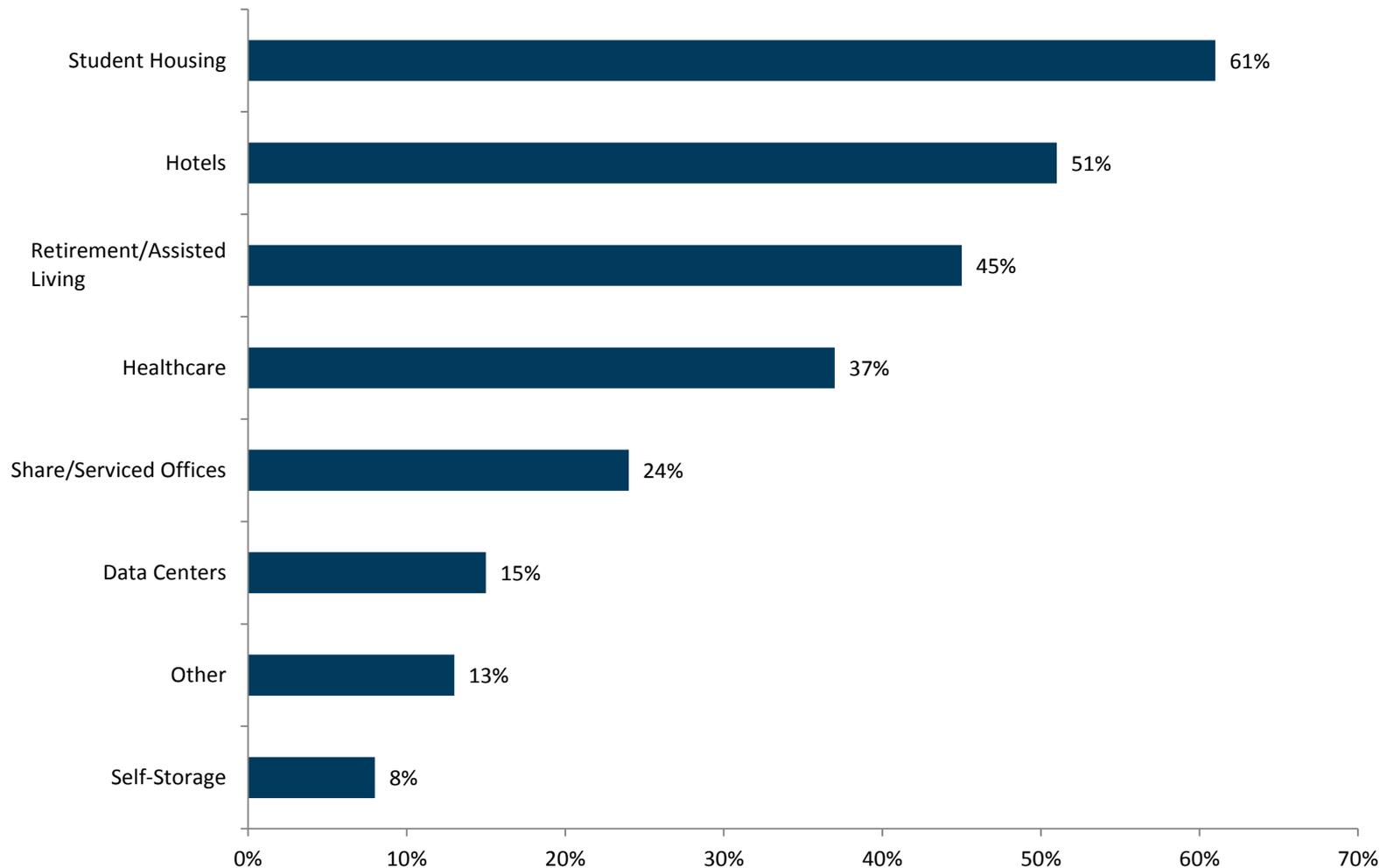


Student's Living Accommodations



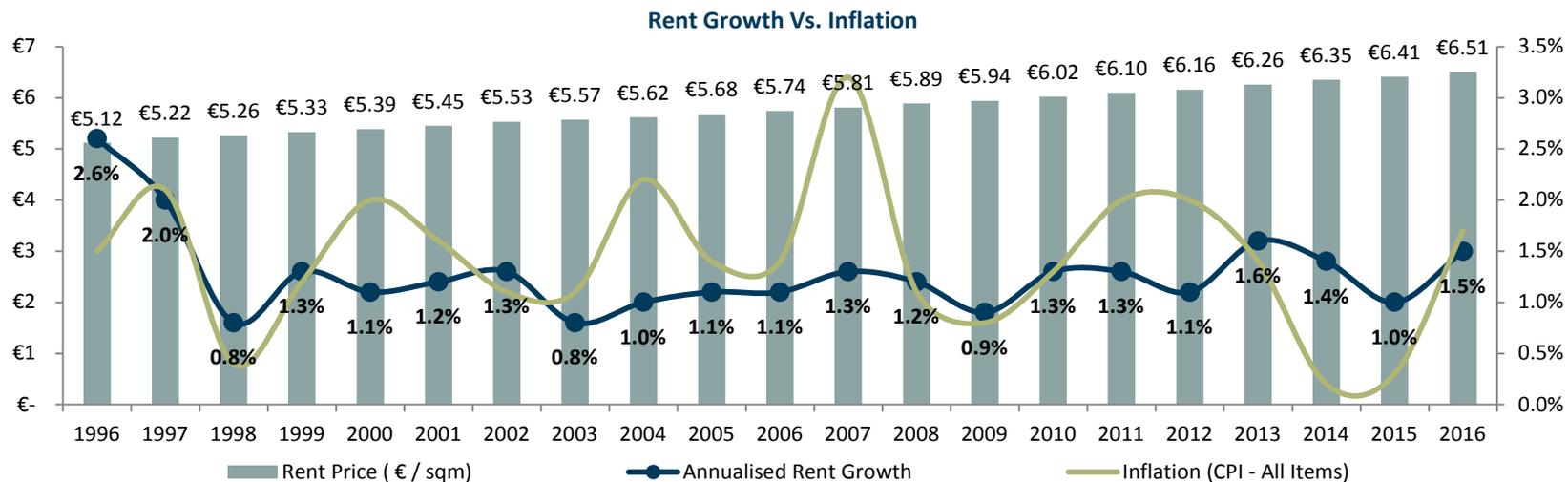
# Student Housing: Investor Interest in this Sector is Growing

Alternative Sectors Being Considered For Investment



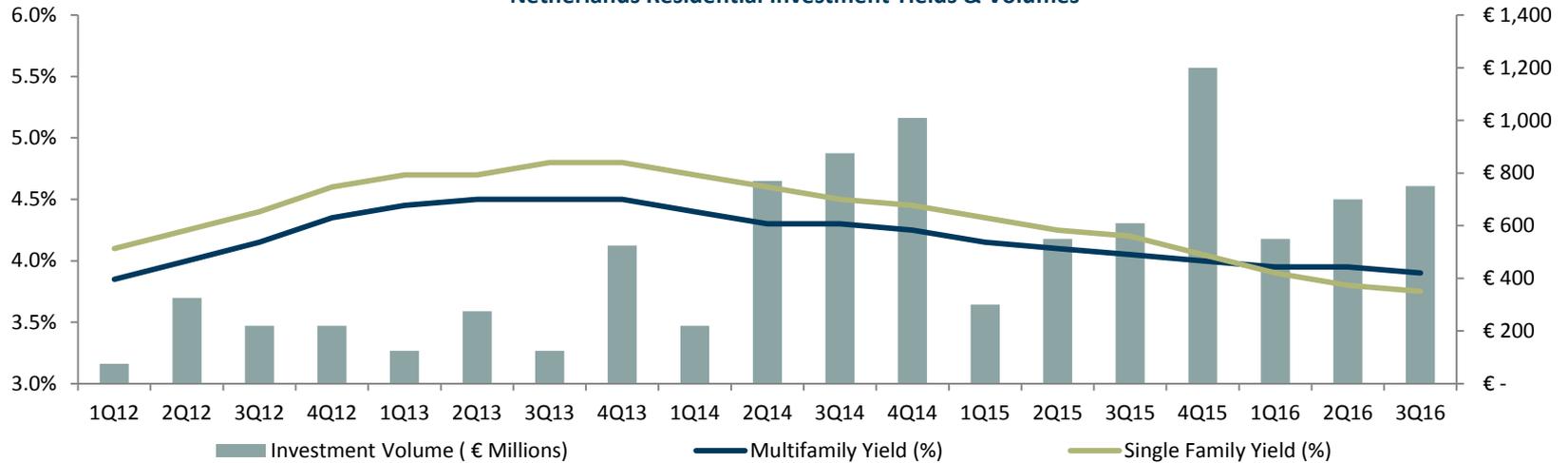
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# German Residential Market, Though Regulated, Offers Reliable Returns

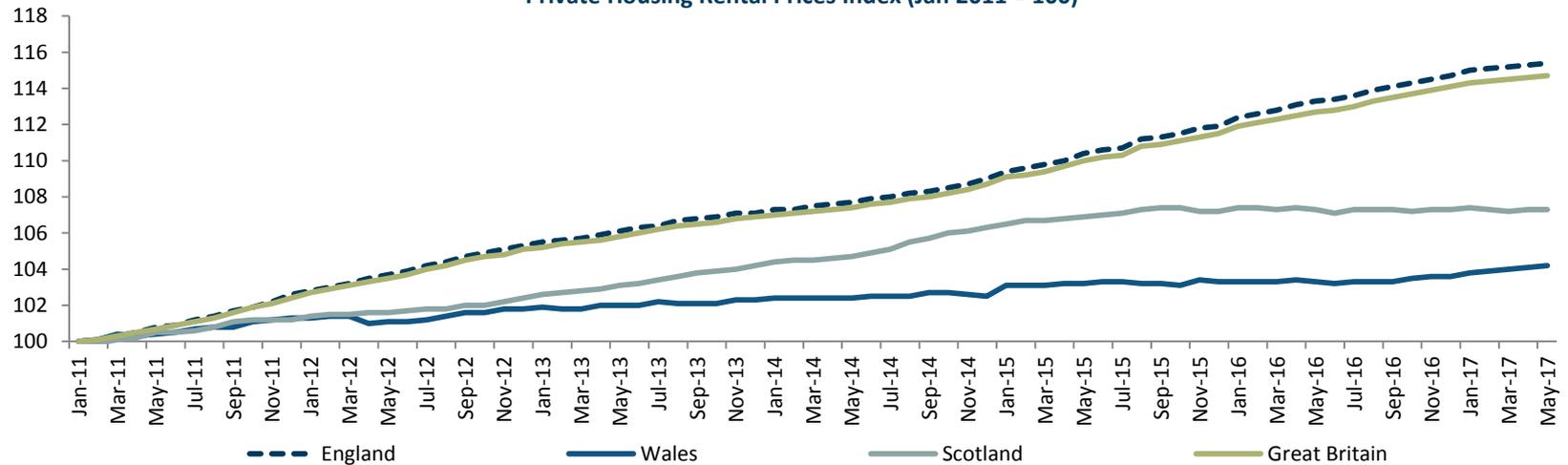


# Likewise, Healthy Fundamentals Exist in Netherlands and U.K. Residential Sectors

Netherlands Residential Investment Yields & Volumes



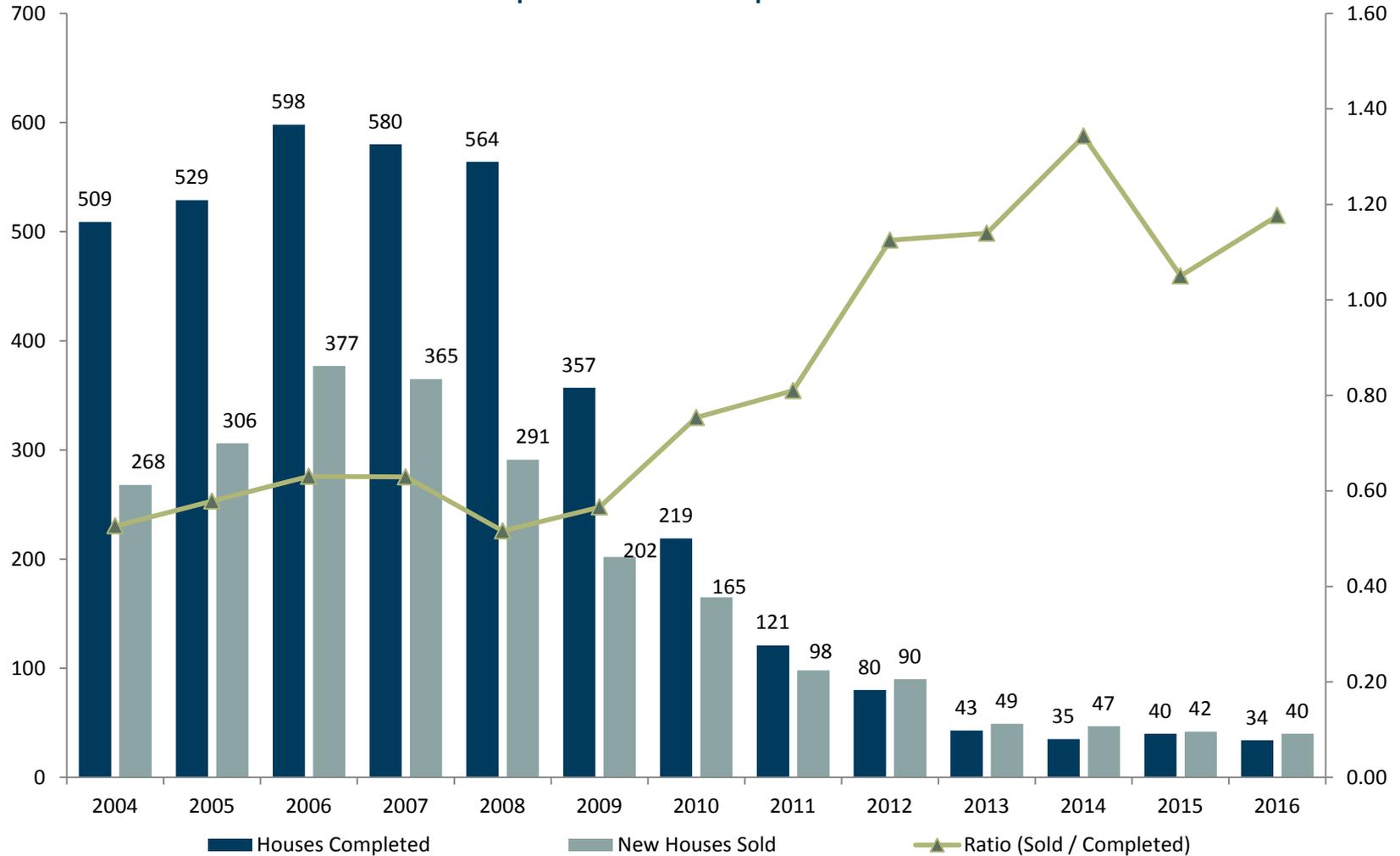
Private Housing Rental Prices Index (Jan 2011 = 100)



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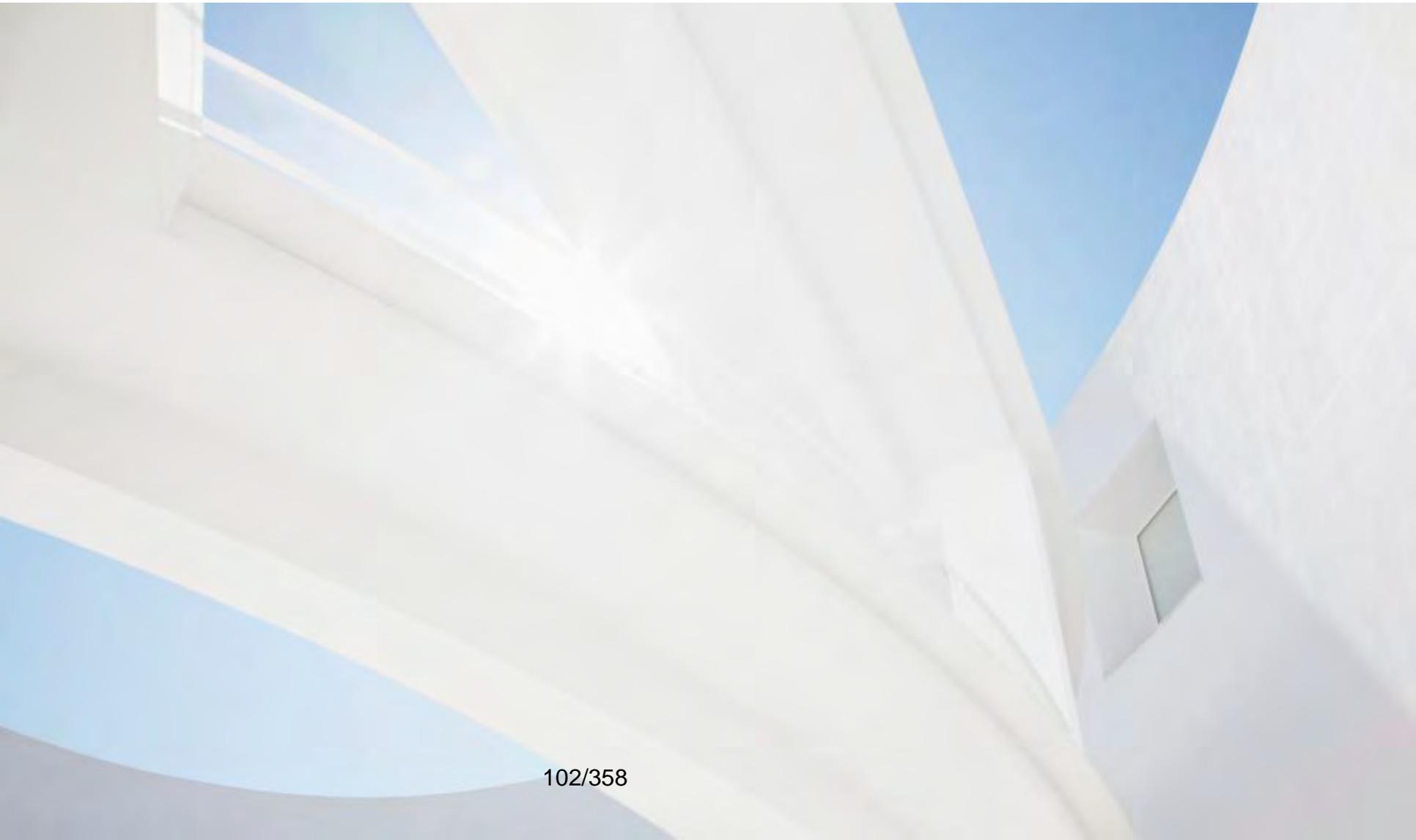
# Spain Residential Experiencing Gradual Recovery In Market Fundamentals

Spain Residential Completions & Sales



101/358

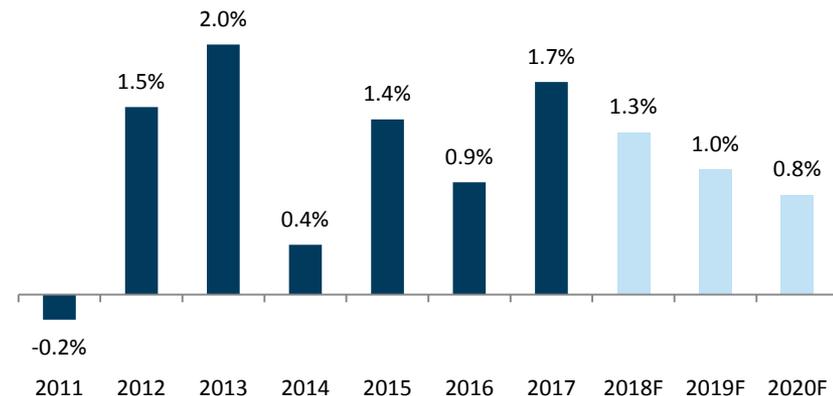
# Asia Pacific: Investment Themes



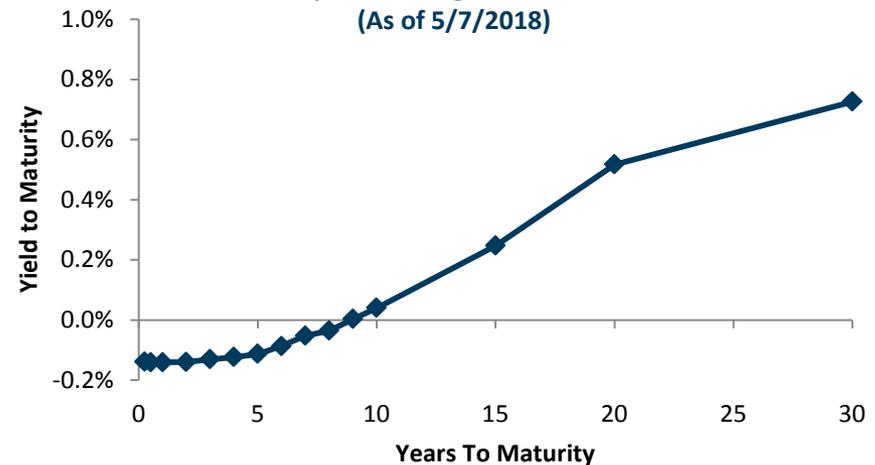
## Japan: Positive Growth Promoted by Monetary Policy

- Japan's economy has benefitted from continued loose monetary policy, but growth forecasts going forward are moderating
- The long end of the yield curve and real GDP growth prospects are driven by population growth, which continues to be the limiting factor
- Low unemployment (~3%) should lead to moderate real wage growth, assuming the economy continues to expand
- 3-month JPY Libor is below 0%, and financing may be available for L + 175 bps or less for good quality real estate, providing a very attractive boost to equity returns
- Given limited growth prospects, preference should be to execute on transactions which primarily derive returns from the income component of the real estate, with modest value-add component

Japan Real GDP (YoY%)

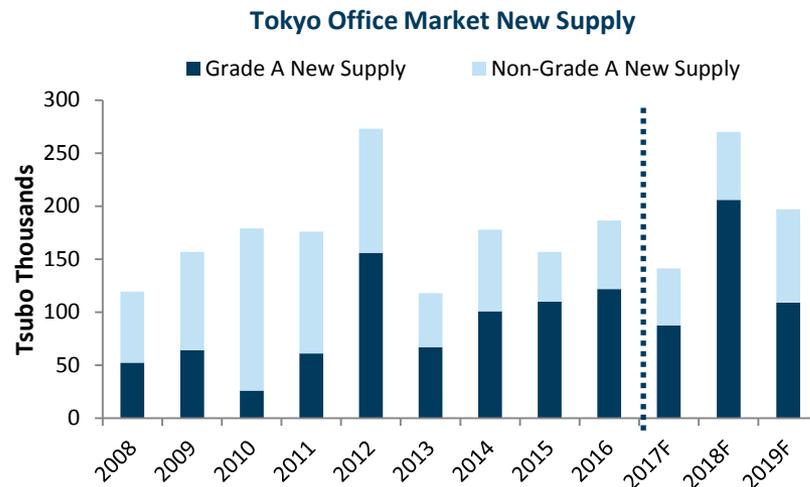
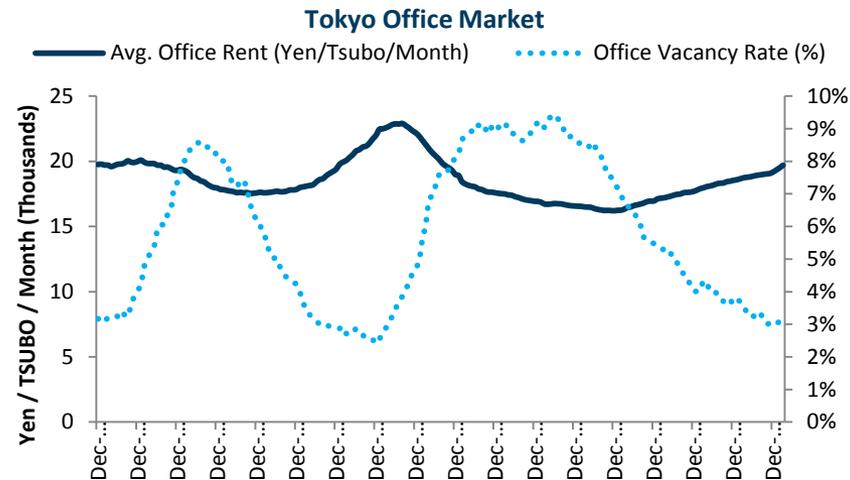


Japan Sovereign Yield Curve  
(As of 5/7/2018)



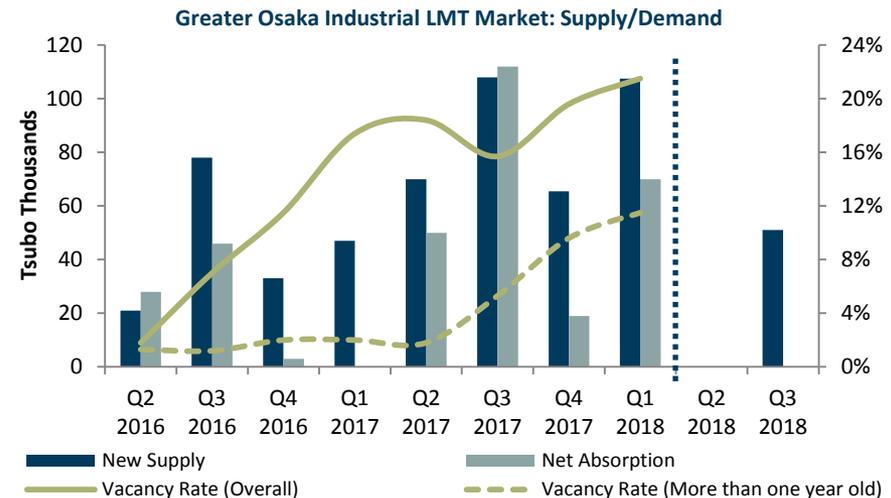
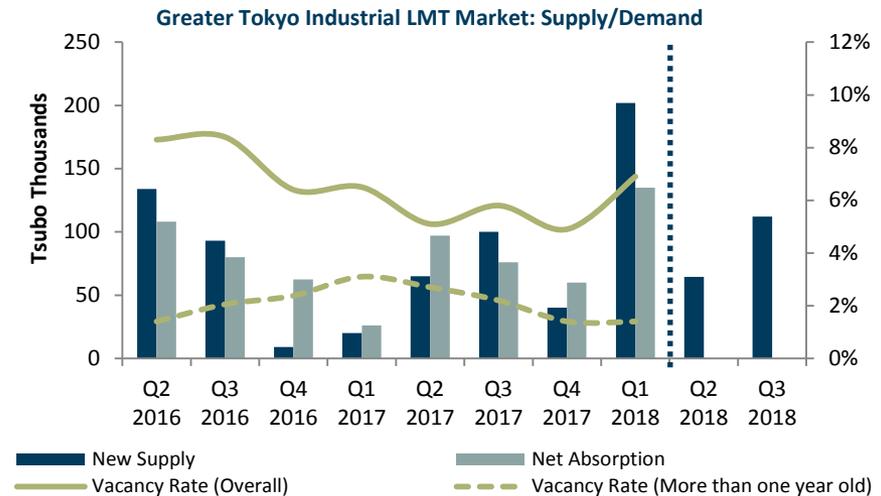
## Japan: Tokyo Office Market Faces Rising Supply

- Given an improving economic back drop and a moderate urbanization trend, Tokyo's office market fundamentals have improved, with vacancy reaching the low single digits and rent trending upwards since late 2013
- Prime office assets currently trade around 3.5-4.0%; although these asset valuations have recently begun showing softness, given similar assets were trading below 3.5% in 2016
- Going forward, new supply is forecasted to outpace demand and limit rent growth, particularly in the higher-quality space
  - Despite low vacancy rates, the wave of new supply in 2018 is expected to limit or even decrease effective rent growth year over year
  - Grade A minus and B office assets will likely see a limited impact from the new supply
- The labor market is becoming increasingly tight in Japan, with employment dropping below 3%, which has the possibility of translating to real wage growth and higher rates of inflation
- Regional cities have also witnessed limited new supply and compressing yields, but lack the liquidity and breadth of opportunity that Tokyo provides and require more experienced managers



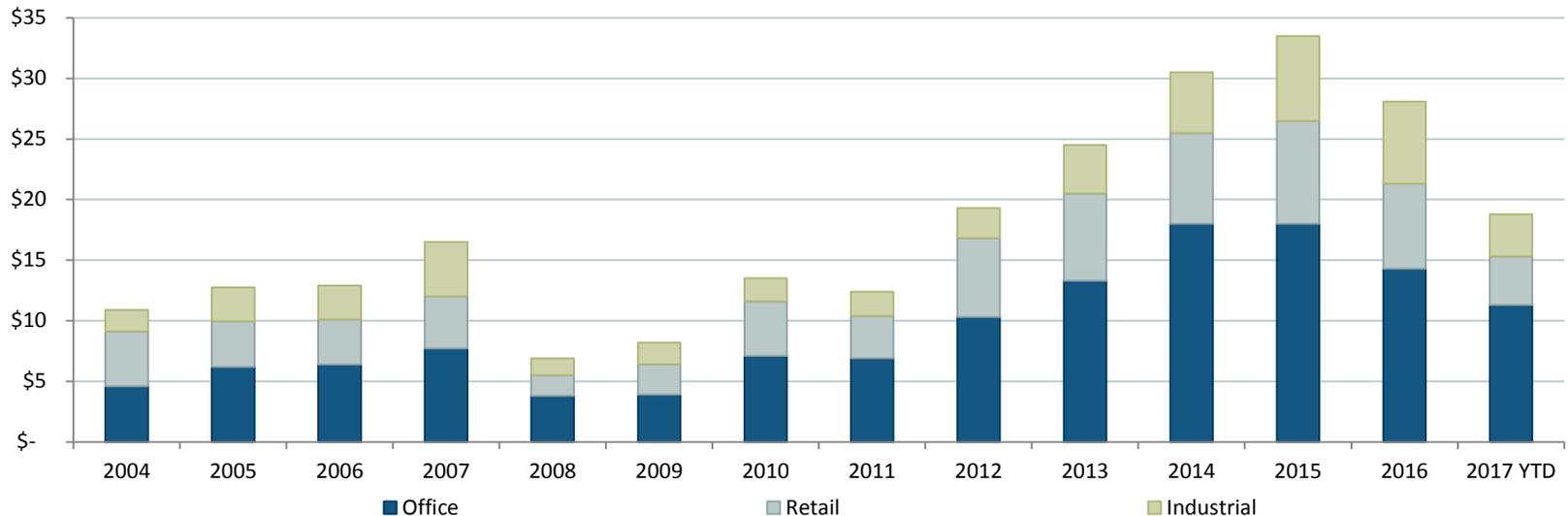
## Japan: Industrial Market Experiencing Wave of New Supply

- Japan's industrial sector has benefitted from strong e-commerce and trade-driven take-up, but continues to experience elevated levels of supply
- Industrial cap rates have compressed to 4.5-5.0% in Tokyo and 5.0-5.5% in Osaka
- Osaka is at the forefront of the oversupply issue, with vacancy rates for the general market rising above 20%, which translated to a 3.5% rental decline year-over-year
- Low cost of financing will continue to fuel new supply and has already begun softening rent growth forecasts
- Old spec buildings, which don't meet the requirements of the third-party logistics companies, are at the highest risk of obsolescence
- Given market conditions, Townsend favors acquiring properties where rents are still below market and have the ability to grow rents through value add activities and taking re-leasing risk



## Australia: Real Estate Transaction Markets Remain Robust

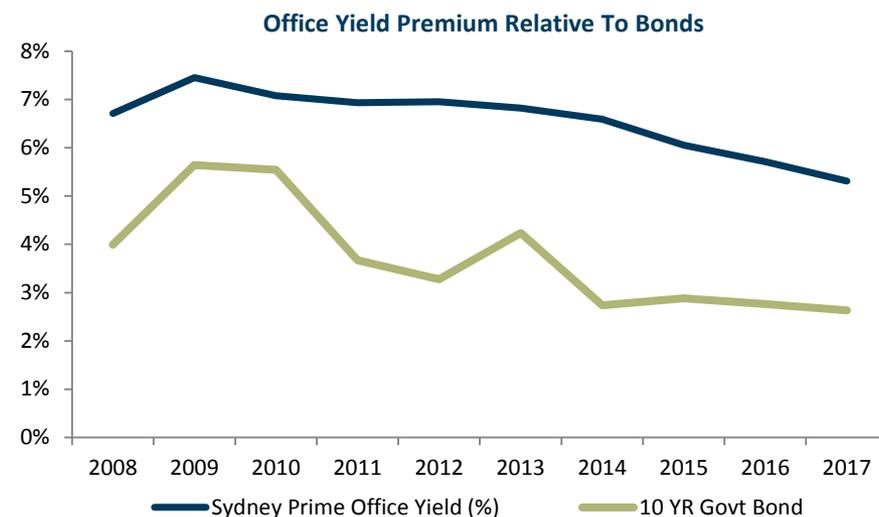
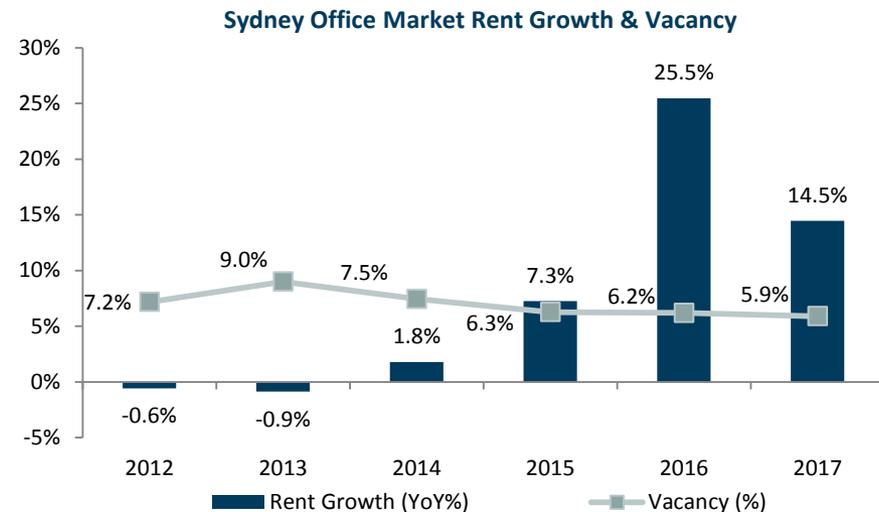
Australia's CRE Market Transaction Volume



- Foreign investor share of transaction volume in Australia is 37%, despite the incremental tax burden of investing in Australia, which typically reduces total returns by a minimum of 15% (even with the most efficiently managed investment trust vehicles)
- Similar to many developed economies, property and bond yields have declined significantly in tandem, at least in part driven down by foreign investors seeking to harvest the attractive yield premium Australia presented relative to other developed economies
- Near term, property yields are expected to remain flat with the potential for yield spreads over bonds to temporarily tighten, as the Reserve Bank of Australia may raise rates to temper asset pricing in the midst of the global economic upswing
- Office markets, especially in the CBD of Sydney and Melbourne, continue to harbor much of the liquidity within Australia's commercial real estate market

## Australia: Rent Growth Driven Office Market (Sydney)

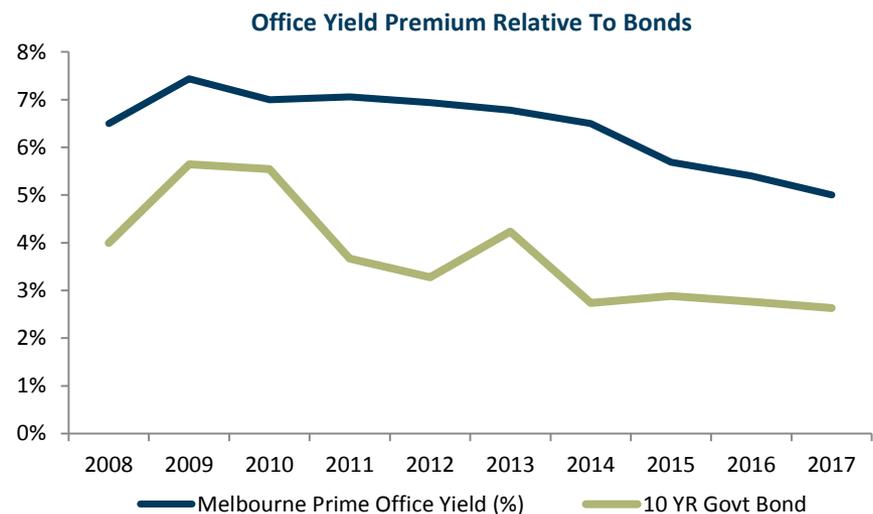
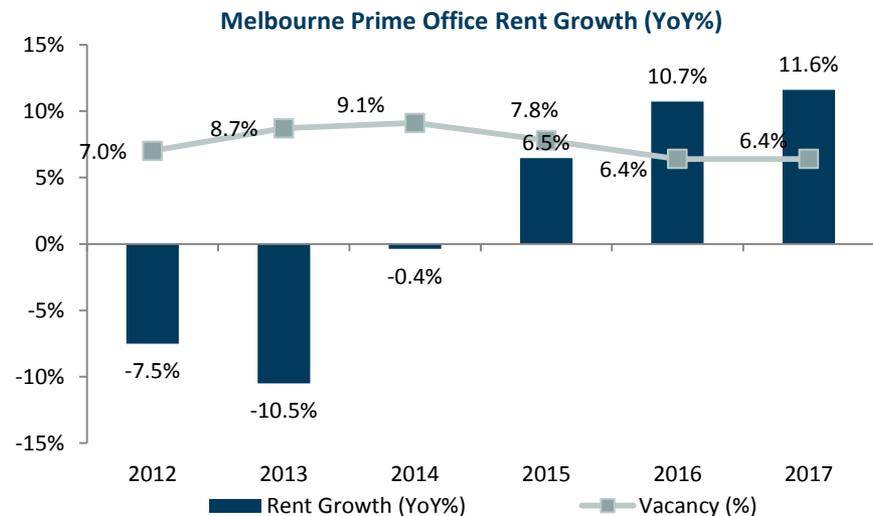
- The Sydney office market has come roaring back, featuring double-digit rental rate growth for the last two years
- Double-digit rent growth is expected to continue in the near term, driven by very limited product coming online until 2020-2021 and an already low vacancy rate in the single digits (~6.0%)
- Healthy vacancy rates, economic growth, and population growth will continue to support fundamentals of an already boisterous office market
- Given a story supporting the underwriting of such high growth rates, prime Sydney office has transacted more recently within the low 4.0% cap rate range
- Office yields remain at a healthy premium over government bond yields, indicating asset pricing remains reasonable
- Planned substantial investment in infrastructure is occurring in Sydney, leading to up-and-coming markets such as the Parramatta submarket, located outside of the downtown CBD



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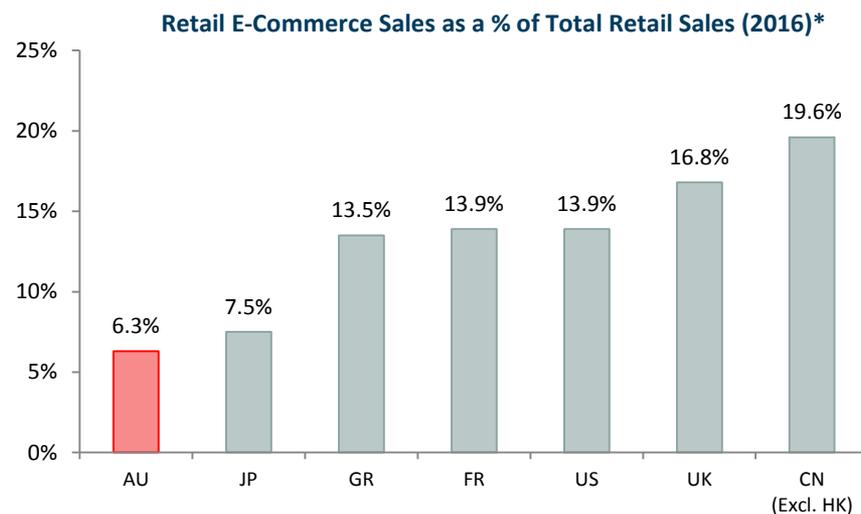
## Australia: Rent Growth Driven Office Market (Melbourne)

- Similar to Sydney, Melbourne has more recently posted double-digit rental growth on the back of a tightening office market, indicated by single-digit vacancy rates
- While Melbourne has more near-term supply in its pipeline and vacancy rates are expected to rise 3-4% over the next few years, the city has a few enhanced demand factors relative to Sydney:
  - Higher population growth rate (+2.4% p.a.)
  - Higher job growth rate (+3.2% p.a.)
- Melbourne has also planned substantial investment in infrastructure to support the rapidly growing population
- The University of Melbourne, the second-highest rated university in Australia, provides a continuous source of economic stimulus for the local economy with over 40,000 enrolled students
- While office yields have tightened similar to Sydney, the yield premium remains healthy over government bond yields
- Both cities are supported by additional intangibles such as beautiful weather and English as a first language, both of which are particularly attractive to international students



## Australia: Retail Yields Tight, Despite Muted Growth Expectations

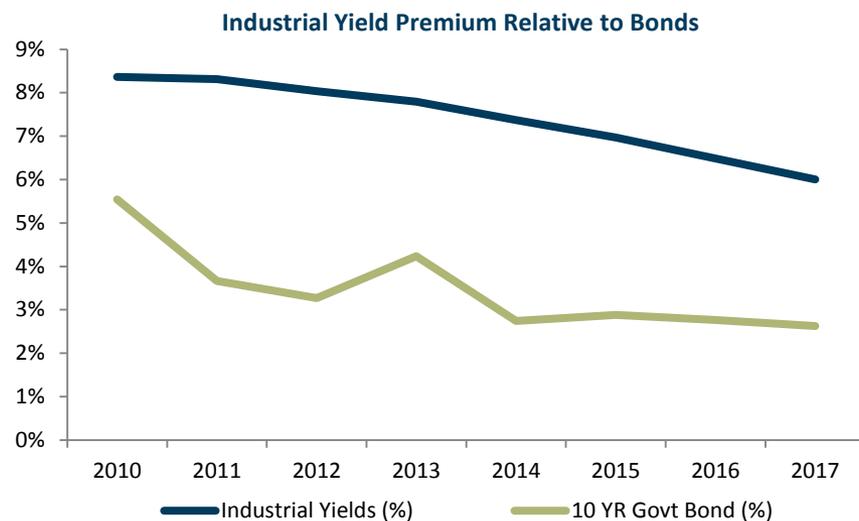
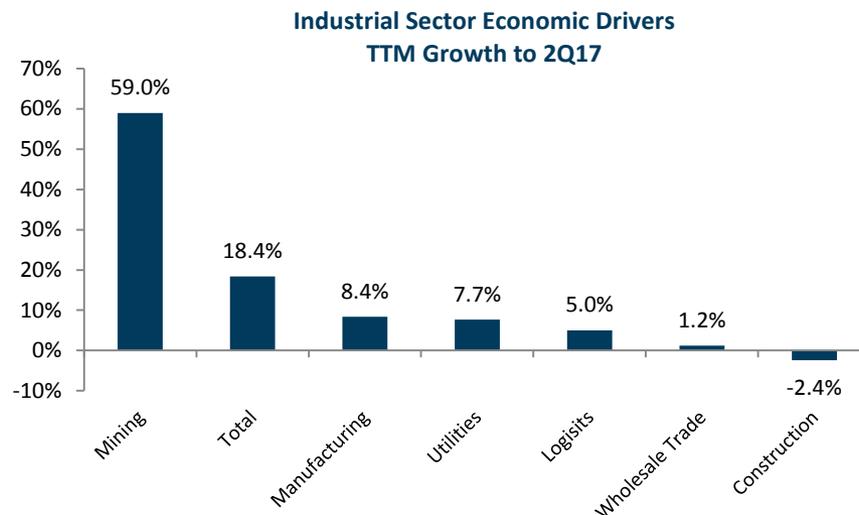
- On the surface, strong GDP growth and elevated population growth would historically provide an exciting back drop for retail, but...
- Retail asset yields remain tight, recently trading between 4-5% in Sydney and Melbourne
- Broadly speaking, retail sales growth in Australia has already begun moderating, which is not a promising trend given limited e-commerce competition
- E-commerce continues to be a relatively small force in the retail market (~6% of sales), but we expect this to trend more inline with other developed economies long term
- Amazon announced in the summer of 2017 that it will be opening its first logistics warehouse in Australia, with an expansion of its service in Australia expected to follow suit
- As we've witnessed in the U.S., a repricing of retail assets will need to take place as managers underwrite elevated capital expenditures to stay competitive in the shifting retail landscape



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## Australia: Industrial Cap Rate Compression with Continued Strong Demand

- Significant cap rate compression has occurred in industrial assets, equaling nearly 250 bps on average in Sydney and Melbourne to 6.0%
- Given sufficient land available for development on the outside of the downtown metros, barriers to entry for industrial are weak and supply is more likely able to meet demand
- There is very limited opportunity in the Core space for industrial assets, given competition from superannuation funds that are more tax efficient and heavily favor assets with long WALEs
- Opportunity to create higher returns exists by taking the lease-up risk of assets with near-term rollover and then exiting to Core or superannuation funds
- Rent growth has historically been moderate to flat in areas such as West Melbourne or South Brisbane, with areas like West Sydney, where growth is stronger, being the exception
- While Amazon's entrance into the industrial market in Australia is a negative for the retail industry, it could create stronger demand in the industrial and warehouse sectors

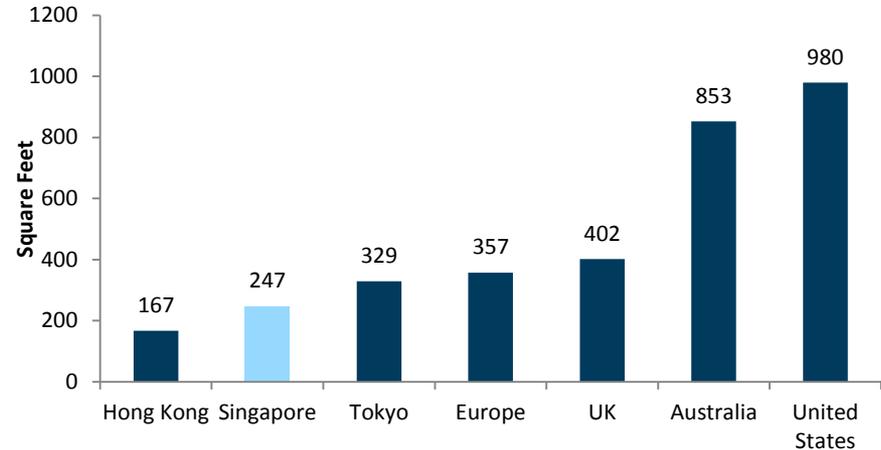


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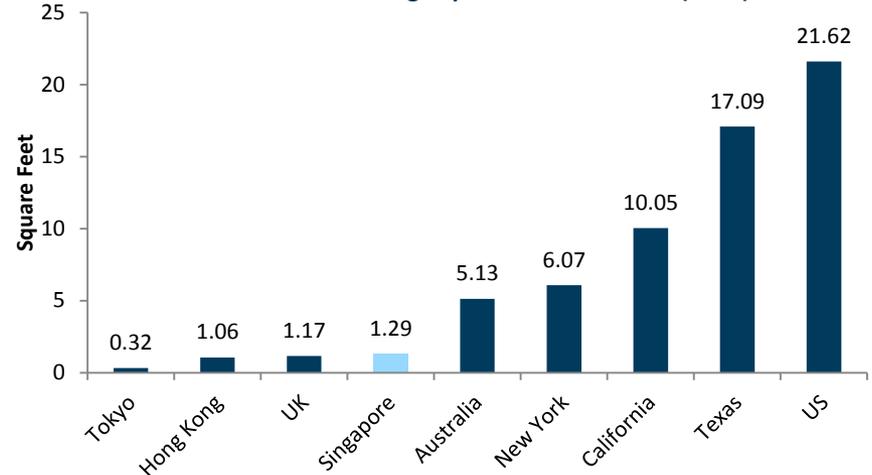
# Singapore: Self-Storage an Emerging Investment Opportunity

- Self-storage in Singapore remains an emerging product type, with limited supply in circulation
- Given the complete lack of affordable residential space, economic circumstances force consumers to seek out temporary storage primarily due to three major life events:
  - Divorce: Becoming more commonplace
  - Death: Aging population will drive rates upward
  - Relocation: Naturally in transitional periods of life
- Economically, self-storage presents a higher and better use than industrial, thus industrial assets present an economically attractive acquisition
- Development of self-storage space is structurally simple, with limited lead time to finished product; initial j-curve of investment period with no cash yield minimized

**Household Space Per Person (2015)**

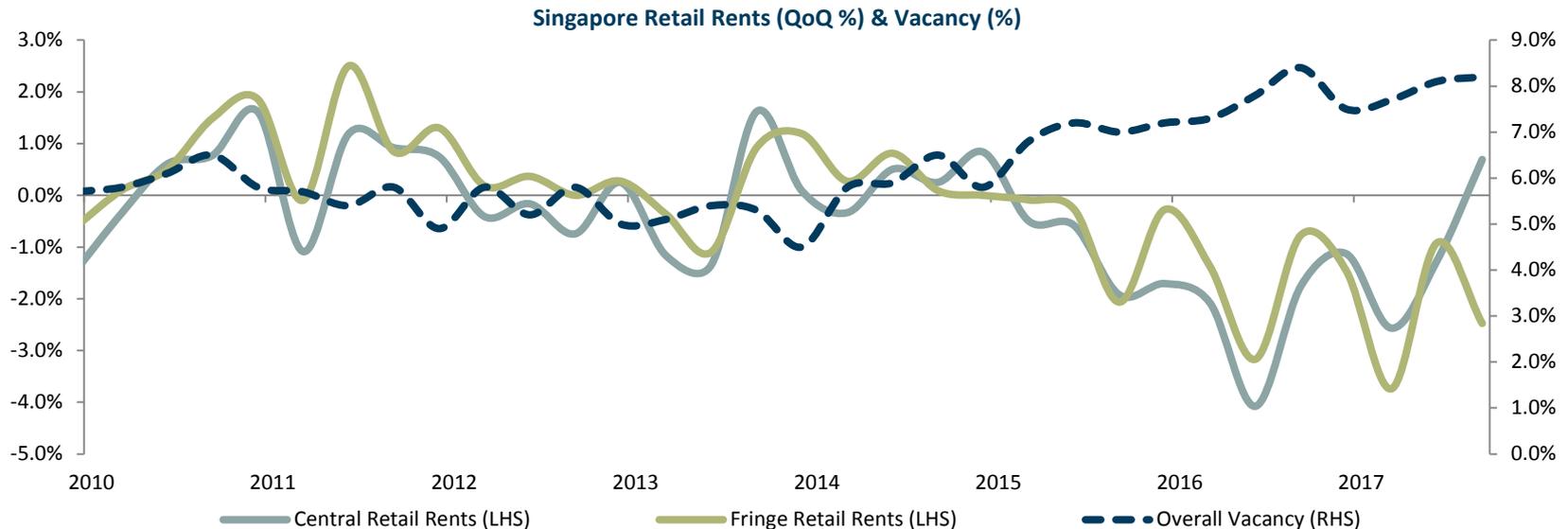


**Rentable Self Storage Space Per Household (2015)**



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## Singapore: Retail Continues To Struggle



- Singapore retail continues to struggle with the shifting landscape, where consumer preferences and spending habits have tilted towards experiential retail (e.g. food, beverage, gyms, etc.)
- Retailers' struggle to adapt has been amplified by Singapore's history as a luxury shopping destination, particularly wealthy Chinese whose personal preference has shifted more towards domestic consumption
- In recent years, increasing retail vacancy rates have placed additional stress on rental rates, which have consistently decreased quarter over quarter since early 2015
- Given Singapore's retail is trading at yields in the low 5% range, even with negative rent growth and increasing vacancy, the pricing of these assets continues to be unattractive; Super Core assets rarely, if ever, trade in these markets

# Disclosures



# Disclosures

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**The NFI-ODCE Index** is a capitalization-weighted, gross of fees, time-weighted return index with an inception date of 1/1/1978. Published reports may also contain equal-weighted and net of fees information. Open-end funds are generally defined as infinite-life vehicles consisting of multiple investors who have the ability to enter or exit the fund on a periodic basis, subject to contribution and/or redemption requests, thereby providing a degree of potential investment liquidity. The term Diversified Core Equity style typically reflects lower risk investment strategies utilizing low leverage and generally represented by equity ownership positions in stable U.S. operating properties (as defined herein). The NFI-ODCE is a quasi-managed index based on the periodic review by the Index Policy Committee ("IPC") of the index's criteria thresholds.

**The S&P 500 Index** is an unmanaged market capitalization weighted index of 500 common stocks chosen for market size, liquidity, and industry group representation to represent U.S. equity performance.

**The Barclays U.S. Aggregate Bond Index** is a broad-based benchmark that measures the investment grade, U.S. dollar-denominated, fixed-rate taxable bond market. The index includes Treasuries, government-related and corporate securities, MBS (agency fixed-rate and hybrid ARM pass-throughs), ABS and CMBS (agency and non-agency).

Index figures do not reflect deduction of fees, expenses, or taxes. One cannot invest directly in an index.

**Value-Added:** Funds that generally include a mix of core investments and others that will have less reliable income streams. The portfolio as a whole is likely to have moderate lease exposure and moderate leverage. As a result, such portfolios should achieve a significant portion of the return from appreciation and are expected to exhibit moderate volatility.

**Opportunistic:** Funds of preponderantly non-core investments that are expected to derive most of their returns from appreciation and/or which may exhibit significant volatility in returns. This may be due to a variety of characteristics such as exposure to development, significant leasing risk, high leverage, or a combination of risk factors.

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# Orange County Employees Retirement System

## OCERS Actuarial Topics Board Offsite

**September 12, 2018**

*Paul Angelo, FSA*

*Segal Consulting*

*San Francisco*

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# Agenda

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- Sensitivity Analyses
- UAAL Amortization: History and Mechanics
  - Change in discount rate
- UAAL Contribution Methodology
  - Basis for collection: percent of pay or dollar amount
  - Structure of payments: level percent of pay or level dollar amount
    - Effect on employer contribution volatility

# Review of Scope and Terminology (from new Actuarial Standard on Risk Assessments)

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- Scenario testing – impact of occurrence of possible event(s)
  - Illustrations prepared each year show impact of one year of favorable or unfavorable market return
  - Metrics studied, both by rate group and for entire plan
    - Employer contribution rate
    - Funded ratio
    - Unfunded Actuarial Accrued Liability (UAAL)
  - Annual scenario testing presented at July 2018 Board meeting
- Sensitivity testing – impact of change in actuarial assumption(s)
  - Same metrics but using alternative long term economic assumptions (i.e., different from those used in 12/31/17 valuation)
    - Also includes effect on Member contribution rates
  - Performed in 2018 even though no experience study scheduled until 2020
  - Results only for entire plan

# OCERS Sensitivity Testing – Hypothetical Impact of Alternative Economic Assumptions

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- Illustrates “what if” impact of changes to current economic assumptions
  1. Inflation (2.75% used in 12/31/17 valuation)
    - COLA increases for retirees
    - Component of salary increases for actives and wage increases for amortizing UAAL
    - Component of investment return assumption
  2. Real return (4.25% used in 12/31/17 valuation)
  3. Investment return (7.00% used in 12/31/17 valuation)
    - In practice, only two alternative assumptions are identified
      - Since  $\text{Inflation} + \text{Real Return} = \text{Investment Return}$

# OCERS Economic Assumptions

	<u>12/31/17 Valuation</u>		<u>12/31/14-16 Valuation</u>		<u>12/31/12-13 Valuation</u>		<u>12/31/11 Valuation</u>	
	<u>Return</u>	<u>Pay*</u>	<u>Return</u>	<u>Pay*</u>	<u>Return</u>	<u>Pay*</u>	<u>Return</u>	<u>Pay*</u>
<b>Price Inflation</b>	2.75%	2.75%	3.00%	3.00%	3.25%	3.25%	3.50%	3.50%
<b>Real Wages</b>	n/a	0.50%	n/a	0.50%	n/a	0.50%	n/a	0.25%
<b>Net Real Return</b>	4.25%	n/a	4.25%	n/a	4.00%	n/a	4.25%	n/a
<b>Total</b>	7.00%	3.25%	7.25%	3.50%	7.25%	3.75%	7.75%	3.75%

\* Excludes Merit and Promotion component of assumed individual salary increases.

# Sensitivity Testing – Alternative Economic Assumptions

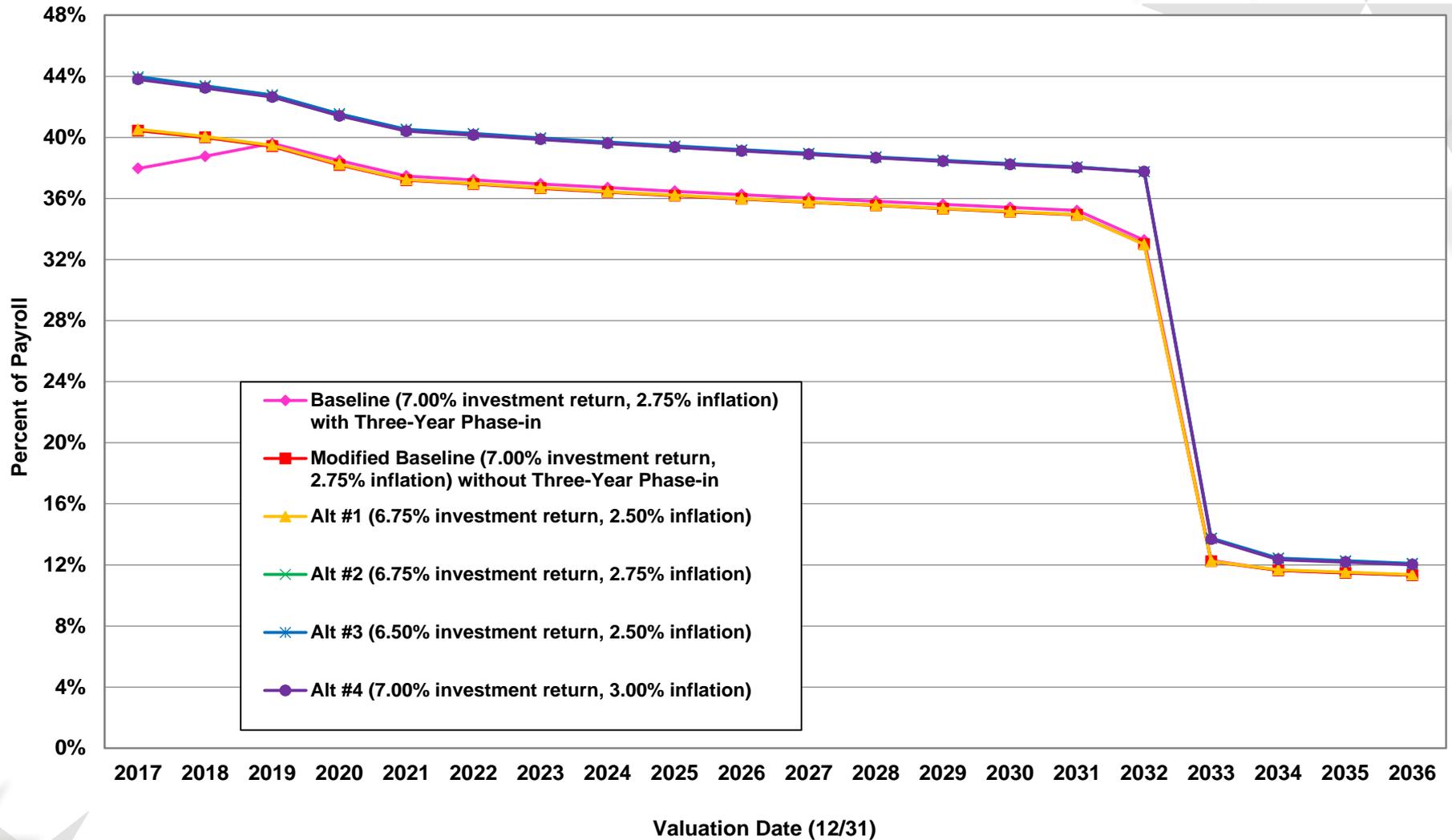
- As proposed by Segal and approved by OCERS
  - These alternatives are not necessarily assumptions Segal would recommend in any future triennial experience study
  - Note Baseline modified to exclude three year phase of cost impact of recent assumption changes

	Inflation	Real Return	Investment Return
Baseline (current assumptions)	2.75%	4.25%	7.00%
Alt #1: Lower inflation only	2.50%	4.25%	6.75%
Alt #2: Lower real return only	2.75%	4.00%	6.75%
Alt #3: Lower inflation and lower real return	2.50%	4.00%	6.50%
Alt #4: Higher inflation and lower real return	3.00%	4.00%	7.00%

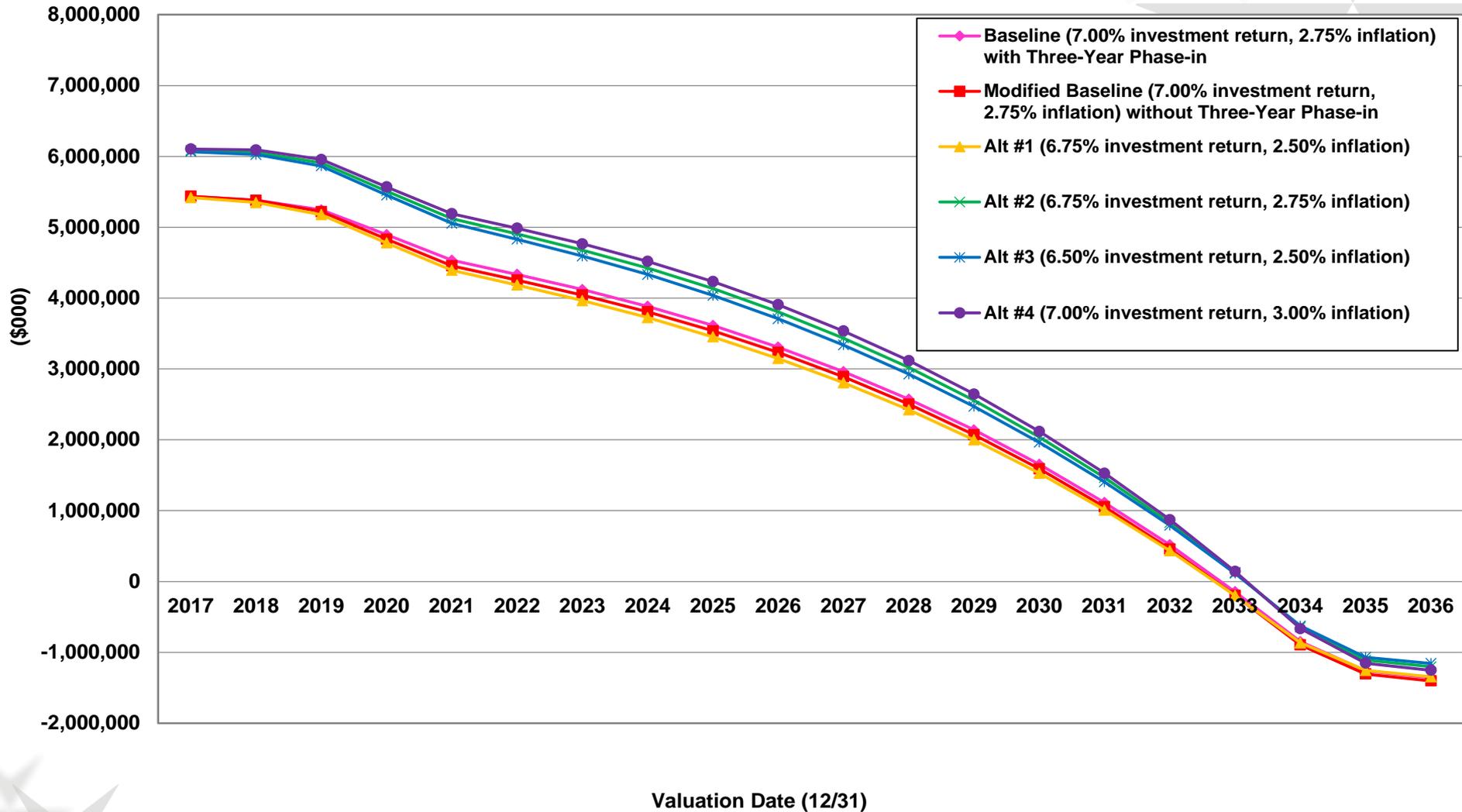
- Results show which alternatives have very similar costs:
  - Baseline and Alt #1 have similar costs
  - Alts #2, #3 and #4 have similar (higher) costs

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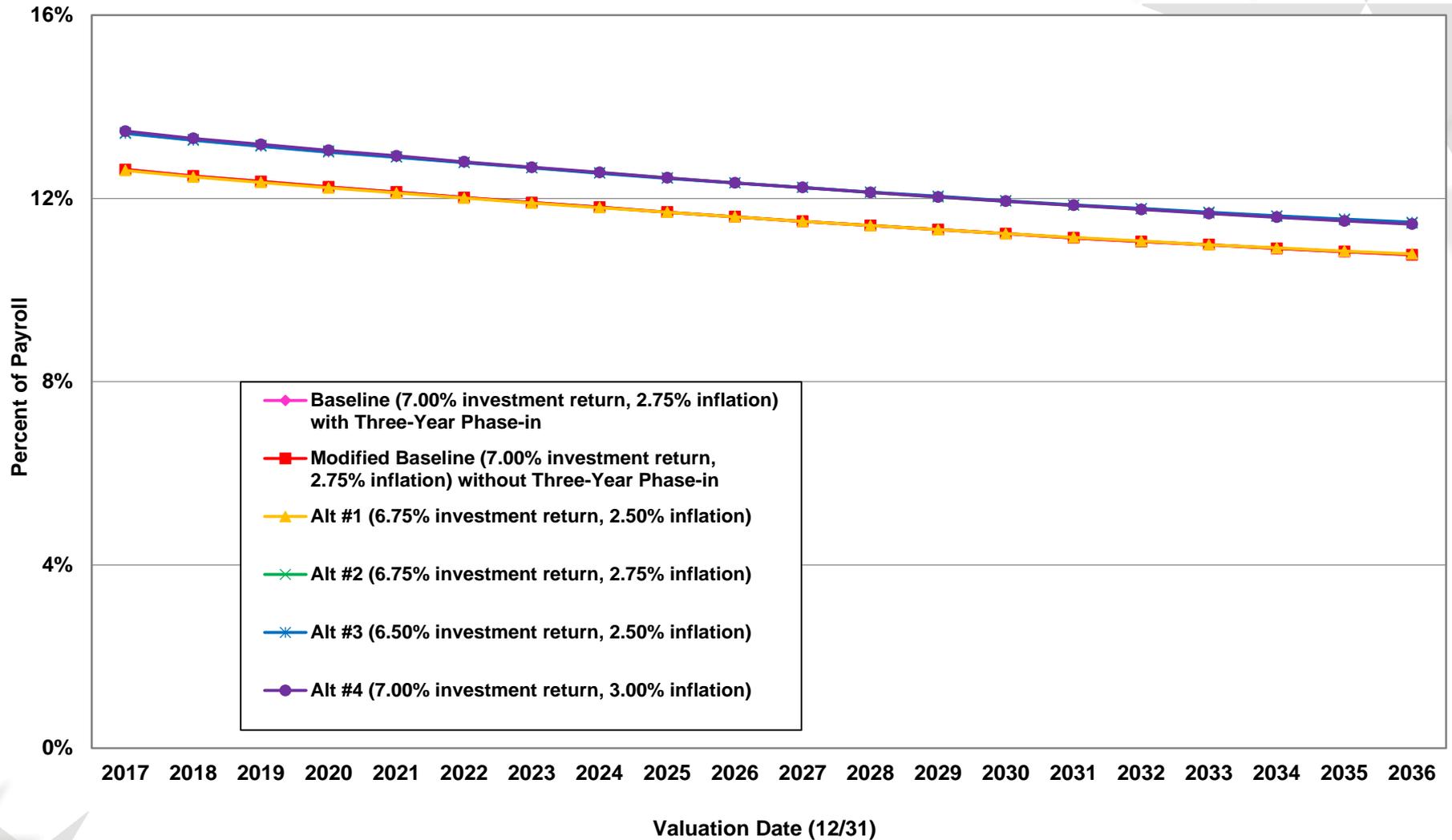
# Projected Employer Rates for Aggregate Plan



# Projected UAAL for Aggregate Plan



# Projected Member Rates for Aggregate Plan





# Funding Policy Components

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- **Actuarial Cost (or Funding) Method** – allocates present value of member's projected benefits to years of service: past, current and future
  - Defines Normal Cost and Actuarial Accrued Liability (AAL)
- **Asset Smoothing Method** – determines an Actuarial Value of Assets that recognizes investment gains or losses over a period of time
  - Manages short term volatility while tracking market value
  - Defines the Unfunded Actuarial Accrued Liability (UAAL)
- **UAAL Amortization Policy** – sets contributions to systematically reduce any UAAL
  - Includes structure, periods and pattern of payments

# Funding Policy – Cost Elements

**Present Value of Future Benefits**

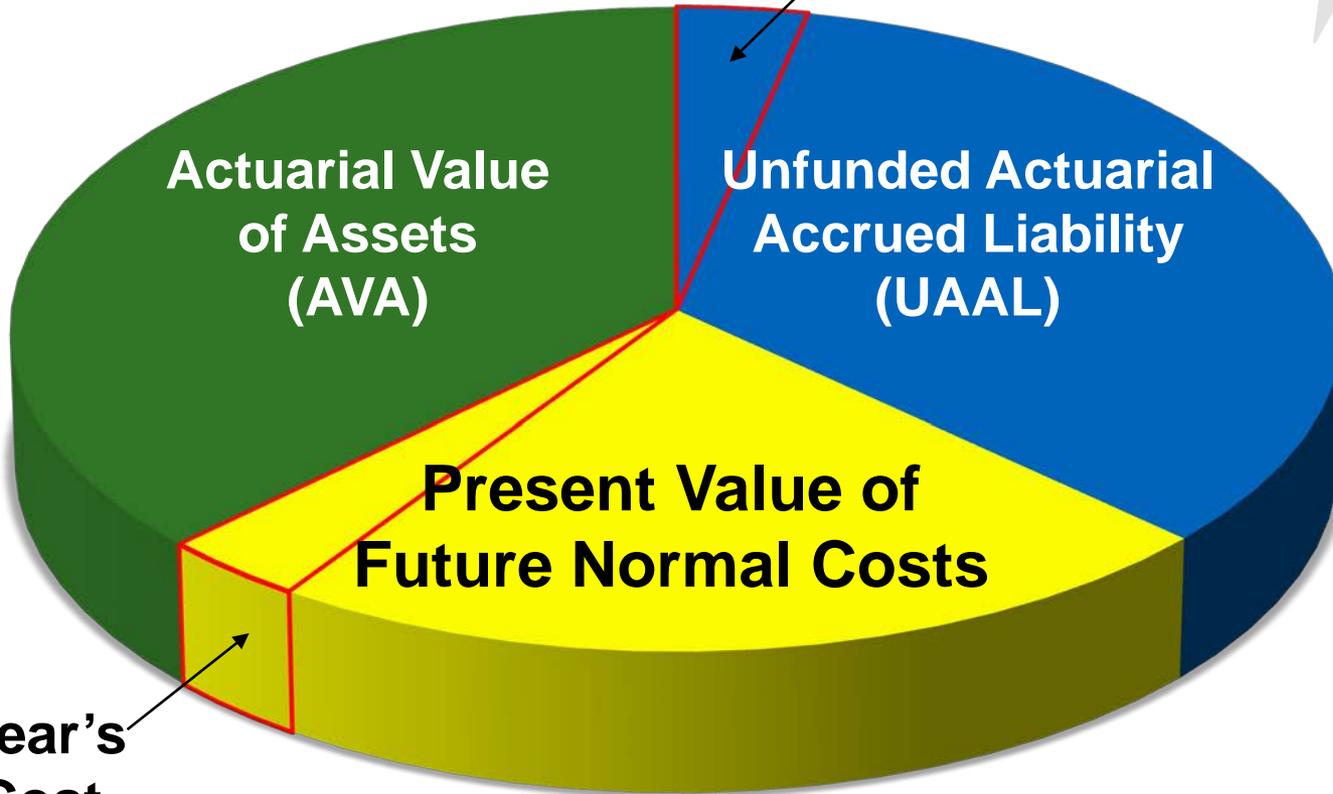
**Current Year's  
Amortization of UAAL**

**Actuarial Value  
of Assets  
(AVA)**

**Unfunded Actuarial  
Accrued Liability  
(UAAL)**

**Present Value of  
Future Normal Costs**

**Current Year's  
Normal Cost**



# UAAL Amortization Policy History and Mechanics

- UAAL amortization policy reaffirmed in April 2018
  - Continuation of 2013 revisions to UAAL amortization policy
    - First applied in 12/31/2013 valuation
    - 12/31/2012 UAAL layers combined and reamortized over 20 years
    - Amortization policy for changes in UAAL after 12/31/2012

Source	Years
Actuarial gains or losses	20
Assumption or method changes	20
Plan amendments	15
Early Retirement Incentives	Up to 5
Actuarial surplus	30

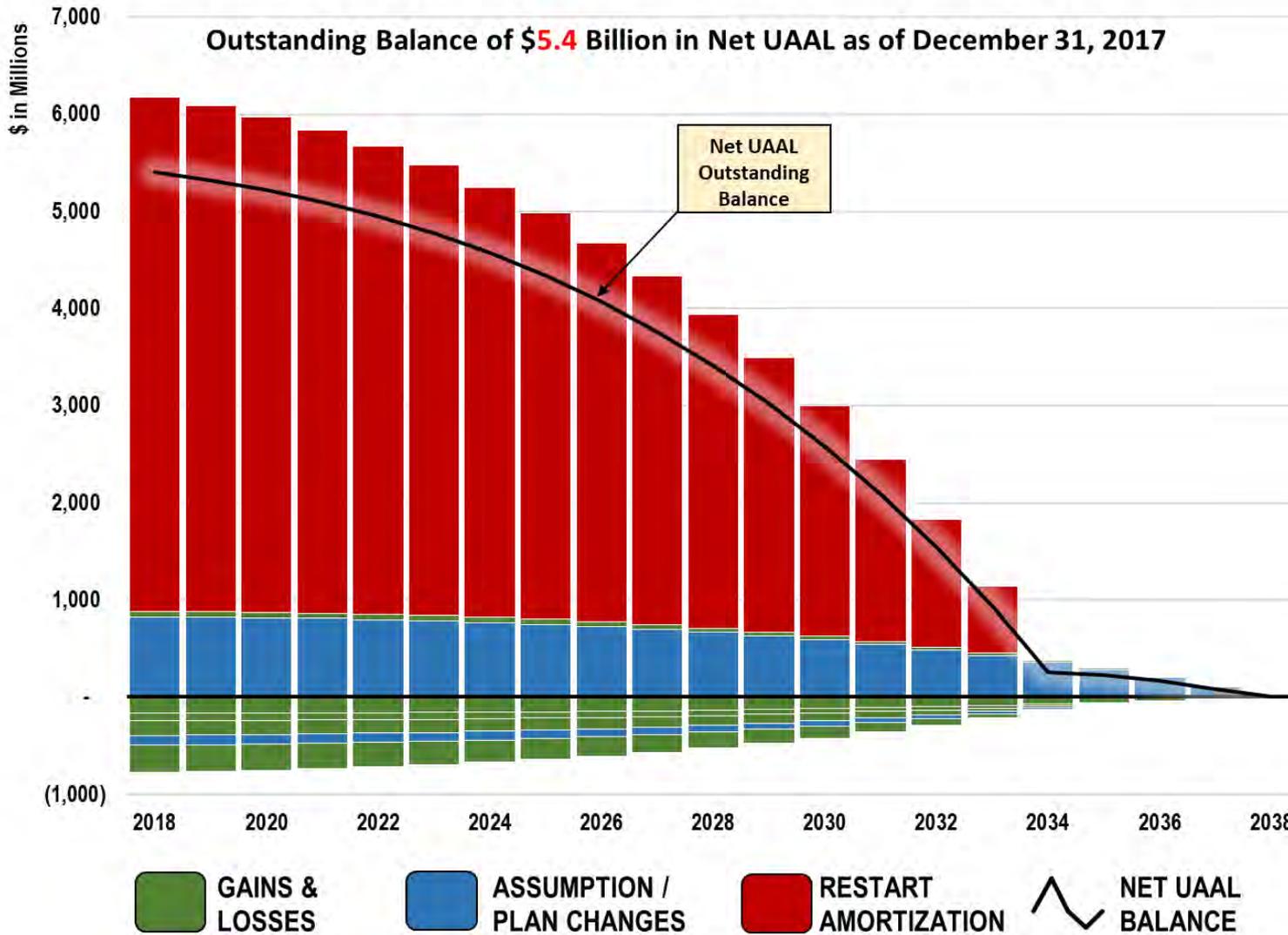
- Continuation of level percent of payroll amortization

# OCERS UAAL Amortization Layers as of Dec. 31, 2017

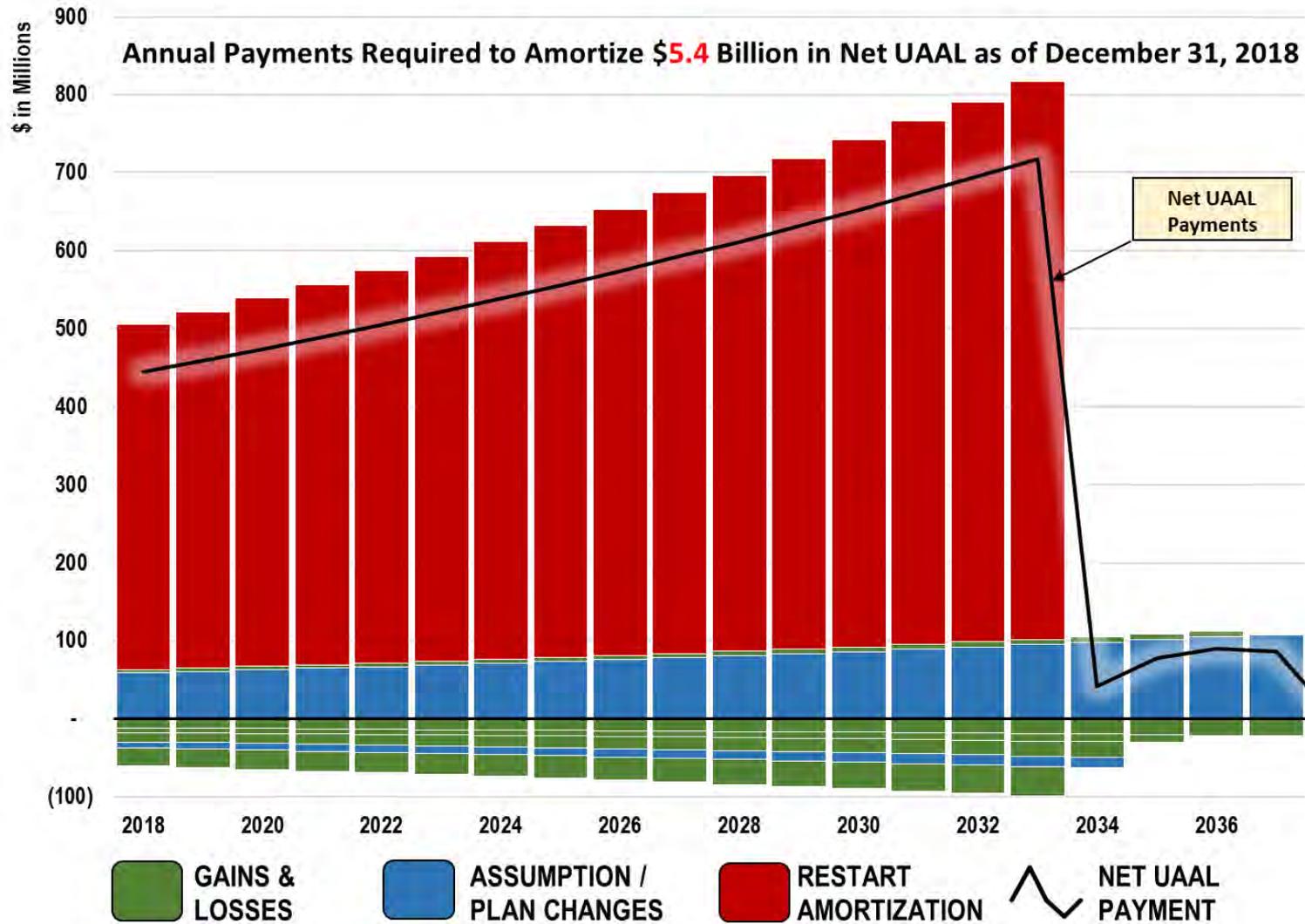
## UAAL Amortization Schedule as of December 31, 2017 (from page 119 of December 31, 2017 Actuarial Valuation Report)

Rate Groups	Date Established	Source	Initial Base	Years Remaining	Remaining Base	Amortization Amount
All Rate Groups Combined Excluding O.C. Vector Control, Department of Education, U.C.I., Cypress Parks and Recreation and O.C. Sanitation District						
	12/31/2013	Restart amortization	\$5,407,593,000	16	\$5,295,408,000	\$442,606,000
	12/31/2013	Actuarial (gain) or loss	(282,229,000)	16	(276,377,000)	(23,100,000)
	12/31/2014	Actuarial (gain) or loss	(152,205,000)	17	(150,361,000)	(12,022,000)
	12/31/2014	Assumption changes	(104,247,000)	17	(102,824,000)	(8,221,000)
	12/31/2015	Actuarial (gain) or loss	(75,507,000)	18	(75,081,000)	(5,760,000)
	12/31/2016	Actuarial (gain) or loss	56,369,000	19	56,281,000	4,156,000
	12/31/2017	Actuarial (gain) or loss	(168,305,000)	20	(168,305,000)	(11,995,000)
	12/31/2017	Assumption changes	822,683,000	20	<u>822,683,000</u>	<u>58,634,000</u>
Subtotal					\$5,401,424,000	\$444,298,000
Rate Group #1 – Plans A, B and U (non-OCTA, non-OCSD) for O.C. Vector Control					\$2,052,000	
Rate Group #1 – Plans A, B and U (non-OCTA, non-OCSD) for Department of Education					\$3,046,000	
Rate Group #1 – Plans A, B and U (non-OCTA, non-OCSD) for U.C.I.					\$30,927,000	
Rate Group #1 – Plans A, B and U (non-OCTA, non-OCSD) for Cypress Parks and Recreation					\$853,000	
Rate Group #3 – Plans B, G, H and U (OCSD)					\$0	
Grand Total					\$5,438,302,000	

# OCERS Layered UAAL Amortization Balances as of December 31, 2017 before Additional Breakdown



# OCERS Layered UAAL Amortization Payments as of December 31, 2017 before Additional Breakdown



# OCERS UAAL Amortization Layers as of Dec. 31, 2017 with Breakdown of Combined 12/31/2012 Layer

## UAAL Amortization Schedule as of December 31, 2017

Rate Groups	Valuation Date to which Attributable	Source	Initial Base	Years Remaining	Remaining Base	Amortization Amount
All Rate Groups Combined Excluding O.C. Vector Control, Department of Education, U.C.I., Cypress Parks and Recreation and O.C. Sanitation District						
	12/31/2004	Restart amortization	\$2,297,293,771	16	\$2,249,634,507	\$188,031,164
	12/31/2005	Actuarial (gain) or loss	69,185,448	16	67,750,138	5,662,759
	12/31/2006	Actuarial (gain) or loss	(29,914,896)	16	(29,294,287)	(2,448,504)
	12/31/2007	Actuarial (gain) or loss	(13,761,683)	16	(13,476,185)	(1,126,380)
	12/31/2007	Assumption changes	248,084,737	16	242,938,013	20,305,484
	12/31/2008	Actuarial (gain) or loss	348,601,646	16	341,369,616	28,532,691
	12/31/2008	Assumption changes	115,808,905	16	113,406,353	9,478,841
	12/31/2009	Premium pay	243,959,440	16	238,898,299	19,967,833
	12/31/2009	Actuarial (gain) or loss	280,224,495	16	274,411,006	22,936,091
	12/31/2009	Reallocation of assets	3,346,997	16	3,277,561	273,948
	12/31/2010	Actuarial (gain) or loss	16,498,344	16	16,156,072	1,350,373
	12/31/2010	Actuarial (gain) or loss	299,894,308	16	293,672,752	24,546,045
	12/31/2011	Assumption changes	355,455,712	16	348,081,489	29,093,689
	12/31/2012	Actuarial (gain) or loss	262,861,918	16	257,408,630	21,514,981
	12/31/2012	Assumption changes	<u>910,053,858</u>	16	<u>891,174,036</u>	<u>74,486,985</u>
Subtotal			\$5,407,593,000 <sup>1</sup>		\$5,295,408,000	\$442,606,000
	12/31/2013	Actuarial (gain) or loss	(282,229,000) <sup>2</sup>	16	(276,377,000)	(23,100,000)
	12/31/2014	Actuarial (gain) or loss	(152,205,000) <sup>2</sup>	17	(150,361,000)	(12,022,000)
	12/31/2014	Assumption changes	(104,247,000) <sup>2</sup>	17	(102,824,000)	(8,221,000)
	12/31/2015	Actuarial (gain) or loss	(75,507,000) <sup>2</sup>	18	(75,081,000)	(5,760,000)
	12/31/2016	Actuarial (gain) or loss	56,369,000 <sup>2</sup>	19	56,281,000	4,156,000
	12/31/2017	Actuarial (gain) or loss	(168,305,000)	20	(168,305,000)	(11,995,000)
	12/31/2017	Assumption changes	822,683,000	20	<u>822,683,000</u>	<u>58,634,000</u>
Subtotal					\$5,401,424,000	\$444,298,000
Rate Group #1 – Plans A, B and U (non-OCTA, non-OCSD) for O.C. Vector Control					\$2,052,000	
Rate Group #1 – Plans A, B and U (non-OCTA, non-OCSD) for Department of Education					\$3,046,000	
Rate Group #1 – Plans A, B and U (non-OCTA, non-OCSD) for U.C.I.					\$30,927,000	
Rate Group #1 – Plans A, B and U (non-OCTA, non-OCSD) for Cypress Parks and Recreation					\$853,000	
Rate Group #3 – Plans B, G, H and U (OCSD)					\$0	
Grand Total			133/358		\$5,438,302,000	

# OCERS UAAL Amortization Layers as of Dec. 31, 2017 with Breakdown of Combined 12/31/2012 Layer - notes

<sup>1</sup> These are the remaining bases as of 12/31/2013 before those bases were combined and reamortized.

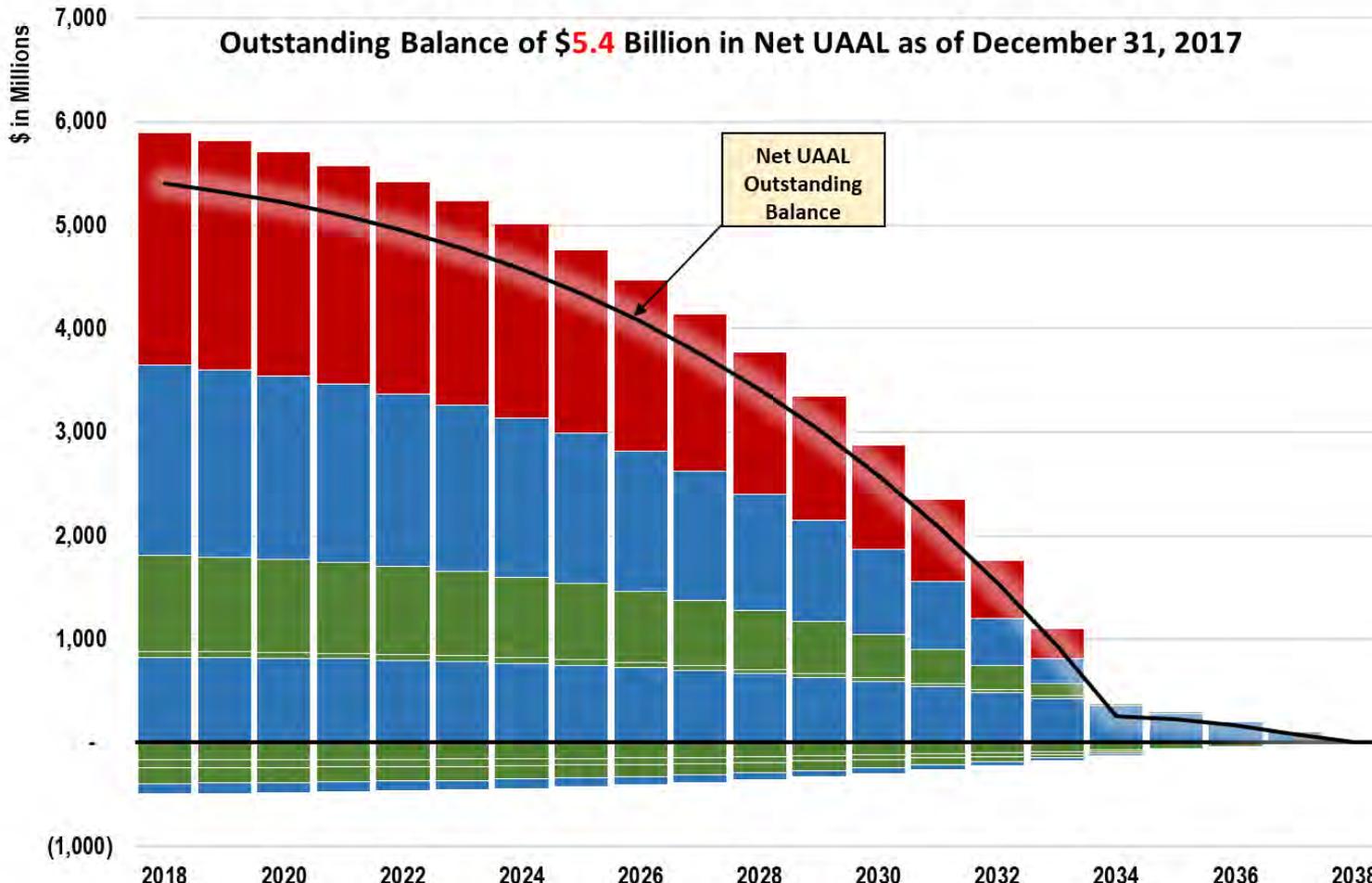
They exclude amounts attributable from Cemetery and Law Library who have since paid off all their UAAL established prior to the 12/31/2017 valuation.

The initial bases (as of the date the bases were originally established) that make up the reamortized amount excluding Cemetery and Law Library were as follows:

<b>Date Established</b>	<b>Source</b>	<b>Initial Base</b>	<b>Years Remaining at 12/31/2013</b>	<b>Remaining Base at 12/31/2013</b>
12/31/2004	Restart amortization	\$2,072,128,398	21	\$2,297,293,771
12/31/2005	Actuarial (gain) or loss	97,489,328	7	69,185,448
12/31/2006	Actuarial (gain) or loss	(38,880,814)	8	(29,914,896)
12/31/2007	Actuarial (gain) or loss	(16,758,918)	9	(13,761,683)
12/31/2007	Assumption changes	228,414,522	24	248,084,737
12/31/2008	Actuarial (gain) or loss	402,661,921	10	348,601,646
12/31/2008	Assumption changes	107,735,794	25	115,808,905
12/31/2009	Premium pay	236,536,089	21	243,959,440
12/31/2009	Actuarial (gain) or loss	310,097,047	11	280,224,495
12/31/2009	Reallocation of assets	3,277,786	21	3,346,997
12/31/2010	Actuarial (gain) or loss	17,635,694	12	16,498,344
12/31/2010	Actuarial (gain) or loss	311,776,010	13	299,894,308
12/31/2011	Assumption changes	344,063,799	28	355,455,712
12/31/2012	Actuarial (gain) or loss	267,346,604	14	262,861,918
12/31/2012	Assumption changes	894,857,775	29	<u>910,053,858</u>
	<b>Total</b>			<b>\$5,407,593,000</b>

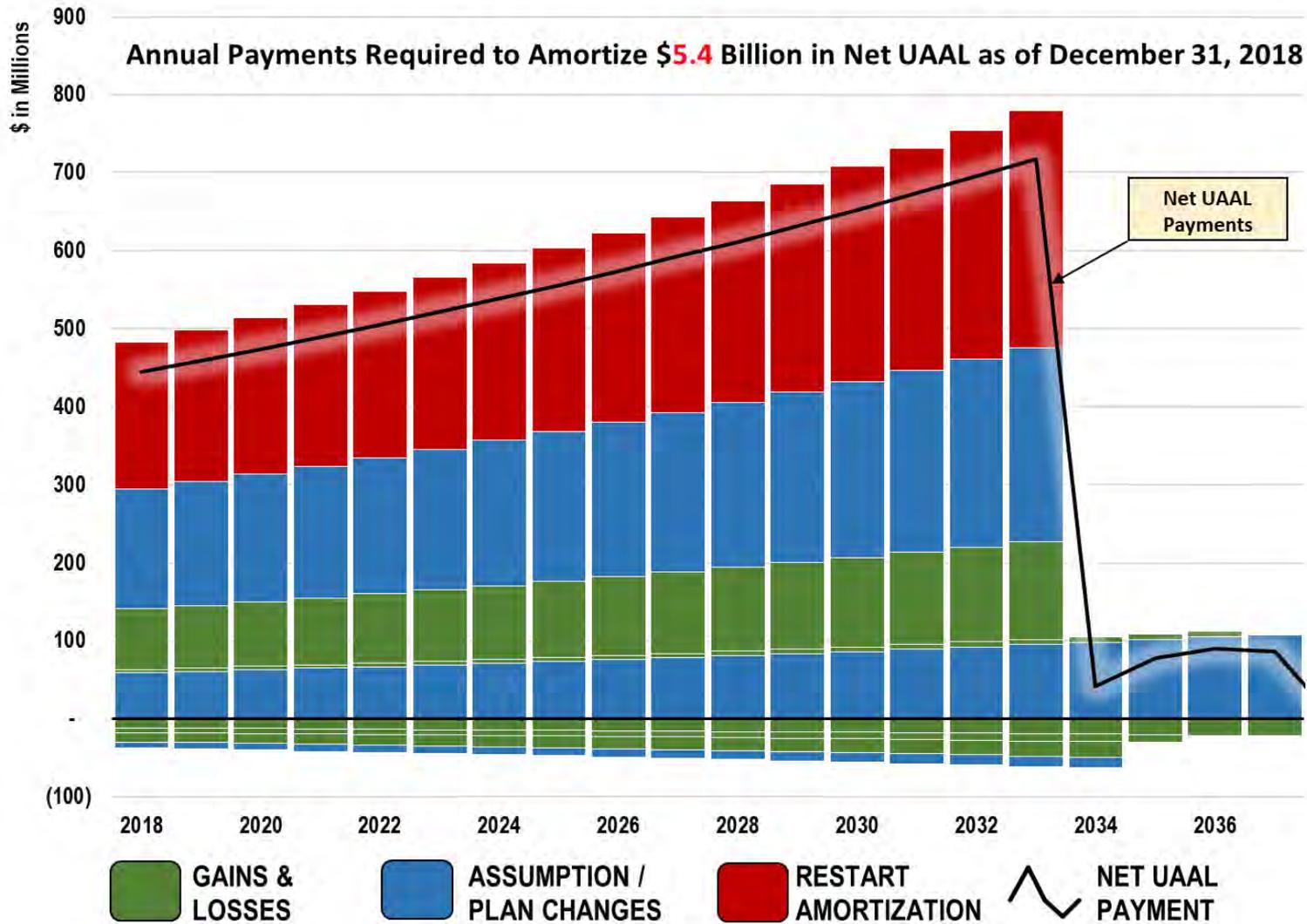
<sup>2</sup> Excludes amounts (if any) attributable from Cemetery and Law Library who have since paid off all their UAAL established prior to the 12/31/2017 valuation.

# OCERS Layered UAAL Amortization Balances as of December 31, 2017 with Additional Breakdown



GAINS & LOSSES
  ASSUMPTION / PLAN CHANGES
  RESTART AMORTIZATION
  NET UAAL BALANCE

# OCERS Layered UAAL Amortization Payments as of December 31, 2017 with Additional Breakdown



# Effect of Change in Discount Rate on UAAL Amortization

---

- Example: discount rate reduced from 7.25% to 7.00% at 12/31/2017
  - Payroll growth also reduced from 3.50% to 3.25%
- All prior amortization layers reamortized at 7.00% discount rate and 3.25% payroll growth (level percent of pay)
  - No change in Outstanding Balance, lower amortization payments
  - For OCERS, net payments reduced from \$385,935,000 to \$385,664,000
    - \$271,000 reduction in net UAAL payments
- New amortization layer for change in UAAL due to economic assumption changes
  - Amortized at 7.00% discount rate and 3.25% payroll growth
  - \$3,999,000 additional UAAL payment for new economic assumptions
- Additional UAAL payment on new layer is greater than reduction in UAAL payments for prior layers
  - Net increase in UAAL payments

# OCERS UAAL Amortization Layers at Dec. 31, 2017

## Effect of Change in Discount Rate

### UAAL Amortization Schedule as of December 31, 2017

Rate Groups	Date Established	Source	Initial Base	Years Remaining	Remaining Base	Amortization Amount at Prior 7.25% Return and 3.50% Payroll	Amortization Amount at Current 7.00% Return and 3.25% Payroll
All Rate Groups Combined Excluding O.C. Vector Control, Department of Education, U.C.I., Cypress Parks and Recreation and O.C. Sanitation District							
	12/31/2013	Restart amortization	\$5,407,593,000	16	\$5,295,408,000	\$442,912,000	\$442,606,000
	12/31/2013	Actuarial (gain) or loss	(282,229,000)	16	(276,377,000)	(23,116,000)	(23,100,000)
	12/31/2014	Actuarial (gain) or loss	(152,205,000)	17	(150,361,000)	(12,029,000)	(12,022,000)
	12/31/2014	Assumption changes	(104,247,000)	17	(102,824,000)	(8,226,000)	(8,221,000)
	12/31/2015	Actuarial (gain) or loss	(75,507,000)	18	(75,081,000)	(5,764,000)	(5,760,000)
	12/31/2016	Actuarial (gain) or loss	56,369,000	19	56,281,000	4,159,000	4,156,000
	12/31/2017	Actuarial (gain) or loss	(168,305,000)	20	<u>(168,305,000)</u>	<u>(12,001,000)</u>	<u>(11,995,000)</u>
Subtotal					\$4,578,741,000	<b>\$385,935,000</b>	<b>\$385,664,000</b>
	12/31/2017	Assumption changes (Economic)*	56,107,000	20	56,107,000		<b>3,999,000</b>
	12/31/2017	Assumption changes (Demographic)*	766,576,000	20	<u>766,576,000</u>		<u>54,635,000</u>
Subtotal					\$5,401,424,000		\$444,298,000
		Rate Group #1 – Plans A, B and U (non-OCTA, non-OCSD) for O.C. Vector Control			\$2,052,000		
		Rate Group #1 – Plans A, B and U (non-OCTA, non-OCSD) for Department of Education			\$3,046,000		
		Rate Group #1 – Plans A, B and U (non-OCTA, non-OCSD) for U.C.I.			\$30,927,000		
		Rate Group #1 – Plans A, B and U (non-OCTA, non-OCSD) for Cypress Parks and Recreation			\$853,000		
		Rate Group #3 – Plans B, G, H and U (OCSD)			\$0		
Grand Total					\$5,438,302,000		

\* Split between economic and demographic assumptions estimated for this illustration.

# UAAL Contribution Methodology

---

- Two separate funding policy issues
  - Basis for collection: percent of pay or dollar amount
  - Structure of payments: level percent of pay or level dollar amount
- UAAL payments are expressed and collected as percent of payroll
  - Administrative feasibility prevents OCERS from collecting level dollar amortization payment or a minimum total dollar amount from employers
  - Shortfall in UAAL contributions if actual payroll increase is less than assumed
  - More than offset by actuarial gains from individual salary increases less than expected

# Salary Gains Compared to Contribution Losses due to Total Payroll Growth less than Expected

- Salary gains compared to contribution losses due to individual salary increases and total payroll growth less than expected from 2009 to 2015

Year Ended Dec 31	Salary Gain/(Loss)	Contribution Gain/(Loss) (estimated)
2009	77,858,000	(5,012,000)
2010	215,936,000	(15,870,000)
2011	154,946,000	(16,090,000)
2012	244,750,000	(36,060,000)
2013	294,326,000	(26,894,000)
2014	125,746,000	(89,407,000)
2015	<u>282,696,000</u>	<u>(44,960,000)</u>
Total	1,396,258,000	(234,293,000)

# Level Percent of Payroll UAAL Amortization

---

- UAAL payments are structured to increase with total payroll
  - Provides level amortization cost for employers
    - Consistent with level percent of pay Normal Cost for actives
  - Payroll assumed to increase with inflation and real wage growth
    - Assumptions approved for December 31, 2017 valuation
    - 2.75% (inflation) + 0.50% (real wage growth) = 3.25% (total)
    - Assumes constant active head count
- Level percent of payroll amortization reduces immediate contribution volatility due to gains/losses and assumption changes
  - Under current OCERS assumptions, first year amortization payments:
    - 7.35% of change in UAAL under level percent of pay amortization
    - 9.44% of change in UAAL under level dollar amortization

# Illustration of UAAL Amortization Methods

➤ \$10,000,000 new UAAL amortization layer

7.00% return 3.25% payroll growth	20 years Level % of pay	20 years Level dollar
Increase in AAL	10,000,000	10,000,000
Amortization factor (first year)	0.073518	0.094393
Amortization amount		
Year 1	\$ 735,180	\$ 943,929
Year 15	\$ 1,150,414	\$ 943,929
Year 20	\$ 1,349,909	\$ 943,929
Year 25	\$ 0	\$ 0
Total amount paid		
Principal	\$ 10,000,000	\$ 10,000,000
Interest	10,264,669	8,878,585
Total	\$ 20,264,669	\$ 18,878,585

# Illustration of UAAL Amortization Methods

## Illustration of Level % of payroll vs. Level dollar UAAL Amortization Payments (using 12/31/2017 assumptions for comparability)

Date Established	Source	Initial Base	Amortization Period	First Year Amortization Amount (Level %)	Level % Payment as Percentage of Payroll**	First Year Amortization Amount (Level \$)	Level \$ Payment as Percentage of Payroll**
12/31/2015	Actuarial (gain) or loss	\$(75,507,000)*	20	\$(5,381,000)	(0.30%)	\$(6,908,000)	(0.38%)
12/31/2016	Actuarial (gain) or loss	56,369,000*	20	4,017,000	0.22%	5,157,000	0.28%
12/31/2017	Actuarial (gain) or loss	(168,305,000)*	20	(11,995,000)	(0.66%)	(15,399,000)	(0.85%)
12/31/2017	Assumption changes	822,683,000*	20	58,634,000	3.24%	75,270,000	4.15%

\* Excludes O.C. Vector Control, Department of Education, U.C.I., Cypress Parks and Recreation and O.C. Sanitation District.

\*\* Based on December 31, 2017 projected compensation of \$1,811,877,000.



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F



# **OCERS HQ Building Renovation**

Presented on September 12, 2018

by

*Brenda Shott, Assistant CEO Finance and Internal Operations*

- Need for Building Renovations
- Background
- Project Plan
- Review of Phase I Activities - Gensler
- Conclusion

# Project Need

Workspace  
needed for new  
hires

3<sup>rd</sup> Floor Vacancy  
Occupancy Plan

Meeting space to  
fit all staff &  
growing seminars

Board Room  
Security, AV &  
Voting

Security  
Assessment –  
implement  
recommendations

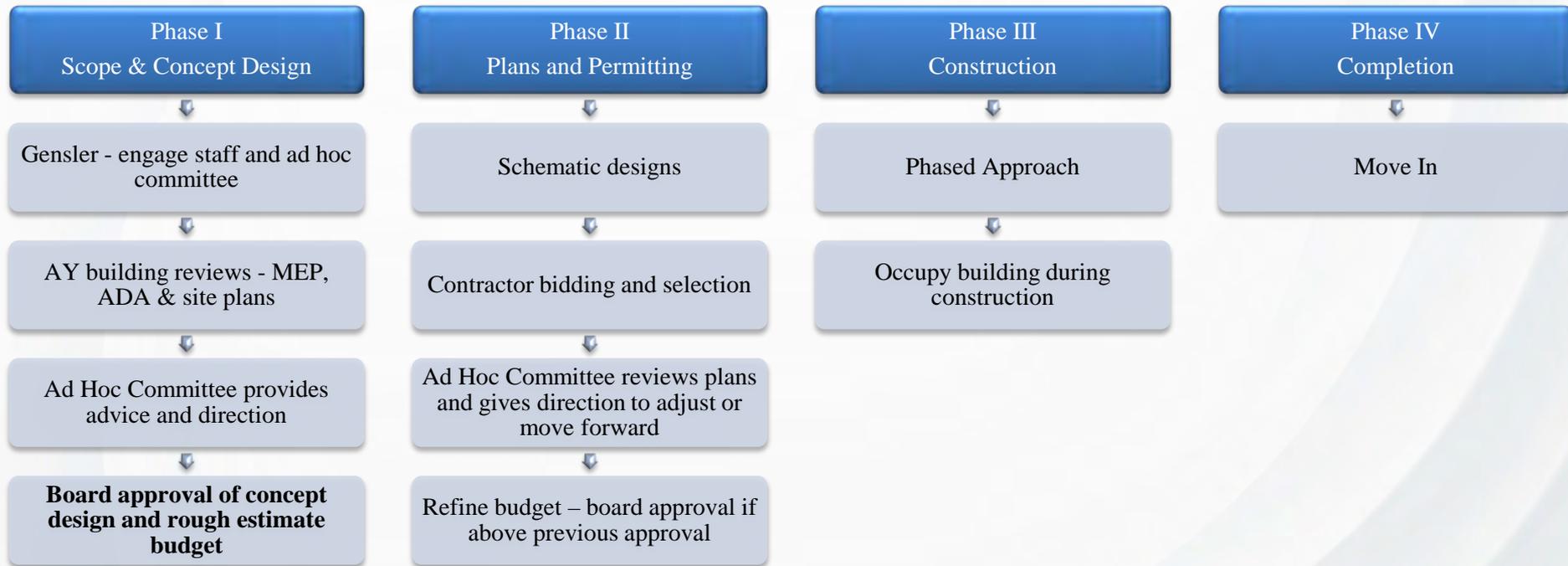
HVAC – address  
recurring issues

## Opportunity to address other items:

- Larger kitchen to accommodate more staff and meeting administration
- Improve technology in conference rooms to support growing need/use of video conferencing and presentation/projection
- Evaluate power supply with planned usage/occupancy
- Outdoor items could be evaluated with the project or in the future
  - Solar panels in parking lot
  - Electric car charging station

## Initial Steps/Background

- Ad Hoc Committee formed specifically for Board Room Upgrades
- Needs highlighted that a broader more comprehensive project would be required instead of piece mealed smaller projects
- Began planning with previous property manager but project put on hold until new property manager was on board
- Avison Young (AY) hired as new Property manager 1<sup>st</sup> Qtr 2018
- AY solicited proposals for architectural design services and selected Gensler



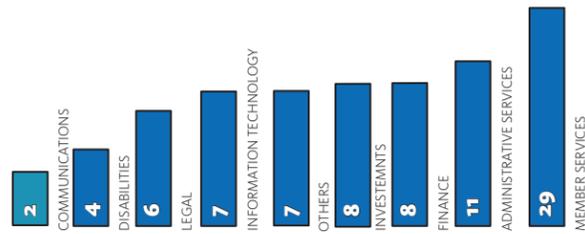
Gensler to discuss Survey, Visioning Session, Programming and next steps

- Questions
- Any Concerns with Project Plan?
- Items the Board wants to be address/included/excluded in concept design?



WORKPLACE PERFORMANCE SURVEY FINDINGS

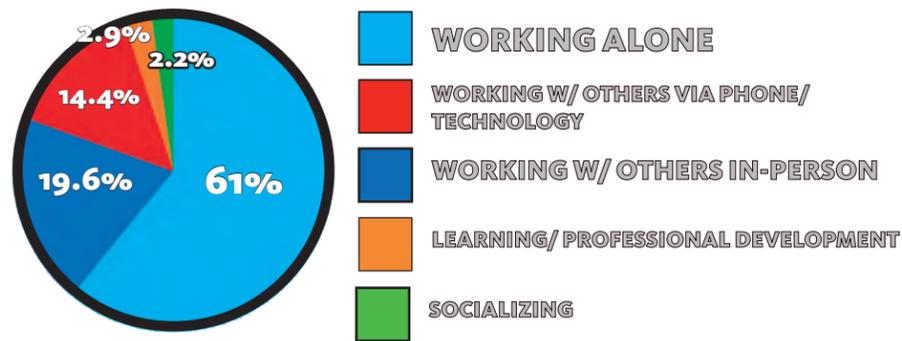
1. who are your employees?



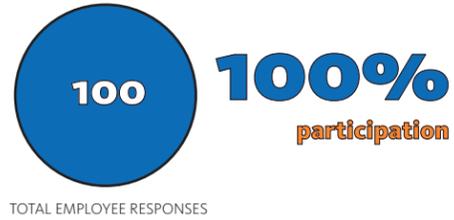
2. which is your individual assigned workspace



3. how do your employees spend their time working in the office?



YOUR WPI SCORE IS:  
**56.8**  
 OUT OF 100



**23%** OF RESPONDANTS HAVE BEEN WITH YOUR COMPANY FOR 5 TO 7 YEARS

4. HIGHEST RATED AREA FOR DESIGN LOOK AND FEEL



LOWEST RATED AREA FOR DESIGN LOOK AND FEEL



5. EMPLOYEES WANT MORE FLEXIBILITY AND ADJUSTABILITY IN THEIR INDIVIDUAL WORKSPACE AND IN THEIR MEETING AREAS.

6. TEMPERATURE WAS THE #1 COMPLAINT THROUGHOUT THE OFFICE

7. WHAT DO YOUR EMPLOYEES LIKE ABOUT YOUR CURRENT SPACE?

the people  
 SOCIAL WORK ENVIRONMENT  
 desk space  
 INDIVIDUAL OFFICES  
 natural light  
 NEAR TEAM

8. WHAT DO YOUR EMPLOYEES LIKE LEAST ABOUT YOUR CURRENT SPACE?

NOISE LEVEL  
 hvac  
 cubicals outdated  
 THE OFFICE LAYOUT  
 no height adjustable tables  
 TEMPERATURE  
 my DESK

**76.5%**  
 FEEL YOUR CURRENT WORKPLACE IS UNBALANCED



“COMMITTED TO SUPERIOR SERVICE”



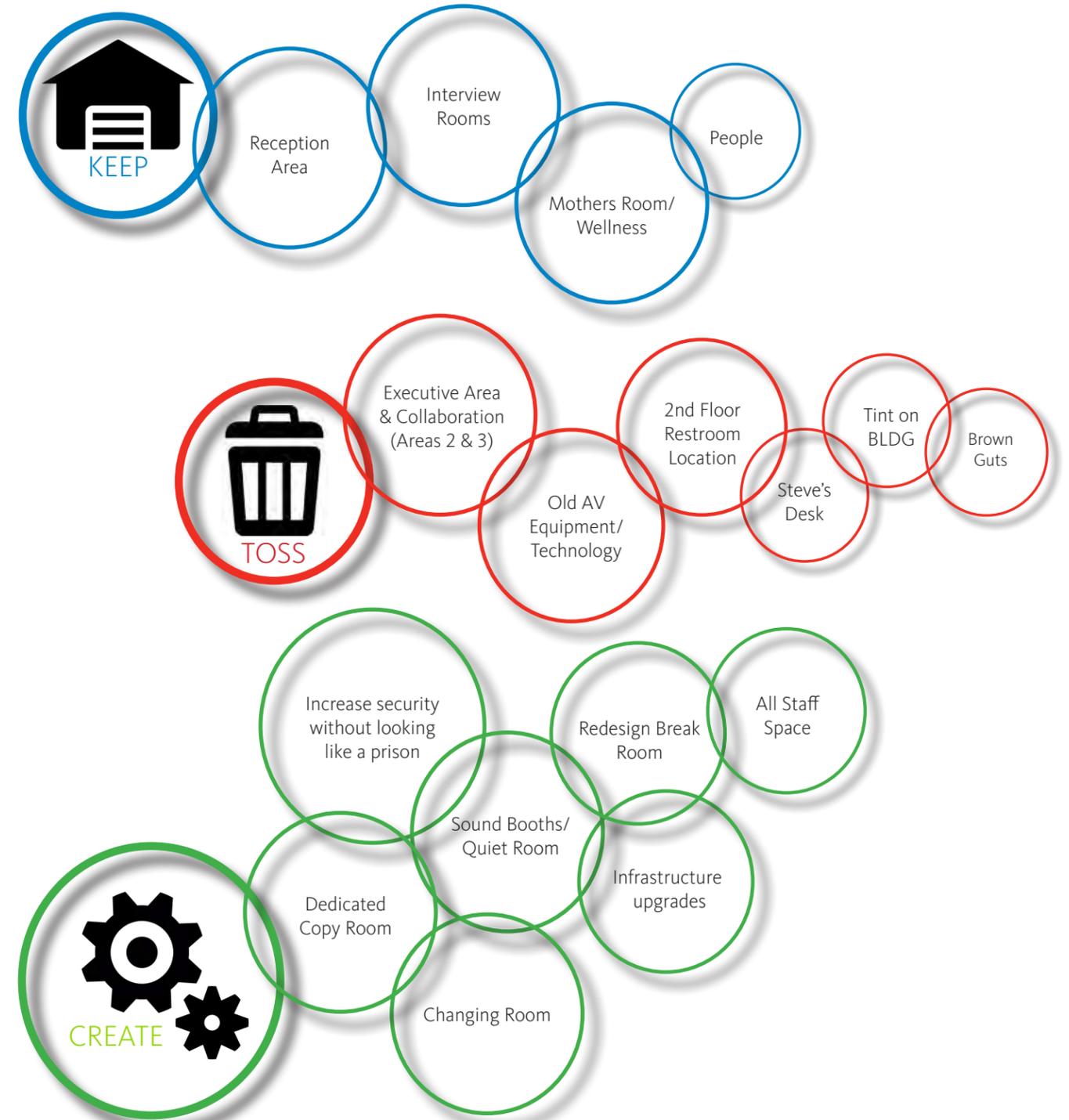
<b>Visioning Summary</b> .....	3
<b>Findings</b> .....	17

# WELCOME AND INTRO.

INTRODUCTIONS. Your name and role at OCERS...

<b>HELLO</b> my name is <i>Dave Ball</i> Trustee	<b>HELLO</b> my name is <i>Brenda Shott</i> Assistant CEO	<b>HELLO</b> my name is <i>Suzanne Jenike</i>	<b>HELLO</b> my name is <i>Jim Doezie</i> Contracts Administration	<b>HELLO</b> my name is <i>Tracy Bowman</i> Director of Finance
<b>HELLO</b> my name is <i>Gina Ratto</i>	<b>HELLO</b> my name is <i>Heidi Halbur</i> Director of Member Services	<b>HELLO</b> my name is <i>Jenny Sadoski</i> IT Director	<b>HELLO</b> my name is <i>Melissa Woznink</i> HR Specialist	<b>HELLO</b> my name is <i>Chris Prevatt</i> Board Member
<b>HELLO</b> my name is <i>Molly Murphy</i> Chief Investment Officer	<b>HELLO</b> my name is <i>Dave Beeson</i> Investment Officer	<b>HELLO</b> my name is <i>Chuck Packard</i> Board Member	<b>HELLO</b> my name is <i>Mike Persi</i> Member Services Manager	<b>HELLO</b> my name is <i>Roger Hilton</i> Board Member
<b>HELLO</b> my name is <i>Steve Delaney</i> CEO		<b>HELLO</b> my name is <i>Cynthia Hockless</i> Admin/ HR Director		

What would you **keep**, **toss** and **create**?



Who would be your **ideal** client?

- Members
- Employees
- Internal Customer, Vendors
- The Board- Trustees
- Global Investment
- Investment Managers
- Client Sponsors
- Public- Front of House
- Large Conference

# your **BRAND** how is your identity reflected in your workspace?

What do you want the new workplace to say about OCERS to employees, customer and the industry?



List words to describe OCERS brand ?



How can physical space provide better opportunities to reflect brand identity?

TECHNOLOGY **LIGHTING**  
INTERACTIVE SPACE SHARING  
**GRAPHICS/ BRANDING**  
**aesthetics** noise (need privacy)  
**SHOWCASE VALUE**  
VENUE FOR COMMUNITY EVENTS

What words describe the culture of OCERS?

**COLLABORATIVE**

*different sub cultures within departments*

**COMMUNITY**

**BREAK UP SILOS** purpose of work

What about your current work environment works well to inspire the creative process? Where are the biggest opportunities for improvement?

- Seating location- departments stay together
- Location of amenities
- Adjacencies
- Employee Awareness
- Informal collaborative spaces
- Tint DN

What is changing about your business and how does the work place need to respond to support this change?

- Online/ technology
- Workforce changing
- Dynamic of retirees- more tech savvy
- Speed of service
- Data security
- Paperless departments
- Teleworking

What impact do you expect new technology will have on your operations, staff and space requirements?

- Ability to work outside

In what ways could workplace support a higher level of performance and constant innovation?

- Technology

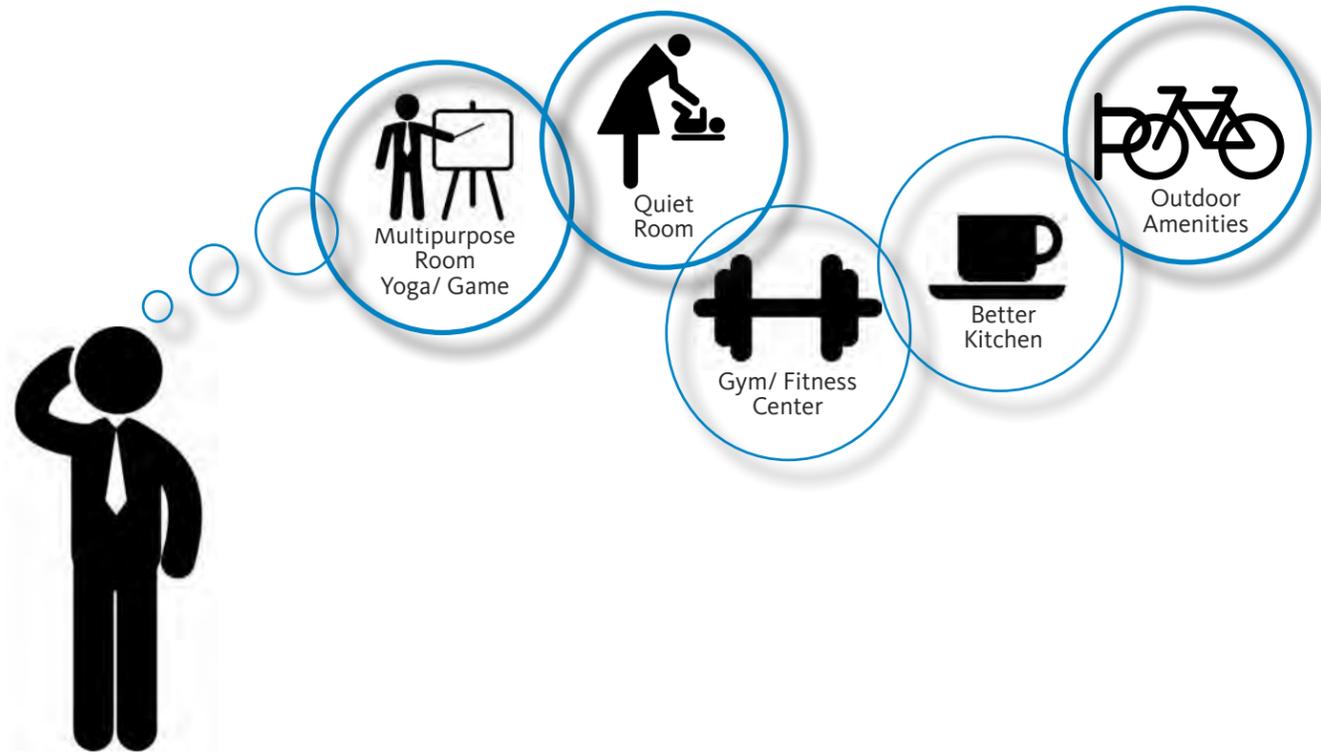
How could the flow of incoming and outgoing products be managed better?

- Entry of building- not inviting

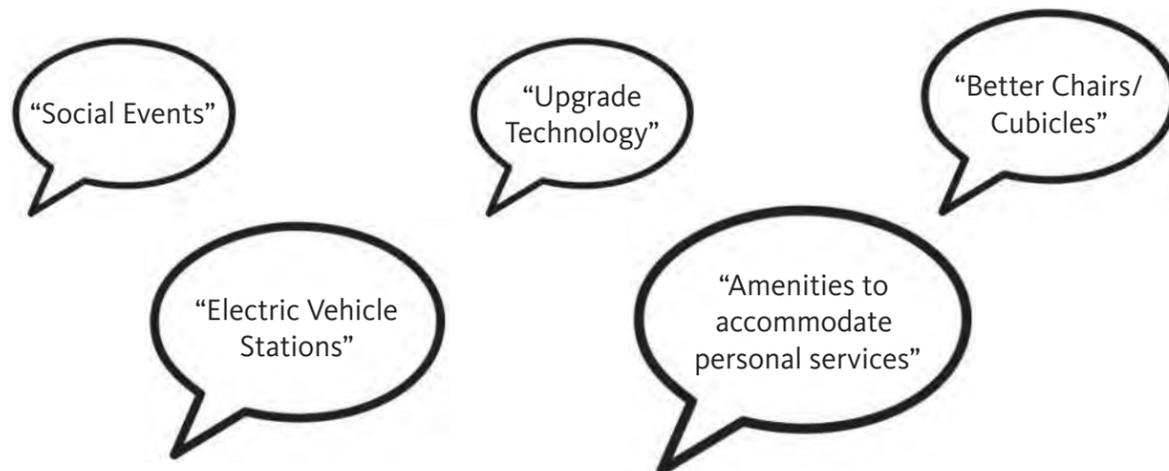
# your **WORKSPACE** DO YOUR EMPLOYEES FEEL LIKE MOST LOYAL CUSTOMER?

To what extent do you feel employees will take advantage of amenities & support areas in a building (conference center, event/multi-purpose space, food service/café, product studio)?

How would you like your employees to work in the future?



How can the new workplace support higher level of attraction & retention?

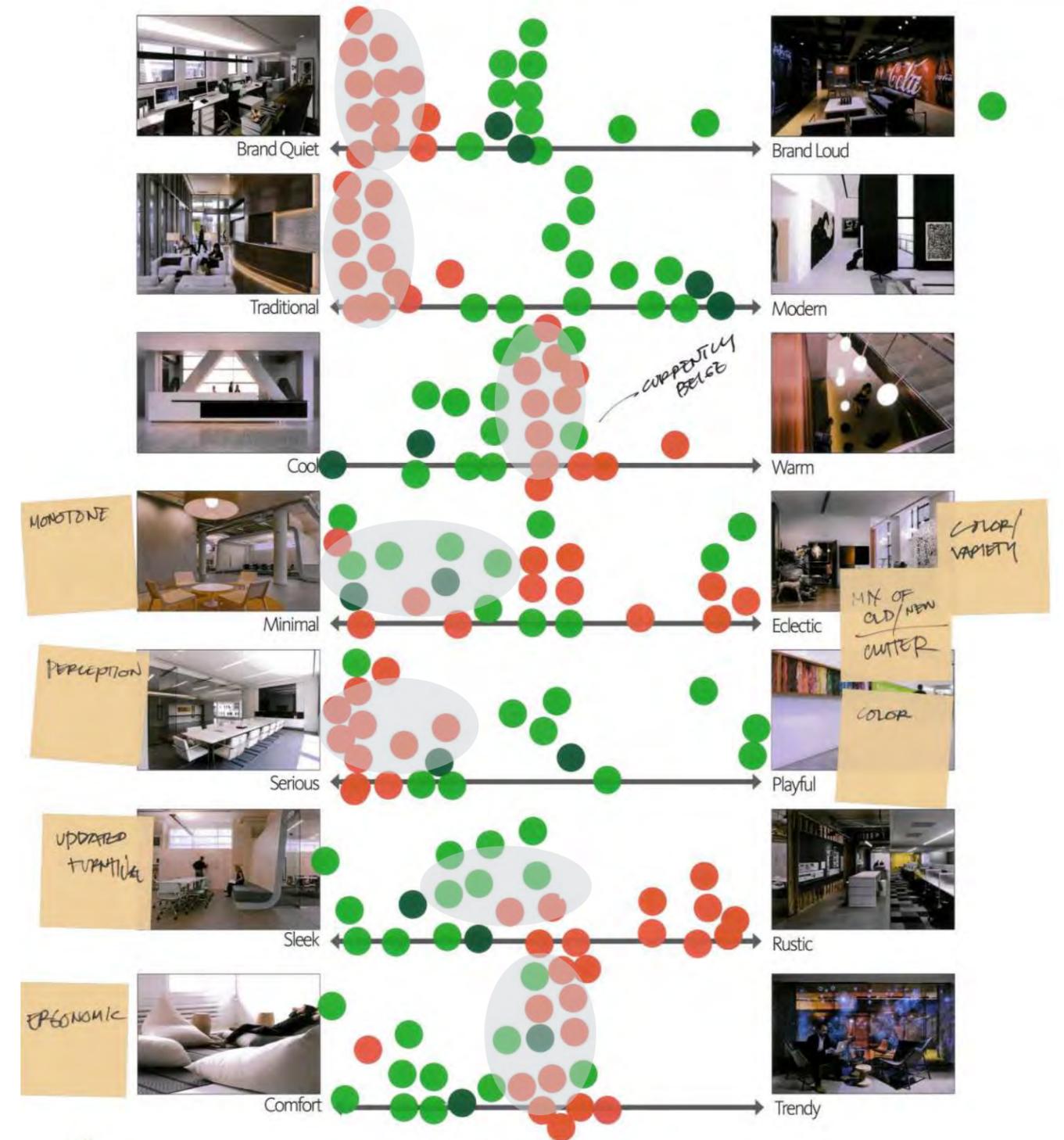
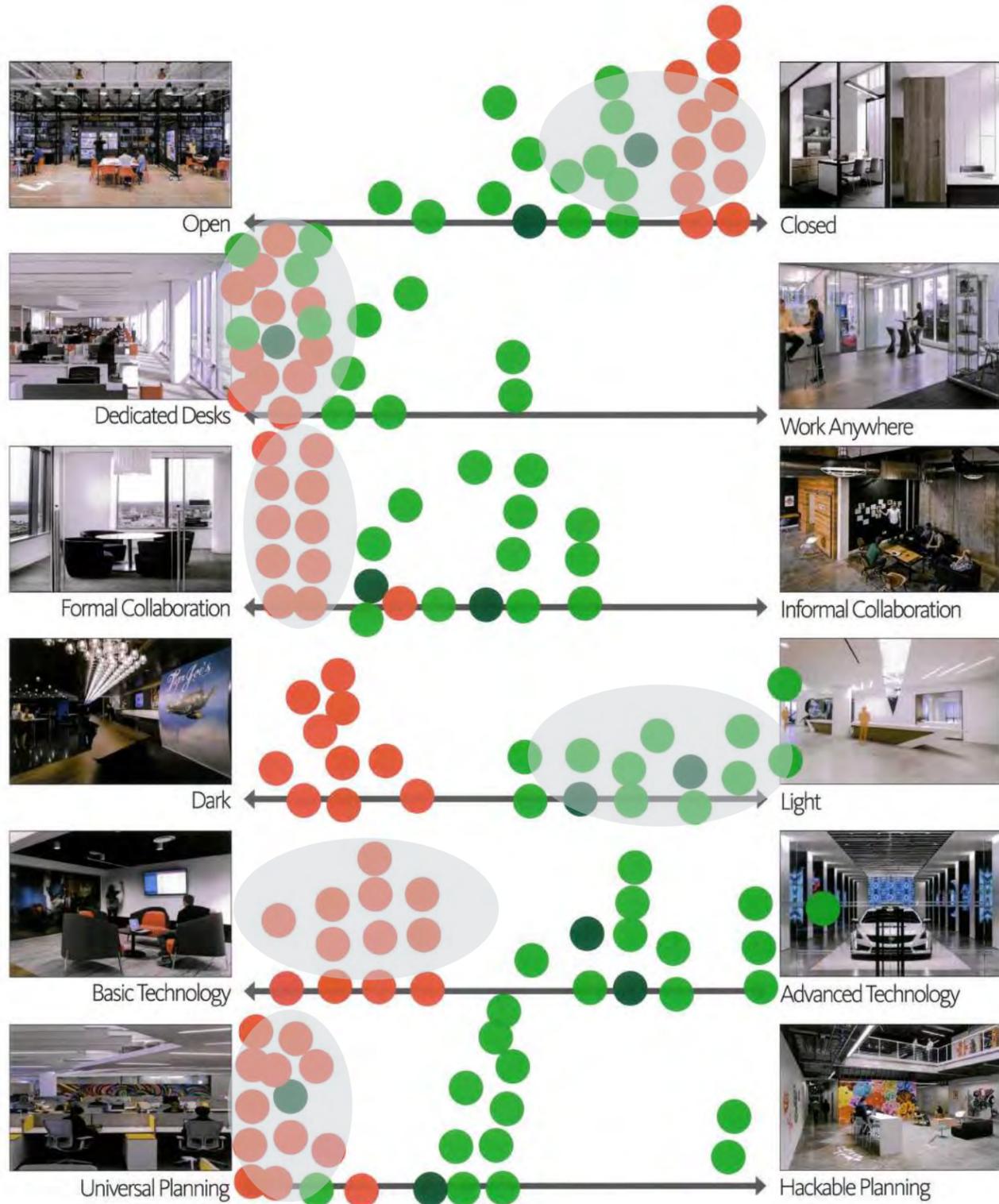


# LOOK & feel

What impressions do you want to create in your new workspace?

● where we want to be

● where we are now

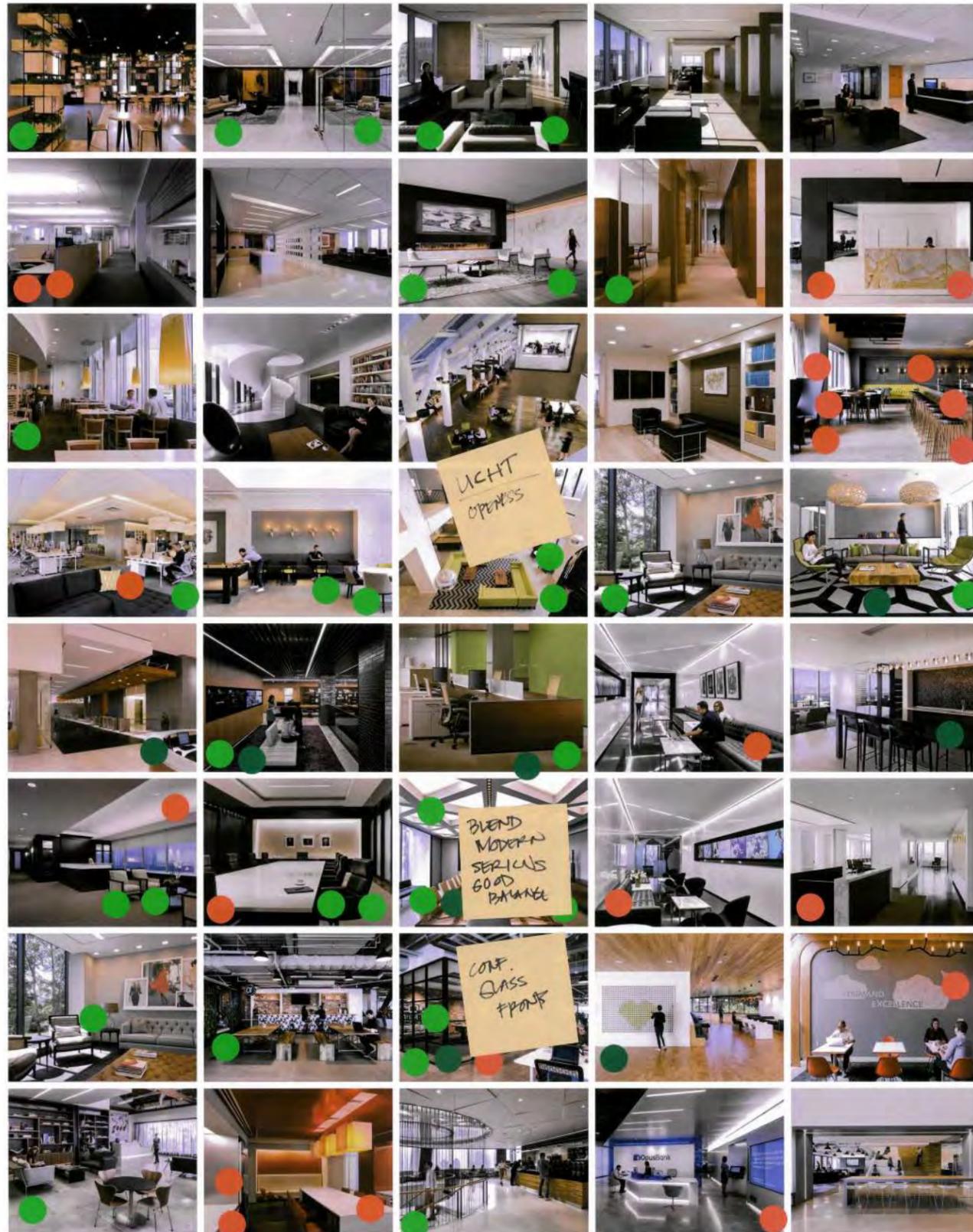


# LOOK & feel

What impressions do you want to create in your new workspace?

● where we want to be

● where we are now



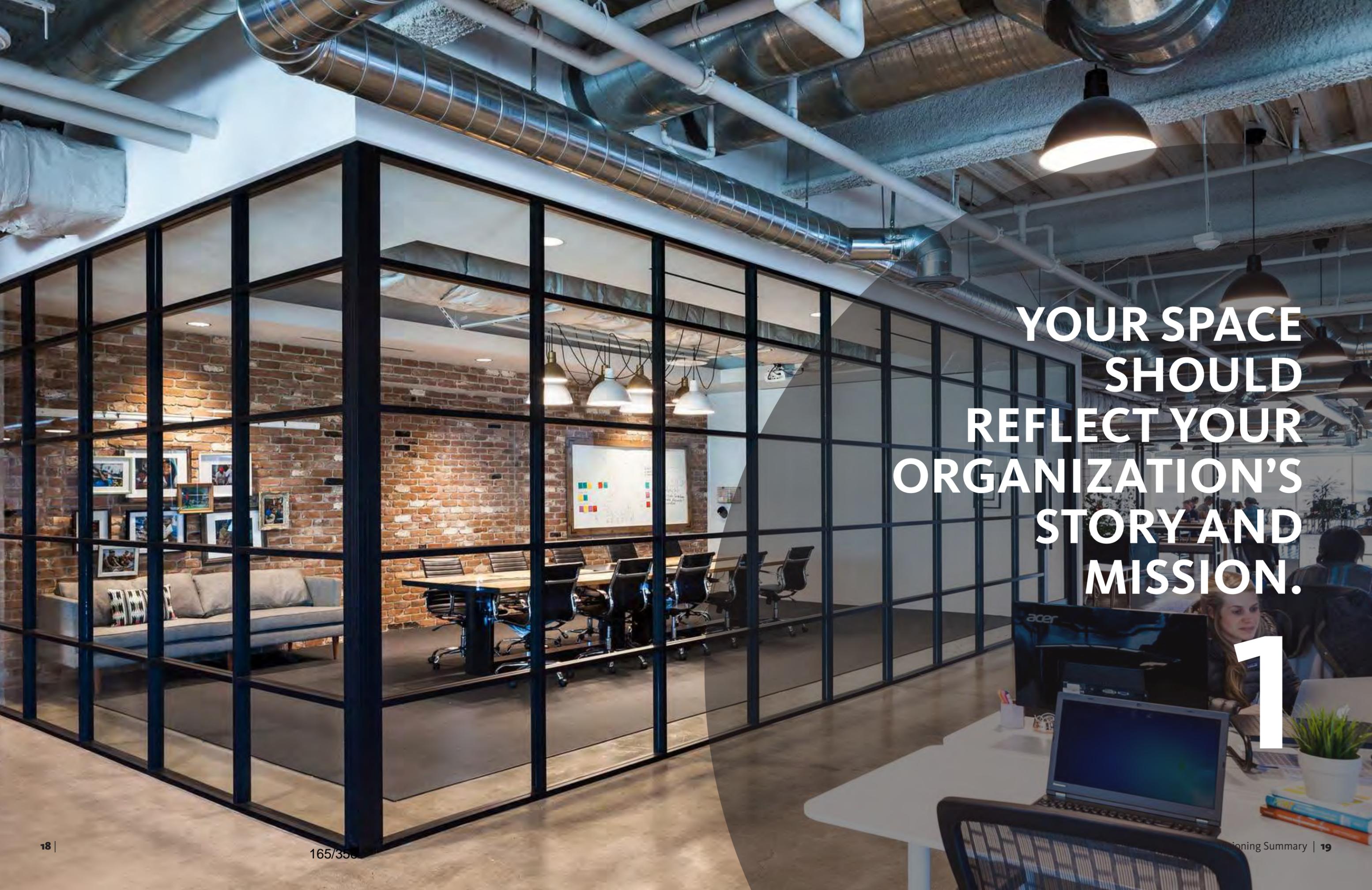
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# VISIONING SESSION



# FINDINGS

A modern office interior featuring glass-walled meeting rooms and exposed ductwork. The space is bright and open, with a mix of industrial and contemporary design elements. A large number '1' is overlaid on the right side of the image.

**YOUR SPACE  
SHOULD  
REFLECT YOUR  
ORGANIZATION'S  
STORY AND  
MISSION.**

**1**



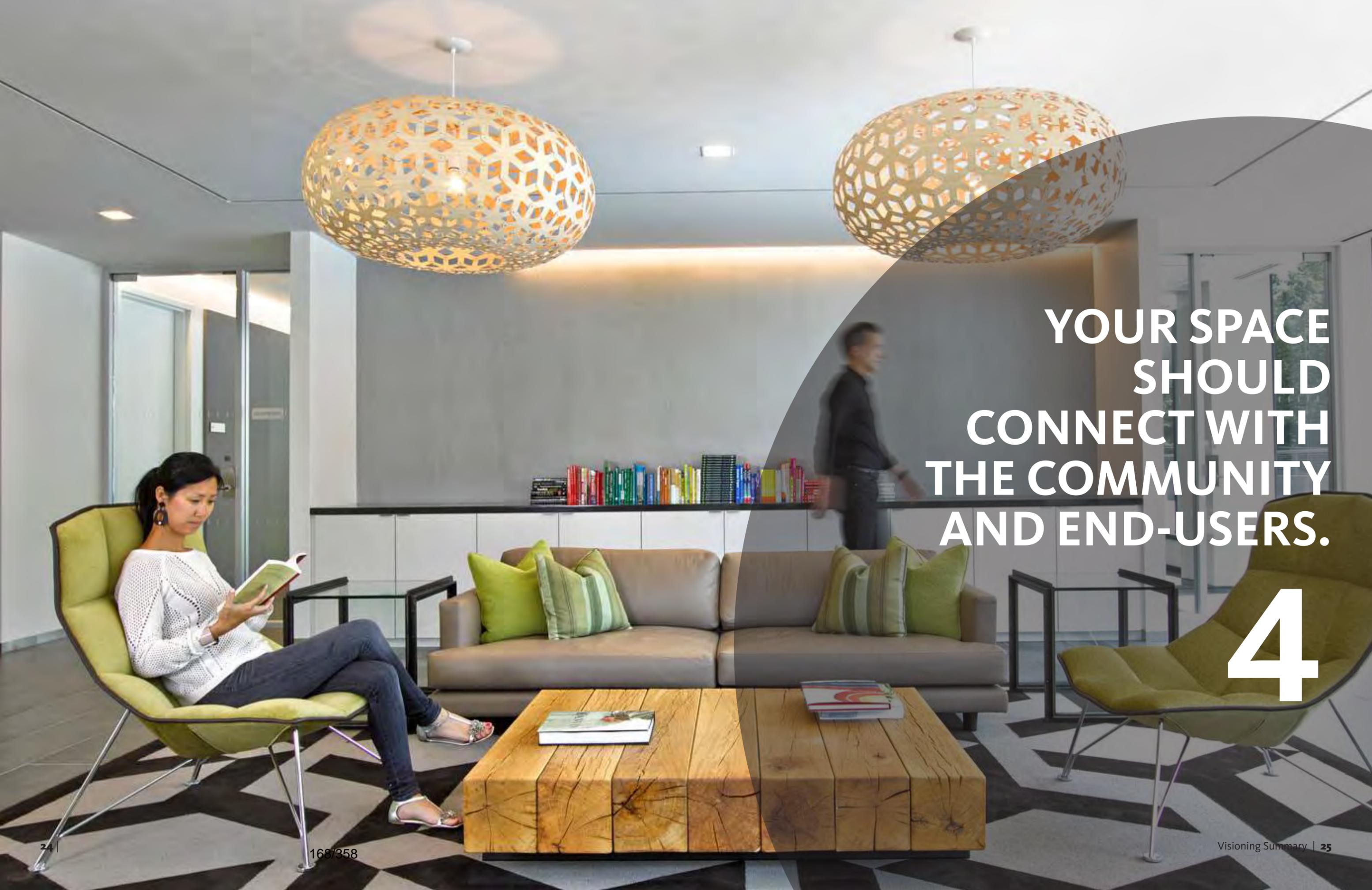
**YOUR SPACE SHOULD  
FEEL INVITING AND  
APPROACHABLE,  
BUT STILL FEEL  
ESTABLISHED AND  
PROFESSIONAL.**

**2**



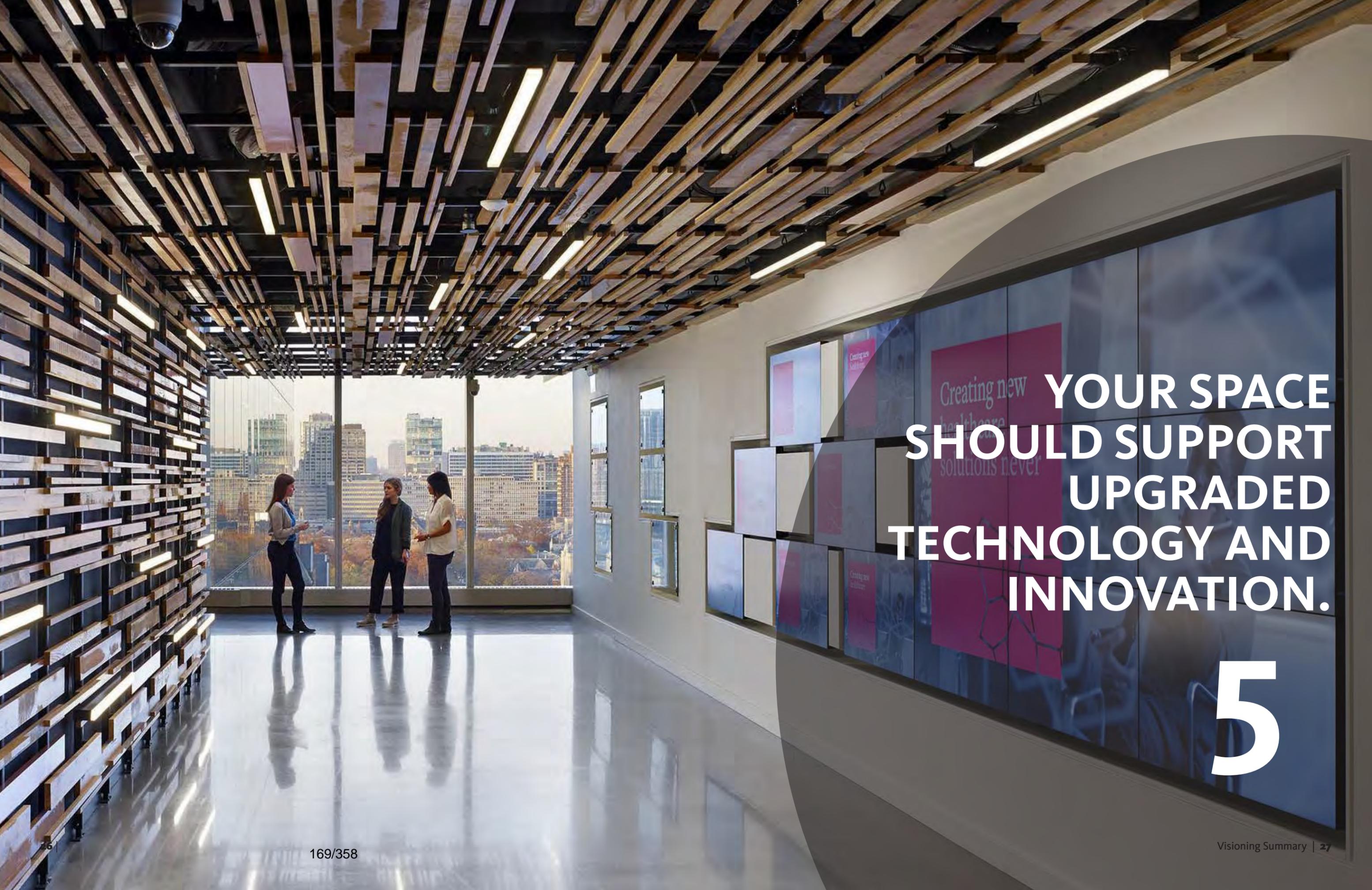
**YOUR SPACE  
SHOULD SUPPORT  
BOTH FOCUS AND  
COLLABORATION  
SPACES.**

**3**



**YOUR SPACE  
SHOULD  
CONNECT WITH  
THE COMMUNITY  
AND END-USERS.**

**4**



**YOUR SPACE  
SHOULD SUPPORT  
UPGRADED  
TECHNOLOGY AND  
INNOVATION.**

**5**

**Thank You!**

A



**TORREYCOVE**  
CAPITAL PARTNERS

CALIFORNIA

MASSACHUSETTS



Orange County Employees  
Retirement System  
**Strategic Planning Workshop**  
**Private Equity**

September 13, 2018



Investment Research /  
Investment Sourcing and Manager Selection

## Private Equity

U.S. Buyouts

Global Buyouts

Venture &  
Growth

Secondaries  
(Funds)

Large

Middle  
Market

Small

Europe

Asia

Latin  
America

## Private Credit

Mezzanine

Distressed Debt

Direct Lending

Credit Hedge Funds

## Real Assets

Energy

Infrastructure

Metals & Mining

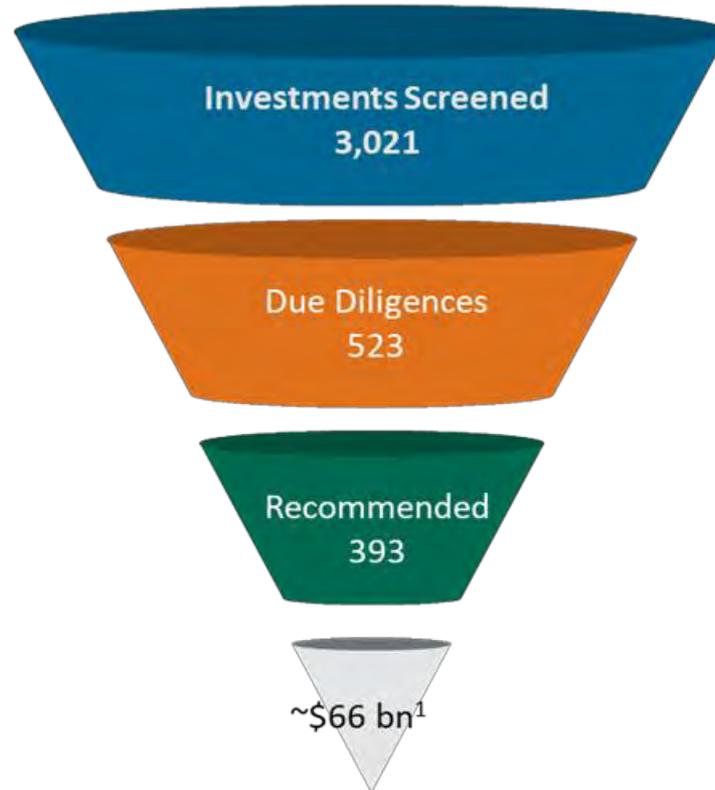
Agriculture

Timber

Royalties

## Research is the Foundation of Our Investment Process

November 10, 2011 – August 27, 2018



<sup>1</sup> Represents Investment Committee approvals from November 10, 2011 through AUGUST 27, 2018, and will differ from actual client commitments.





## Strategy

- Active value creation strategy
  - Sector-focused expertise
    - Operational Expertise
    - Competitive advantages
- Access to a unique deal flow

## Management + Organization

- Experience and History
- Firm resources and bandwidth
- Ownership/compensation structure
- Operational processes & controls
- Affiliates
- Litigation

Due Diligence Considerations

## Track Record

- Analysis of return drivers
- Benchmarking / sensitivity analysis
- Performance by various metrics
  - Valuation analysis
- Returns across market cycles
  - Attribution of performance
    - Pricing discipline

## Fund Structure

- Alignment of interest with LPs
- Conflicts of Interest
- Term review
- End of life issues
- Investment guidelines



## Progress Toward PE Program Plan



## Based on TorreyCove's Recommendations:

	US Buyout & Growth			Special Situations, Venture Capital, & Other		
	FUND NAME	COMMITMENT	STATUS	FUND NAME	COMMITMENT	STATUS
<b>Closed</b>	<ul style="list-style-type: none"> <li>• HIG Advantage \$50mm – Mid-Mkt Buyout Closed on 4/23/18</li> <li>• Thoma Bravo Fund XIII \$75mm – Large Buyout Closed on 6/29/18</li> <li>• Accel-KKR Growth III \$25mm – Growth Equity Closed on 7/19/18</li> </ul>			<ul style="list-style-type: none"> <li>• GGV VII and VII Plus \$50mm - Venture Closed on 8/9/18</li> </ul>		
<b>Negotiations</b>	<ul style="list-style-type: none"> <li>• <i>Tech Buyout Fund</i> [\$75mm] Large Buyout In Process</li> <li>• <i>Generalist Buyout Fund</i> [\$25mm] Large Buyout In Process</li> </ul>					
<b>Upcoming</b>				<ul style="list-style-type: none"> <li>• <i>Energy Income Fund</i> [TBD] RA Q4 2018</li> <li>• <i>Energy Fund</i> [TBD] RA Q4 2018</li> </ul>		

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## Approved Preliminary Plan

2018 Commitments	\$300 million to \$350 million
Range of Commitments	\$20 million to \$100 million
Number of Commitments per Year	5 to 10

## YTD Progress

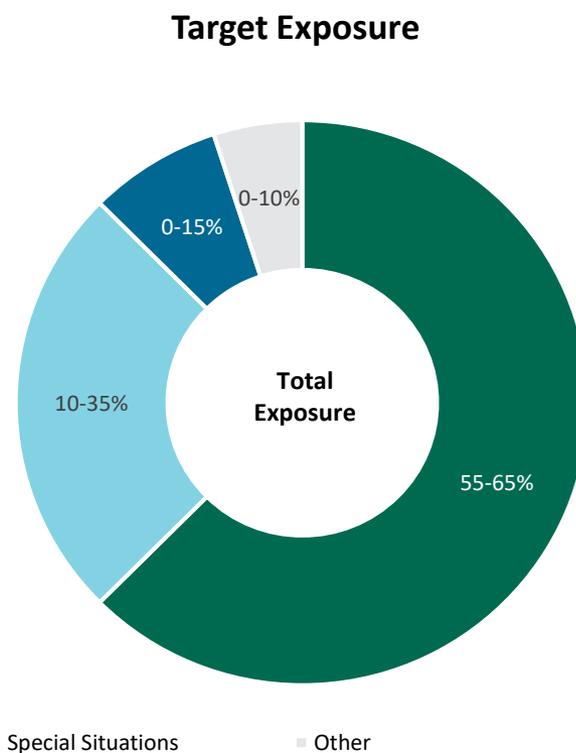
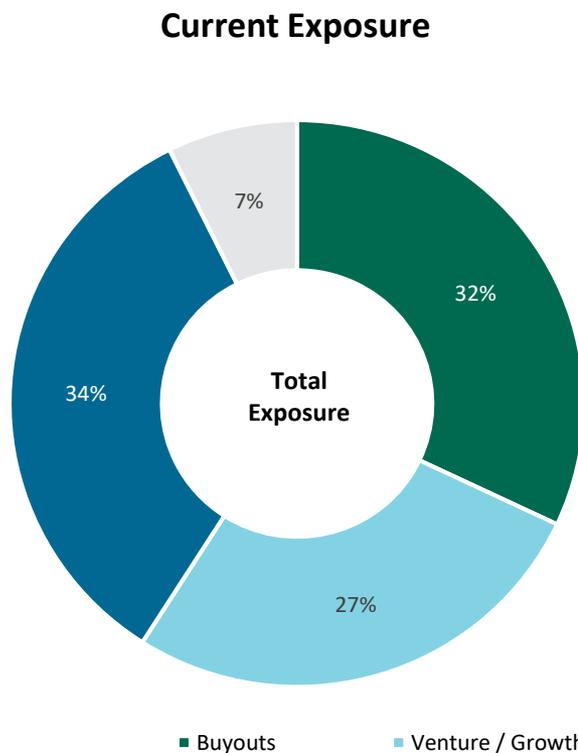
2018 Commitments	\$330 million <sup>1</sup>
Range of Commitments	\$25 million to \$75 million
Number of Commitments <sup>2</sup>	7 including pending closings

<sup>1</sup> Pantheon 2018 SMA's \$100 million commitment was made in Q1 2018 prior to TorreyCove engagement - \$30 million assumed for 2018 in this aggregate 2018 figure

<sup>2</sup> Includes Pantheon 2018; the 2 Pending Energy Funds to be allocated to Real Assets are not included in this count

## Current Exposure<sup>1</sup> vs. TorreyCove Recommended Long Term Weighting

- Majority of YTD commitments have been North American buyout funds (4 of 7 deals or 68.2% of capital)
- TorreyCove recommends continuing the build out of large and mid-market buyout exposure
- Focus on managers with proven discipline in current valuation environment

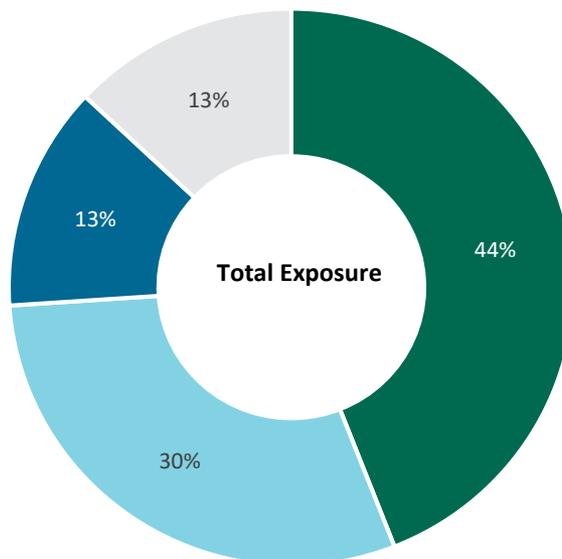


<sup>1</sup> Estimated based on fair market value of fully funded and unfunded commitments as of 12/31/2017 2017 and YTD commitments: HIG Advantage, TB XIII, Pantheon 2018, GGV VII series, Accel-KKR Growth III, as well as 2 buyout funds in closing process

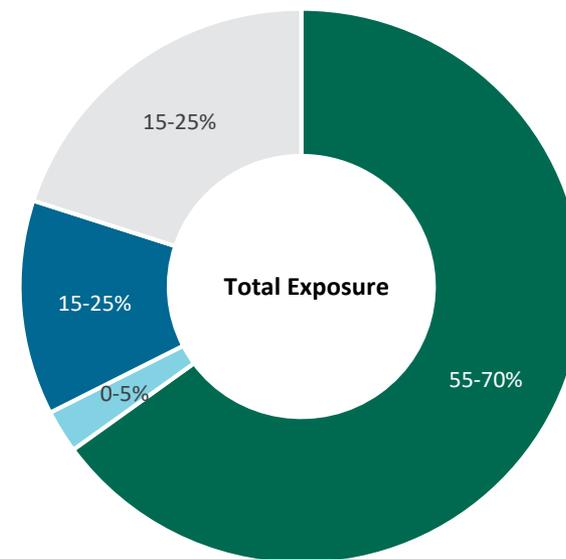
## Current Exposure<sup>1</sup> vs. TorreyCove Recommended Long Term Weighting<sup>2</sup>

- “Global” exposure from FoFs includes a mixture of exposure to all regions
- Based on fair market values, North American and Europe account for 57% and 22%, respectively, as of 12/31/2017
- There is already a fair amount of geo diversification from existing FoFs portfolio
- TorreyCove recommends a continued focus on North American managers and an opportunistic approach to non-U.S. managers

**Current Exposure**



**Target Exposure**



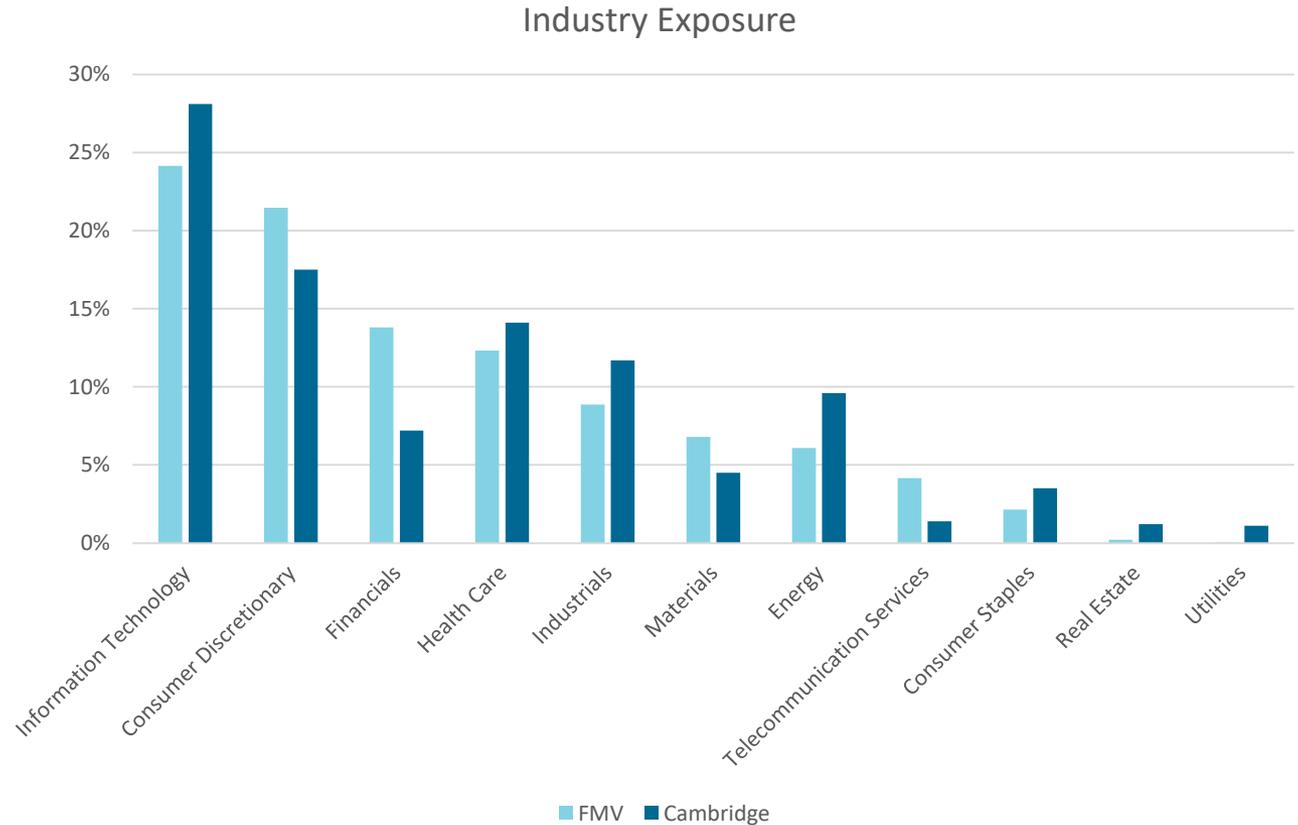
■ North America    ■ Global    ■ Asia Pacific    ■ Europe

<sup>1</sup> Estimated based on fair market values and unfunded commitments as of 12/31/2017 and YTD commitments: HIG Advantage, TB XIII, Pantheon 2018, GGV VII series, and Accel-KKR Growth III as well as 2 buyout funds in closing process

<sup>2</sup> Target Exposure includes non-exposure as the smallest category, which is different from current “Global” exposure in the FoFs portfolio

- Fair market values reflect current portfolio and not potential exposures from unfunded commitments
- OCERS' portfolio has a fair amount of diversification by industry
- Recent commitments have been more geared towards Information Technology exposures

## Fair Market Values<sup>1</sup> vs. Cambridge Database<sup>2</sup>



<sup>1</sup> Based on fair market values as of 12/31/2017

<sup>2</sup> Based on Cambridge data base, no filter applied to strategy, stage, geography, as of 12/31/2017



## Private Equity Market Outlook

## **BUYOUTS**

(Small, Medium, Large/Mega)

Funds that invest equity to acquire businesses, usually financed in part with debt. We classify these firms based on the enterprise values of companies in which they invest: small – up to \$200 million enterprise value; medium – \$200 million to \$1 billion; large – over \$1 billion.

Investment Strategies Include:

- Strategic Repositioning: Expansion of resources (such as sales force), business lines, or geographies
- Buy and Build: Acquisition of a platform company with the plan of acquiring competitors and combining them to create a larger business while consolidating a fragmented industry
- Carve outs: Separation of a business from a parent company, often without a dedicated management team or business systems like accounting and IT
- Turnarounds: Equity investment into companies that are struggling with the goal of changing operations to positively impact profitability

## **VENTURE CAPITAL & GROWTH EQUITY**

(Early, Late, Diversified, Growth)

Funds that make equity investments in nascent companies developing new technologies and/or services. The dominant areas of focus include Information Technology (IT) and Life Sciences.

Market Segments Include:

- Early Stage: Pre-revenue or pre-earnings companies
- Late Stage: Post-revenue companies experiencing rapid growth
- Growth Equity: Profitable companies experiencing rapid growth, transitioning to Buyouts

## **SPECIAL SITUATIONS (DISTRESSED DEBT, MEZZANINE, CREDIT- ORIENTED, SECONDARIES, OTHER)**

Special Situations funds encompass many “outside the box” strategies.

- Distressed debt strategies seek to invest in debt which is low relative to intrinsic value and which may convert to equity via a balance sheet restructuring.
- Mezzanine investments are a combination of subordinated debt and equity securities and generally are in the middle of the capital structure between senior debt and equity in terms of priority of repayment.
- Credit-oriented investments refer to any strategy that uses loans or debt as its primary investment instrument.
- Secondaries focus on the purchase of existing funds (at a discount, par, or premium), with pricing inverse to economic conditions.

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## Trends and Factors Impacting Private Equity Sub-Strategies:

SUB-STRATEGY	DRIVERS	TRENDS
<p><b>NORTH AMERICAN BUYOUTS:</b></p>	<ul style="list-style-type: none"> <li>• Mergers and acquisition activity, exit markets - including U.S. public markets, availability and pricing of leverage</li> </ul>	<ul style="list-style-type: none"> <li>• Strong exits and distributions over the last several years</li> <li>• Tax code changes, coupled with trade tensions, are expected to provide a marginal push toward domestic production and sourcing</li> <li>• Supply and cost of credit remain very accommodative; leverage multiples at high end of range</li> <li>• High levels of dry powder in absolute terms (approximately \$1.8 trillion)</li> <li>• Purchase price multiples are stretched – at record levels for some segments</li> <li>• Investment pace is flat to slowing (amount is steady but number of deals has fallen) due to valuation</li> <li>• Increasing use of subscription lines, which will slow equity deployment and juice performance as adoption becomes more widespread</li> </ul>

## Trends and Factors Impacting Private Equity Sub-Strategies:

SUB-STRATEGY	DRIVERS	TRENDS
<p><b>EUROPEAN BUYOUTS:</b></p>	<ul style="list-style-type: none"> <li>Regulation, currency, mergers and acquisition activity, exit markets - including secondary buyouts, availability and pricing of leverage, export orientation</li> </ul>	<ul style="list-style-type: none"> <li>Monetary stance remains highly accommodative, though ECB will cut back on bond purchases in September</li> <li>Economic growth has been relatively good for past two years, but shows signs of slowing</li> <li>Italy is a major risk factor: high levels of debt, weak banking system, sclerotic growth</li> <li>Purchase and debt multiples are at or near record highs; lower middle market more attractive</li> <li>European banking system remains undercapitalized, suggesting the possibility for disruption or crisis.</li> <li>Despite somewhat higher lending recently, credit availability to smaller enterprises will remain challenged, which supports opportunities in the private credit space.</li> <li>Trade tensions with U.S., along with Brexit, could have a meaningful impact on the GDP of export-dependent EU member countries, most importantly Germany, which derives about half of its GDP from exports.</li> </ul>

## Trends and Factors Impacting Private Equity Sub-Strategies:

SUB-STRATEGY	DRIVERS	TRENDS
<p><b>ASIAN BUYOUTS:</b></p>	<ul style="list-style-type: none"> <li>Regulation, founder sales, liquidity within public markets, economic growth</li> </ul>	<ul style="list-style-type: none"> <li>Asian markets continue to outperform other major emerging markets in terms of growth</li> <li>Demographics and under-penetration in certain sectors suggest important opportunities in the health care and financial services</li> <li>Stock market volatility in China continues to impact potential exits</li> <li>Renminbi depreciation and heightened trade tensions with China look to impact returns of USD-based investors, as well as possible exits to China state-sponsored firms in certain cases</li> <li>Japan: economic expansion, though moderate, has been one of its longest; monetary and fiscal policy remain accommodative; good opportunity in middle market if reforms continue</li> <li>South Korea: strong investment activity and exit momentum; sound macroeconomic environment; good opportunities in consumer and retail sectors</li> </ul>

## Trends and Factors Impacting Private Equity Sub-Strategies:

SUB-STRATEGY	DRIVERS	TRENDS
<b>VENTURE CAPITAL &amp; GROWTH EQUITY:</b>	<ul style="list-style-type: none"> <li>Intellectual property creation, technology cycle, IPO market</li> </ul>	<ul style="list-style-type: none"> <li>Despite a downtick within the past two years, later-stage valuations continued to move strongly higher; all stages have shown meaningful growth in valuations</li> <li>Holding periods continue to lengthen as VCs and Growth Equity are willing to fund companies longer prior to exit, while they focus on increasing efficiency and profitability</li> <li>Very strong fundraising and deployment pace for US venture</li> <li>The number of exits has declined over the past few years, but total value has remained stable and reasonably strong over that time</li> <li>Strong M&amp;A flows and equity markets support the exit picture, although strategic acquisitions from major Chinese companies may moderate given trade tensions and regulations</li> </ul>

## Trends and Factors Impacting Private Equity Sub-Strategies:

SUB-STRATEGY	DRIVERS	TRENDS
<p><b>DISTRESSED / TURNAROUND:</b></p>	<ul style="list-style-type: none"> <li>• Default rates, interest rates, federal and monetary policy, other macroeconomic factors</li> </ul>	<ul style="list-style-type: none"> <li>• Current environment remains tough, but good time to position for the turn of the cycle</li> <li>• HY issuance has slumped somewhat in 2018, but issuance in recent years has been strong; yields are stable; energy sector has substantially recovered</li> <li>• Rising interest rates, deleveraging (in part due to new U.S. tax code) in some sectors, a relatively weak financial sector in Europe, and potential destabilizing global events could trigger opportunity</li> <li>• After an upturn in the wake of the energy bust, default rates have returned to levels that are well below the long term average</li> <li>• Opportunity: operational turnarounds of undermanaged or orphaned business units focused on cost control, accelerating growth both organically and via acquisition</li> </ul>

## Trends and Factors Impacting Private Equity Sub-Strategies:

SUB-STRATEGY	DRIVERS	TRENDS
<b>MEZZANINE:</b>	<ul style="list-style-type: none"> <li>Buyout deal flow, bank lending, alternate sourcing of capital</li> </ul>	<ul style="list-style-type: none"> <li>Deal flow generally follows buyout volume, which has been adequate in recent years, though slowing somewhat in 2018 due in large part to high prices</li> <li>Rising interest rates in the US are a tailwind to the strategy</li> <li>Continued stiff competition from debt capital markets puts pressure on pricing</li> <li>High leverage multiples in buyout sector means credit quality of mezzanine tranche has degraded</li> <li>Reasonably large level of excess dry powder to invest in the space</li> </ul>

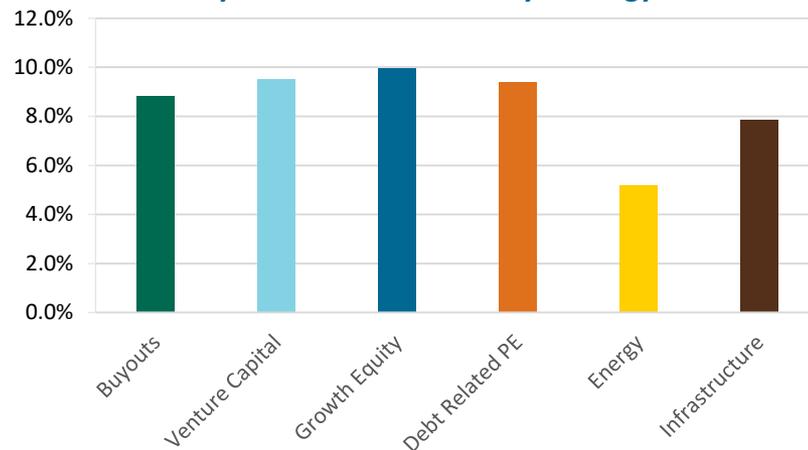
## Trends and Factors Impacting Private Equity Sub-Strategies:

SUB-STRATEGY	DRIVERS	TRENDS
<p><b>SECONDARIES:</b></p>	<ul style="list-style-type: none"> <li>Regulatory sales, portfolio management, liquidity needs, secondary dry powder</li> </ul>	<ul style="list-style-type: none"> <li>Record fundraising and deployment trend of past few years looks set to continue through 2018</li> <li>Lessening in regulatory pressures as a driver of deal flow</li> <li>Institutionalization of asset class: LPs are typically using secondary transactions to rationalize portfolios – transactions are rarely liquidity-driven</li> <li>More than ample dry powder in strategy and lack of high motivation to sell by LPs means highly competitive pricing for good quality deals</li> <li>GP-led transactions have been expanding significantly in recent years</li> </ul>

## Industry Performance Varies by Sub-Sector Across Cycles

- While all sub-sectors experienced positive returns over the last 10-year period, performance varies on a vintage year basis
- Venture capital has the highest volatility of the private equity-related sub-sectors
- Venture capital and energy both are cyclical, but tend to move in different directions

## 10-year Horizon Returns by Strategy



Source: Cambridge Associates data as of December 31, 2017

## Pooled Returns by Vintage Year

Strategy	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Buyouts	15.0%	16.3%	23.0%	25.2%	19.1%	18.7%	16.8%	23.1%	28.9%	17.6%
Venture Capital	14.3%	15.3%	15.8%	17.6%	18.2%	17.8%	15.8%	19.5%	14.7%	8.5%
Growth Equity	13.5%	14.4%	9.7%	14.4%	15.1%	14.4%	15.7%	17.8%	12.8%	-3.1%
Debt Related PE	10.1%	11.5%	9.7%	9.1%	15.1%	10.9%	15.4%	16.6%	11.6%	-6.8%
Energy	8.7%	11.3%	9.0%	7.6%	15.0%	10.3%	11.7%	15.6%	11.3%	-13.5%
Infrastructure	1.0%	10.8%	1.5%	5.7%	7.2%	6.8%	11.5%	10.6%	9.6%	---

<sup>1</sup> Debt Related Private Equity includes Control-Oriented Distressed and Credit Opportunities strategies

Source: Cambridge Associates data as of December 31, 2017. Past performance is not necessarily indicative of future results.



## Private Equity

- Continued focus on high conviction North American buyout opportunities
  - At least two top quartile opportunities launching in Q1
- 2019 Private Equity program plan and pacing

## Real Assets – Private Investments

- Pacing and program plan to be presented in Q4 2018
- Focus on high conviction Energy and Infrastructure opportunities



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The investment results for any particular client of TorreyCove may differ significantly from the investment results presented herein due to different holding periods, different weighting of the portfolio, different acquisition dates, different fees and incentive amounts, and a more limited history of investments, among other factors. Accordingly, IRRs presented herein are not necessarily representative of the IRRs achieved by TorreyCove for all of its clients as a whole or all of its clients individually.

The investment professionals of TorreyCove have conducted due diligence on and approved 647 investments totaling \$84.0 billion in commitments. The Firm currently tracks and includes 64% of these recommendations by total investments approved (417 out of 647) and 65% by total \$ commitment (\$54.5 billion out of \$84.0 billion) in its track record (as of 9/30/2017). 170 of these investments (representing \$20.9 billion in commitments) were made at predecessor organization, PCG AM. In order to calculate performance on an investment recommendation the firm must have access to all cash flow information for that recommendation. The Firm makes every effort to include all investment recommendations in its track record.

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The Cambridge Associates index (the “CA index”): all private equity results presented are unmanaged and are calculated net of general partner fees (including carried interest) and all partnership expenses and do not take into account advisor fees necessary to replicate the index. The CA index is viewed as an independent representation of the private equity market in general, and includes buyout, mezzanine and other private equity funds. The selection of these results does not imply similar strategies or universe of securities, and TorreyCove’s strategy, which may include direct investments and co-investments, may be materially different. The volatility between TorreyCove and the CA index may vary materially due to the relatively lower number of equity holdings by TorreyCove as compared to the CA index, as well as the different investment strategy followed by TorreyCove as described herein.

Information and complete reports regarding TorreyCove’s track records and IRRs are available upon request. To receive a complete list and description of TorreyCove’s investments included in the track record contact Kara King at (858) 456-6000, 10180 Barnard Road, suite 200, San Diego, California 92121, kking@torreycove.com.

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# PORTFOLIO CONSTRUCTION: WHERE'S THE ALPHA?



September 13, 2018

# What are we discussing today?

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- Components of the current portfolio
- Return outlook for the portfolio
- Alpha and beta potential over the next market cycle
- Forward asset class activities
- Conclusion

# Current Asset Allocation

OCERS' Current Asset Allocation vs. Alternative Asset Allocations

Asset Class	11.5% Std. Dev. (%)	12.2% Std. Dev. (%)	Current Policy (as invested) <sup>1</sup> (%)	13.0% Std. Dev. (%)	13.8% SD (w/ GRO) (%)	13.8% SD (w/o GRO) (%)	14.5% SD (w/ GRO) (%)	14.5% SD (w/o GRO) (%)
Global Public Equity	29	31	37	35	39	37	42	40
Private Equity	6	7	5	8	11	10	12	11
Core Fixed Income	20	18	12	17	12	16	10	12
Credit	14	14	15	13	11	14	10	13
Real Assets	21	22	17	22	22	23	21	24
Opportunistic <sup>2</sup>	0	0	12	0	0	0	0	0
Risk Mitigation	10	8	0	5	5	0	5	0
Cash	0	0	2	0	0	0	0	0
<i>20-Year Expected Return (Geometric)</i>	<i>7.5</i>	<i>7.6</i>	<i>7.7</i>	<i>7.8</i>	<i>8.1</i>	<i>8.0</i>	<i>8.2</i>	<i>8.2</i>
<i>Standard Deviation</i>	<i>11.5</i>	<i>12.2</i>	<i>13.0</i>	<i>13.0</i>	<i>13.8</i>	<i>13.8</i>	<i>14.5</i>	<i>14.5</i>
<i>% Illiquid</i>	<i>22</i>	<i>24</i>	<i>27</i>	<i>25</i>	<i>30</i>	<i>28</i>	<i>29</i>	<i>31</i>
<i>% Non-U.S.</i>	<i>19</i>	<i>20</i>	<i>24</i>	<i>22</i>	<i>24</i>	<i>24</i>	<i>25</i>	<i>25</i>

Asset Allocation was adopted in January 2017, which has an expected 20 year return of 7.8% with a 13.0% Standard Deviation

- Relative to the Public Fund Peer Group, OCERS has a significantly lower allocation to global public equity, higher allocations to credit and real assets (including real estate)

	Median Allocation (Public DB Plans >\$1Billion)	OCERS
Public Equity	45%	35%
Private Equity	9%	8%
Fixed Income (including credit)	22%	30%
Real Assets (including real estate)	11%	22%

# Annual Index Performance vs. OCERS Total Plan

2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Annualized 10 Year
MSCI EM 34.0%	MSCI EM 32.2%	MSCI EM 39.4%	CPI+5% 5.1%	MSCI EM 78.5%	MSCI EM 18.9%	NCREIF ODCE 16.0%	MSCI EM 18.2%	Russell 3000 33.6%	Cambridge PE 17.9%	NCREIF ODCE 15.0%	High Yield 17.5%	MSCI EM 37.3%	Cambridge PE 10.1%
NCREIF ODCE 21.4%	MSCI EAFE 26.3%	Cambridge PE 29.8%	BC US Univl 2.4%	High Yield 57.5%	Cambridge PE 18.4%	Cambridge PE 14.3%	MSCI EAFE 17.3%	MSCI EAFE 22.8%	Russell 3000 12.6%	Cambridge PE 5.9%	Russell 3000 12.7%	MSCI EAFE 25.0%	Russell 3000 8.6%
BLOOM Cmdty 21.4%	Cambridge PE 23.2%	JPM GBI-EM 18.1%	JPM GBI-EM -5.2%	MSCI EAFE 31.8%	Russell 3000 16.9%	CPI+5% 8.1%	JPM GBI-EM 16.8%	Cambridge PE 17.5%	NCREIF ODCE 12.5%	CPI+5% 5.8%	BLOOM Cmdty 11.8%	Russell 3000 21.1%	High Yield 7.9%
MSCI EAFE 13.5%	NCREIF ODCE 16.3%	BLOOM Cmdty 16.2%	Cambridge PE -5.6%	Russell 3000 28.3%	BLOOM Cmdty 16.8%	BC US Univl 7.4%	Russell 3000 16.4%	NCREIF ODCE 13.9%	CPI+5% 5.8%	Russell 3000 0.5%	MSCI EM 11.2%	JPM GBI-EM 15.2%	CPI+5% 6.7%
JPM EMBI 10.3%	Russell 3000 15.7%	NCREIF ODCE 16.0%	NCREIF ODCE -10.0%	JPM GBI-EM 22.0%	NCREIF ODCE 16.4%	High Yield 4.4%	Cambridge PE 16.1%	OCERS 10.9%	BC US Univl 5.6%	BC US Univl 0.4%	JPM GBI-EM 9.9%	OCERS 14.5%	OCERS 5.4%
OCERS 8.8%	OCERS 13.6%	MSCI EAFE 11.2%	OCERS -21.0%	BLOOM Cmdty 18.9%	JPM GBI-EM 15.7%	Russell 3000 1.0%	High Yield 15.6%	HFRI FoF 9.0%	OCERS 4.7%	OCERS -0.1%	NCREIF ODCE 8.8%	Cambridge PE 13.3%	NCREIF ODCE 5.0%
CPI+5% 8.4%	High Yield 11.8%	OCERS 10.4%	HFRI FoF -21.4%	OCERS 18.3%	High Yield 15.2%	OCERS 0.5%	OCERS 12.0%	High Yield 7.4%	HFRI FoF 3.4%	HFRI FoF -0.2%	Cambridge PE 8.7%	High Yield 7.5%	BC US Univl 4.3%
HFRI FoF 7.5%	HFRI FoF 10.4%	HFRI FoF 10.3%	High Yield -26.4%	HFRI FoF 11.5%	OCERS 11.2%	JPM GBI-EM -1.8	NCREIF ODCE 10.9%	CPI+5% 6.6%	High Yield 2.5%	MSCI EAFE -0.8%	OCERS 8.5%	HFRI FoF 7.7%	JPM GBI-EM 3.6%
Russell 3000 6.1%	JPM EMBI 9.9%	CPI+5% 9.1%	BLOOM Cmdty -35.7%	BC US Univl 8.6%	MSCI EAFE 7.8%	HFRI FoF -5.7%	CPI+5% 6.8%	BC US Univl -1.4%	MSCI EM -2.2%	High Yield -4.6%	CPI+5% 7.2%	NCREIF ODCE 7.6%	MSCI EAFE 1.9%
High Yield 2.7%	CPI+5% 7.6%	BC US Univl 6.5%	Russell 3000 -37.3%	CPI+5% 7.7%	BC US Univl 7.2%	MSCI EAFE -12.1%	BC US Univl 5.5%	MSCI EM -2.6%	MSCI EAFE -4.9%	JPM GBI-EM -14.9%	BC US Univl 3.9%	CPI+5% 7.1%	MSCI EM 1.7%
BC US Univl 2.7%	BC US Univl 5.0%	Russell 3000 5.1%	MSCI EAFE -43.4%	Cambridge PE -9.6%	CPI+5% 6.6%	BLOOM Cmdty -13.3%	HFRI FoF 4.8%	JPM GBI-EM -9.0%	JPM GBI-EM -5.7%	MSCI EM -14.9%	MSCI EAFE 1.0%	BC US Univl 4.1%	HFRI FoF 1.1%
Cambridge PE -9.6%	BLOOM Cmdty 2.1%	High Yield 2.2%	MSCI EM -53.3%	NCREIF ODCE -29.8%	HFRI FoF 5.7%	MSCI EM -18.4%	BLOOM Cmdty -1.1%	BLOOM Cmdty -9.5%	BLOOM Cmdty -17.0%	BLOOM Cmdty -24.7%	HFRI FoF 0.5%	BLOOM Cmdty 1.7%	BLOOM Cmdty -6.8%

- Lower than peer group allocation to equity, higher allocations to fixed income and real assets has resulted in a 10-year annualized return of 5.4% for OCERS, which is significantly below the actuarial assumption rate
- U.S. Equity beta as represented by the Russell 3000 in the last three and five years has delivered low to mid-teen returns
- In the last three and five years, significant alpha for OCERS has come from international developed equity, emerging markets equity, credit, private equity and real estate

# OCERS: 10-Year Forward Return Expectations

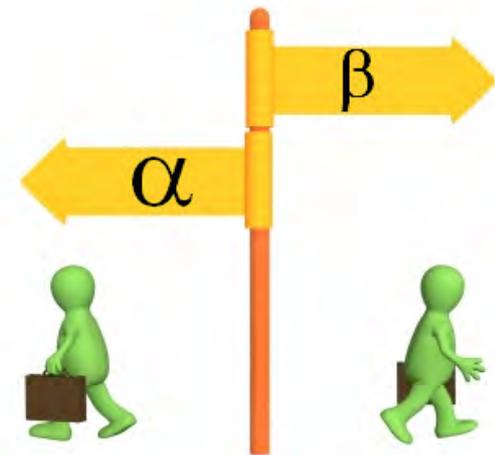
ASSET CLASS	MANAGER RETURN EXPECTATIONS	MEKETA RETURN EXPECTATIONS
<b>Short Term</b>	<b>4.84%</b>	<b>4.84%</b>
US Equity	5.85%	5.40%
International Equity	7.05%	6.10%
EM Equity	11.08%	9.00%
Private Equity	13.97%	8.70%
Private Debt	13.46%	7.00%
Core Fixed Income	2.90%	2.70%
Credit	7.07%	7.00%
Real Return	11.63%	7.00%
Real Estate	7.71%	5.70%
Risk Mitigation	5.51%	7.33%
<b>TOTAL FUND</b>	<b>7.32%</b>	<b>6.06%</b>

1. OCERS' individual investment managers return expectations over a market cycle were aggregated to calculate the manager return expectations for each asset class
2. Meketa return expectations are the expected beta returns over the next 10-year period (including illiquidity premiums)
3. Since the manager return expectations are based on the outlook and estimates of each investment manager, the returns may be somewhat optimistic
4. Return expectations for alternatives (private debt, real return, real estate and risk mitigation) are difficult to forecast with much certainty given the dispersion of manager returns

## Takeaways from the Ten Year Forward Return Expectations Analysis

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- If OCERS were to invest only through passive instruments as represented by the overlay strategy, 10-year expected return is sub 5%
- Beta returns will only deliver a total fund return of 6.1%
- To get to the 7% actuarial assumption rate, OCERS will need to invest across a wide spectrum of assets, assume illiquidity and take advantage of active management to realize alpha and deliver a total fund return of 7.3%



## Asset Class Activities: Next 12-24 months

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- Public Equities: Evaluate active/passive, currency hedging, role of hedge funds
- Private Equity: Continue implementation of the direct program
- Private Debt & Credit: Upgrade, upsize and aggregate mandates
- Real Return: Evaluate asset class, upgrade, upsize and aggregate mandates
- Real Estate: Transition to 60/40 core/non-core
- Risk Mitigation: Diversify the program
- Evaluate and develop philosophy surrounding revenue sharing



C



**Orange County Employees Retirement System**  
Asset Allocation Update  
September 2018

## Introduction

- In the first quarter of 2017, the Investment Committee voted to adopt a new asset allocation policy for the portfolio, as well as target ranges, and a re-categorization of existing strategies. Subsequently, the Committee reviewed each major asset class and set sub-allocation targets.
- In conjunction with the adopted asset allocation, the Committee added an allocation to Risk Mitigating Strategies, with a target of 5%. In the fourth quarter of 2018, OCERS Staff, Meketa, and PCA will recommend increasing the risk mitigating strategies allocation to 10%, with the goal of better protecting the portfolio in the event of a market crisis scenario.
- OCERS Staff and Meketa Investment Group will also be asking the Committee to consider other, smaller asset allocation policy changes, which would make the portfolio more efficient (lowering expected volatility for the same long-term expected return). This document seeks to lay the groundwork for our bringing more specific recommendations to upcoming Committee meetings. Our recommendations will likely include the following advisements:
  - Increasing Risk Mitigating Strategies
  - Increasing Private Equity
  - Decreasing Credit
  - Decreasing Real Assets
  - Reconsidering an Opportunistic asset class
- Overall, the asset allocation recommendations of OCERS Staff and Meketa Investment Group would result in a “barbell” approach to the portfolio, where an increase in low-risk assets would allow for a minor increase in higher-returning assets as well.

**Current Portfolio**

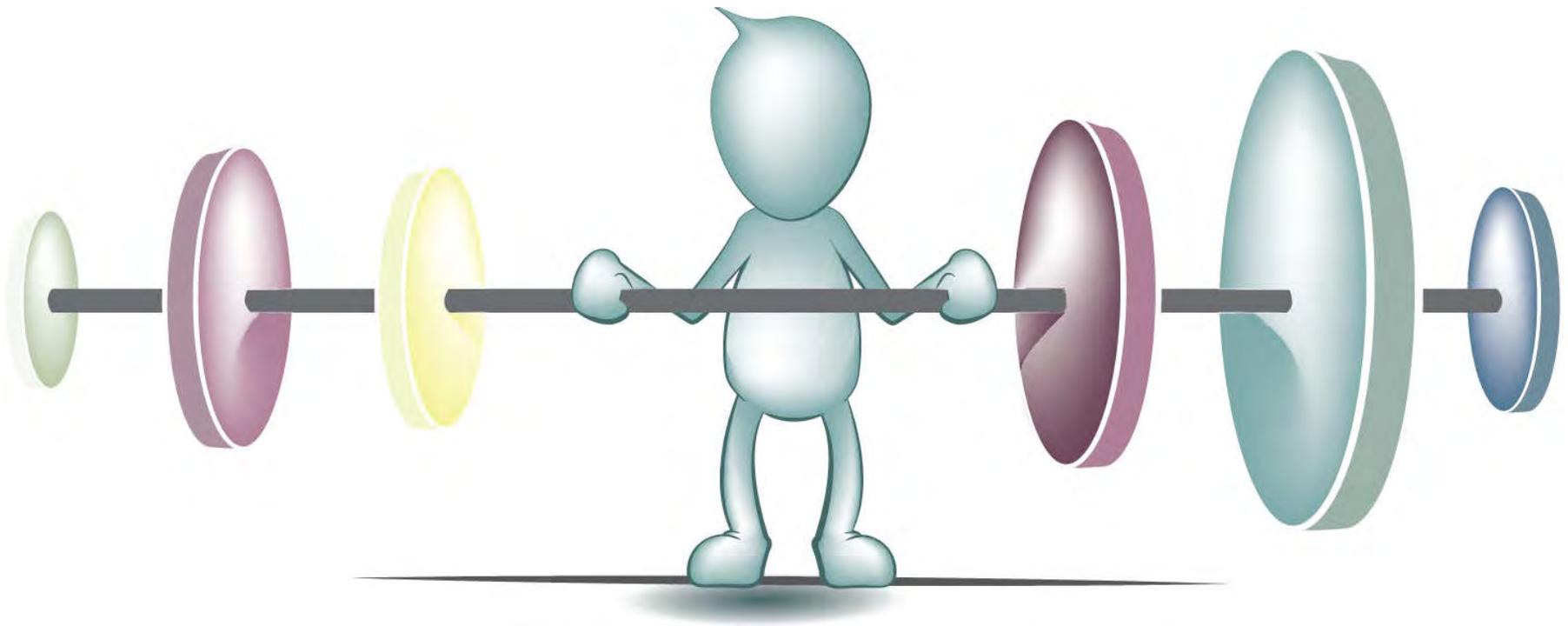
Low Risk



High Risk

Risk-Mitigating	Fixed Income	Credit
5%	17%	13%

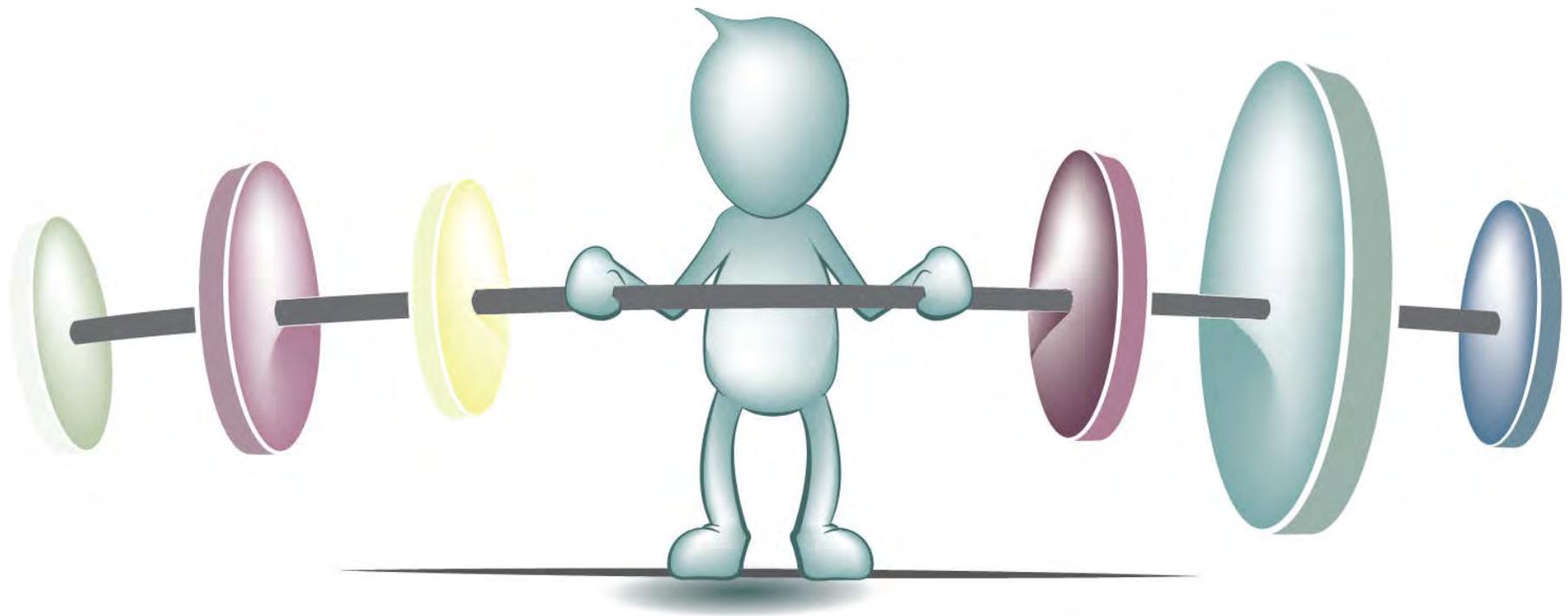
Real Assets	Equity	Private Equity
22%	35%	8%



**7.5% Expected Return, 12.8% Standard Deviation**

### Recommended Asset Allocation

Low Risk			High Risk		
<b>Risk-Mitigating</b>	<b>Fixed Income</b>	<b>Credit</b>	<b>Real Assets</b>	<b>Equity</b>	<b>Private Equity</b>
10%	17%	11%	17%	35%	10%



**7.5% Expected Return, 12.4% Standard Deviation**

### Preview of Likely Asset Allocation Recommendations<sup>1</sup>

	Current Policy (%)	Recommended Update (%)	Change (%)
<b>Public Equity</b>	35	35	--
<b>Private Equity</b>	8	10	+2
<b>Fixed Income</b>	17	17	--
<b>Credit</b>	13	11	-2
<b>Real Assets</b>	22	17	-5
<b>Risk Mitigating</b>	5	10	+5
<i>Expected Return</i>	7.5	7.5	--
<i>Standard Deviation</i>	12.8	12.4	-0.4
<i>Sharpe Ratio</i>	0.36	0.37	0.37

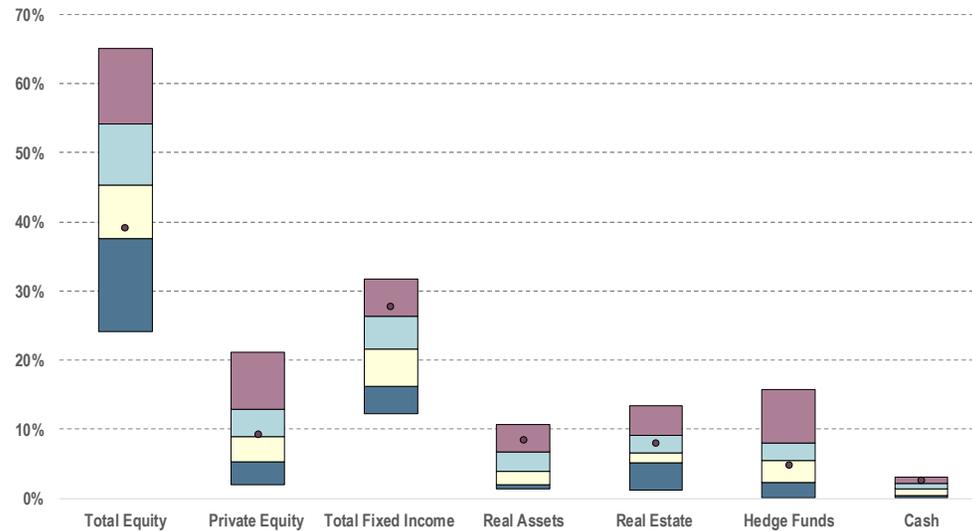
<sup>1</sup> Expected return and standard deviation are based upon Meketa Investment Group's 2018 Annual Asset Study. Throughout this document, returns for periods longer than one year are annualized.

## Why Change?

- Modest adjustments to asset allocation over time are appropriate
- New Chief Investment Officer has now had time to absorb the full portfolio and make well-reasoned judgements on asset allocation
- Specific asset class rationale
  - Risk Mitigating Strategies – protect against potentially devastating downside risks
  - Credit/Real Assets – existing allocations are too high given current market environment
  - Private Equity – OCERS is in a strong position to trade liquidity for higher expected return

### Peer Comparison

**Total Plan Allocation vs. InvesorForce Public Defined Benefit Plans > \$1 Billion  
As of June 30, 2018**



	Total Equity (%)	Private Equity (%)	Fixed Income (%)	Real Assets (%)	Real Estate (%)	Hedge Funds (RMS) (%)	Cash (%)
5th Percentile	65	21	3	11	13	16	3
25th Percentile	54	13	26	7	9	8	2
Median	45	9	22	4	7	5	1
75th Percentile	38	5	16	2	5	2	0
95th Percentile	24	2	12	1	1	0	0
OCERS Total Portfolio (actual)	39	9	28	9	8	5	3
<b>Current Target Allocation</b>	<b>35</b>	<b>8</b>	<b>30</b>	<b>12</b>	<b>10</b>	<b>5</b>	<b>0</b>
<b>Likely Recommendations</b>	<b>35</b>	<b>10</b>	<b>28</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>0</b>

Notes: "Total Portfolio" represents actual exposures as of June 30, 2018  
 "Total Equity" is inclusive of all Public Equity, but does not include Private Equity  
 "Fixed Income" includes both Fixed Income and Credit assets  
 "Hedge Funds" is representative of the RMS exposures and is inclusive of Long-Term Treasuries  
 Assets are categorized per their respective asset class (i.e. equity long/short assets included within the Domestic Equity asset class are considered Equity assets)



## Summary

- OCERS Staff and Meketa Investment Group will provide more detailed recommendations and analysis of these suggested changes at upcoming Committee meetings. We look forward to discussing our suggestions with the Committee.

# Appendices

## Meketa Investment Group 2018 Annual Asset Study Twenty-Year Annualized Return and Volatility Expectations for Major Asset Classes

Asset Class	Annualized Compounded Return (%)	Annualized Average Return (%)	Annualized Standard Deviation (%)
<b>Rate Sensitive</b>			
Cash Equivalents	2.9	2.9	1.0
Investment Grade Bonds	3.6	3.7	4.0
Long-term Government Bonds	3.5	4.3	13.0
TIPS	3.3	3.6	7.5
<b>Credit</b>			
High Yield Bonds	5.4	6.2	12.5
Bank Loans	5.0	5.5	10.0
Emerging Market Bonds (major; unhedged)	4.9	5.6	11.5
Emerging Market Bonds (local; unhedged)	5.4	6.5	14.5
Direct Lending - First Lien	5.7	6.4	11.0
Direct Lending - Second Lien	7.3	8.6	16.0
Mezzanine Debt	6.6	8.0	17.0
Distressed Debt	6.6	9.0	22.0
<b>Equities</b>			
Public U.S. Equity	7.3	8.9	18.0
Public Developed Market Equity	7.1	9.1	20.0
Public Emerging Market Equity	9.4	12.5	25.0
Private Equity Composite	9.3	12.9	27.0
<b>Real Assets</b>			
REITs	6.8	10.9	28.5
Core Private Real Estate	5.5	6.2	12.0
Value Added Real Estate	6.9	8.7	19.0
Opportunistic Real Estate	8.5	11.6	25.0
High Yield Real Estate Debt	6.4	9.0	23.0
Natural Resources (Private)	8.8	11.4	23.0
Commodities	4.6	6.2	18.0
Infrastructure (Core)	6.6	7.7	15.0
Infrastructure (Non-Core)	8.5	11.1	23.0
<b>Other</b>			
Hedge Funds	5.2	5.5	8.5

### Meketa Investment Group 2018 Annual Asset Study: Correlation Expectations

	TIPS	Investment Grade Bonds	High Yield Bonds	U.S. Equity	Developed Market Equity	Emerging Market Equity	Private Equity	Real Estate	Natural Resources (private)	Commodities	Core Infrastructure (private)	Hedge Funds
TIPS	1.00											
Investment Grade Bonds	0.80	1.00										
High Yield Bonds	0.30	0.20	1.00									
U.S. Equity	0.00	0.05	0.70	1.00								
Developed Market Equity	0.15	0.05	0.70	0.90	1.00							
Emerging Market Equity	0.15	0.05	0.70	0.80	0.90	1.00						
Private Equity	0.05	0.05	0.65	0.85	0.80	0.75	1.00					
Real Estate	0.10	0.20	0.50	0.50	0.45	0.40	0.45	1.00				
Natural Resources (private)	0.10	0.10	0.45	0.65	0.60	0.60	0.55	0.45	1.00			
Commodities	0.35	0.05	0.40	0.35	0.55	0.60	0.30	0.15	0.65	1.00		
Core Infrastructure (private)	0.30	0.30	0.60	0.55	0.55	0.50	0.45	0.60	0.60	0.40	1.00	
Hedge Funds	0.20	0.05	0.70	0.80	0.85	0.85	0.65	0.45	0.65	0.35	0.60	1.00



## Notes and Disclaimers

- <sup>1</sup> The returns shown in the Policy Options and Risk Analysis sections rely on estimates of expected return, standard deviation, and correlation developed by Meketa Investment Group. To the extent that actual return patterns to the asset classes differ from our expectations, the results in the table will be incorrect. However, our inputs represent our best unbiased estimates of these simple parameters.
- <sup>2</sup> The returns shown in the Policy Options and Risk Analysis sections use a lognormal distribution, which may or may not be an accurate representation of each asset classes' future return distribution. To the extent that it is not accurate in whole or in part, the probabilities listed in the table will be incorrect. As an example, if some asset classes' actual distributions are even more right-skewed than the lognormal distribution (i.e., more frequent low returns and less frequent high returns), then the probability of the portfolio hitting a given annual return will be lower than that stated in the table.
- <sup>3</sup> The standard deviation bars in the chart in the Risk Analysis section do not indicate the likelihood of a 1, 2, or 3 standard deviation event—they simply indicate the return we expect if such an event occurs. Since the likelihood of such an event is the same across allocations regardless of the underlying distribution, a relative comparison across policy choices remains valid.

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# RISK MITIGATION CLASS COMPONENTS

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September 2018



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CONSULTING  
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# Table of Contents

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Class Overview & Role	1
Frameworks for Components	2
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# Class Overview & Role

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- Risk Mitigation Class Components

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# Class Overview & Role

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- OCERS (as a plan sponsor) and its Total Portfolio are procyclical with one another
  - During the worst periods (e.g., Great Financial Crisis), both the portfolio and plan sponsor (i.e., tax revenue) suffer
  - During the best periods, both the portfolio and plan sponsor excel
- A Risk Mitigation class seeks to offset some of the challenges
  - Moderate total portfolio drawdown
  - Provide a source of liquidity for rebalancing or benefit payments
  - Improve long-term compound return
    - Due to lower drawdown, less volatility, and rebalancing
- While OCERS is currently net cash-flow positive, the utility of a Risk Mitigation class is increased when net cash-flow negative

# Class Overview & Role

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- A functional strategic class
  - Functional = class name describes its purpose, not asset type
- Risk Mitigation class is explicitly constructed to be void of static exposures to equity/credit risk (i.e., *Economic Growth Risk*)
- The class's primary goal/function would be to protect the OCERS portfolio during severe equity bear markets (e.g., >15-20% drawdowns)
- Secondary goal is to produce an uncorrelated positive real return in the long-term
- As a strategic class, it is not reliant upon market timing/tactical decisions to prove fruitful

# Class Overview & Role

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- The class consists of multiple underlying components
- Each component has a different role and/or attributes
- Vital to examine the class in aggregate and not components in isolation
- Multiple frameworks can be used to describe the component structure
  - PCA will discuss two different but related frameworks
- Component frameworks provide a basis for better understanding the class and its performance
- Reasonable people can utilize different frameworks

# Frameworks for Components

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- Risk Mitigation Class Components

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# Potential Strategies

- A wide variety of strategies can be considered for the class
- It is not required that every strategy possess each desired attribute, but the class as a whole should demonstrate them in aggregate
- These strategies can then be grouped into higher-level categories

Potential Strategies and Desired Attributes

Strategy*	Positive Expected Return?	Negative Conditional Correlation to Equities?	Systematic / Humble Implementation?	Liquid & Scalable?	High Volatility?	Cost Effective (fees)?
Long U.S. Treasury Bonds	✓	✓	✓	✓	✓	✓
CTAs/Systematic Trend Following	✓	✓	✓	✓	✓	✓
Alternative Risk Premia	✓	varies	✓	✓	varies	✓
Global Macro	varies	varies	varies	varies	varies	varies
Tail Risk Strategies	✗	✓	✓	✓	varies	✓

\*Strategy list selected by PCA, Meketa, and OCERS Staff | See Appendix for strategy descriptions

# Framework #1: Traditional, High-level Version

## 1) Established Diversifiers

- *Longstanding strategies that have been utilized for decades*

- Long U.S. Treasury Bonds
- CTAs/Systematic Trend Following

## 2) Alternative Return Capture

- *Strategies that have de minimis long-term market exposure and seek to either predict major market moves or exist in isolation of major market moves*

- Global Macro
- Alternative Risk Premia

## 3) Explicit Protection/Insurance

- *Guaranteed positive payoffs during market drawdowns with continual costs to maintain the program*

- Tail Risk Strategies (e.g., buying put options)

# Framework #2: Functional Roles Version

## 1) First Responder\*

- *Strategies that have a high likelihood of responding quickly and positively during “risk-off” market events*
  - Tail Risk Strategies
  - Long U.S. Treasury Bonds (exception = inflationary/rising rate events)

## 2) Second Responder\*

- *Strategies that will naturally reposition to take advantage of sustained market drawdowns*
  - CTAs/Systematic Trend Following

## 3) Portfolio Return Bolster\*

- *Strategies that have unreliable protection attributes but are also unrelated to Growth-risk and can help improve the long-term return of the class*
  - Alternative Risk Premia

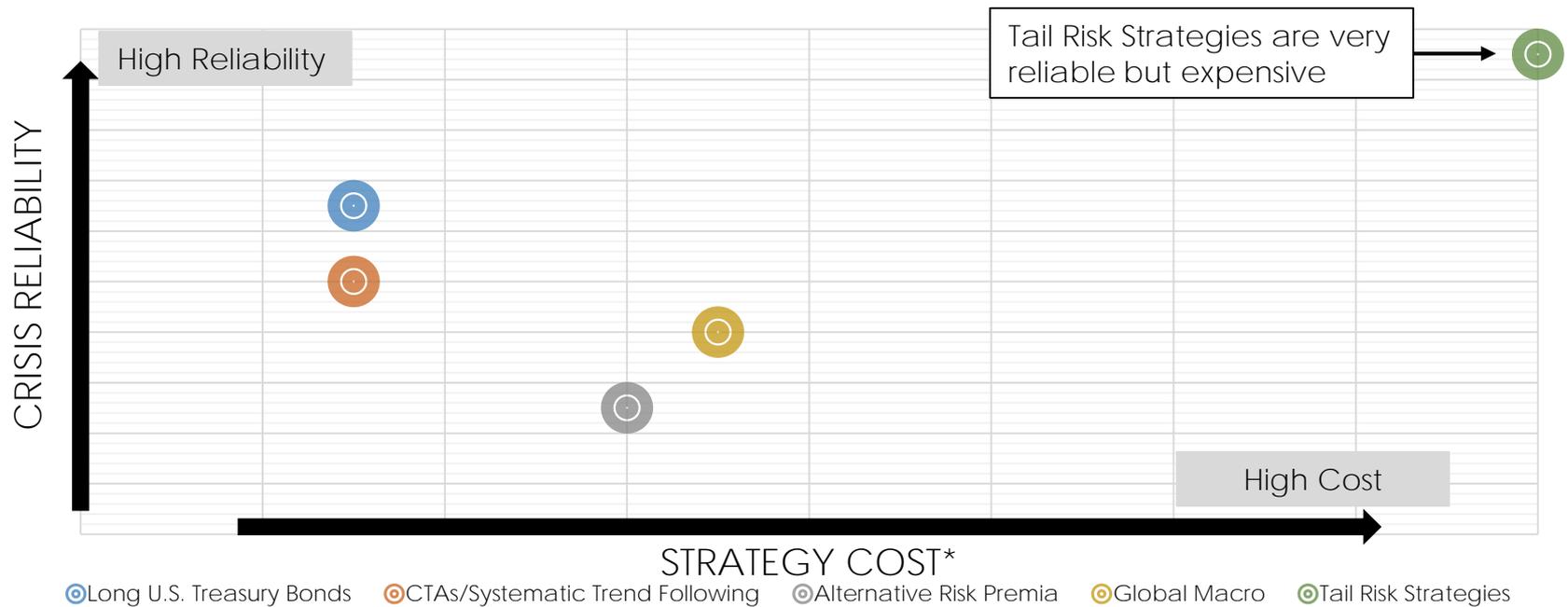
\*Global Macro strategies can fit into any of the categories but success is dependent on manager selection and prevailing market environment

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# Reliability and Costs

- In PCA's opinion, examining "crisis reliability" and "costs" of each strategy type is crucial
- "Costs" should incorporate expected returns and management fees

## PCA's Qualitative View on Cost\* & Reliability



\*Cost includes long-term expected returns and management fees

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# Managing Expectations

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- With the exception of cash, all investment strategies have risks
- If well designed and implemented, the risks of the Risk Mitigation class should be different than *Economic Growth Risk*
  - *Interest Rate Risk* will likely be a meaningful risk
- In order to be reactive and impactful, the class must be fairly volatile by design (>10% volatility)
  - As such, material negative returns (>15% drawdowns) are possible
  - This is not an absolute return class
- The Risk Mitigation class is not an insurance policy
  - While designed to have insurance-like attributes, it is also designed to have a positive expected return (not a negative expected return)
- The class is meant to protect in large, sustained bear markets not minor drawdowns

# Managing Expectations

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- Several potential components/strategies are not easily benchmarked
  - In turn, the aggregate class does not have a perfect benchmark
- Moreover, the benchmark mismatch is further compounded when comparing short-term results
- The class should be constructed to be “as simple as possible but as complex as necessary”
- Aggregate class review/judgement should be focused on the long-term and behavior during equity bear market situations

# Appendix

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- Risk Mitigation Class Components

# Appendix: Potential Strategy Descriptions

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## Long U.S. Treasury Bonds

- Investments in long-term (20+ year) U.S. Treasury Bonds
- While void of *Economic Growth Risk*, long-term U.S. Treasury Bonds have material *Interest Rate Risk*
  - Current benchmark/index duration  $\approx$  17-18 years
- Commonly represented by:
  - Bloomberg Barclays U.S. Government: Long Index
  - Bloomberg Barclays U.S Treasury: Long Index
- Despite material *Interest Rate Risk*, long-term U.S Treasury Bonds are not as directly impacted by monetary policy as short & intermediate bonds
  - Long end of yield curve is primarily driven by economic growth and inflation
    - Economic growth and inflation are direct inputs to monetary policy, however

# Appendix: Potential Strategy Descriptions

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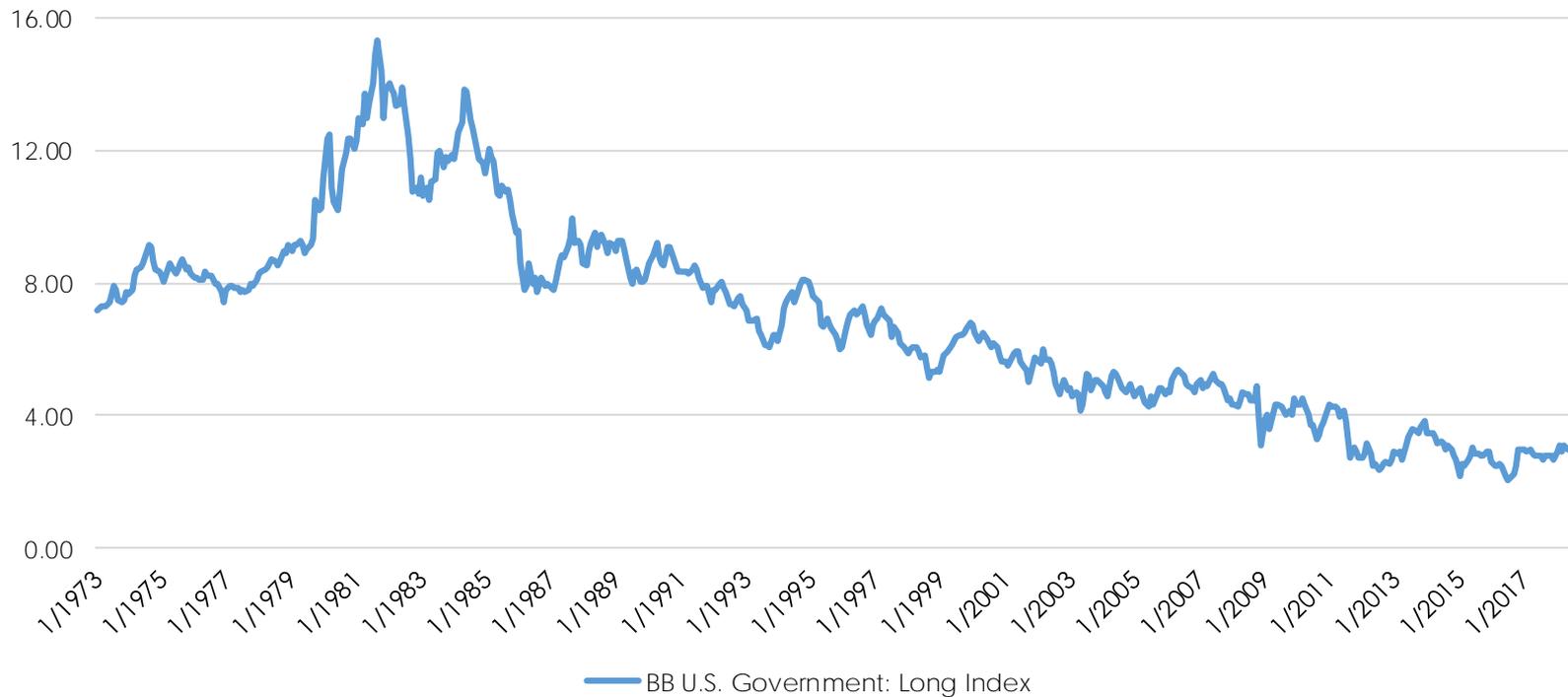
## Long U.S. Treasury Bonds

- Risk Mitigation-related Pros:
  - Extremely liquid (especially during crisis situations)
  - Scalable; no foreseeable capacity limitations
  - Strong reactive movements during deflationary crisis situations
  - High impact (i.e., volatile)
  - Positive expected long-term real returns
  - Near zero management costs
- Risk Mitigation-related Cons:
  - Unlikely to protect during market drawdowns that coincide with high inflation
    - e.g., stagflation (high unemployment and high inflation)

# Appendix: Potential Strategy Descriptions

## Long U.S. Treasury Bonds

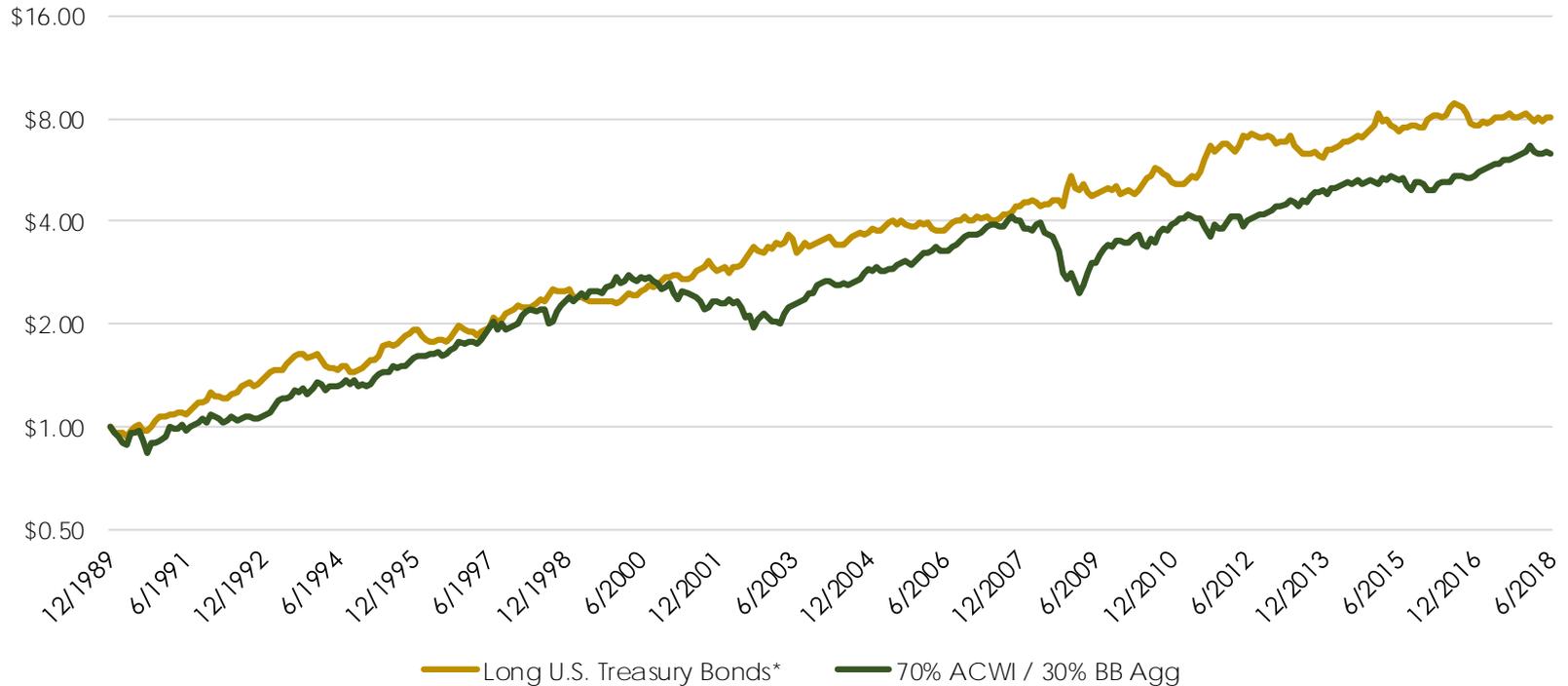
Long-term U.S. Treasury Bond Yields



# Appendix: Potential Strategy Descriptions

## Long U.S. Treasury Bonds

Growth of \$1 - Long U.S. Treasury Bonds and 70/30 Portfolio



	Long U.S. Treasury Bonds*	70% ACWI / 30% BB Agg
Historical Return (1/1990 - 6/2018)	7.6%	6.7%
Historical Volatility (1/1990 - 6/2018)	9.6%	10.6%
Max Drawdown	-15.5%	-41.1%
Return During Tech Bubble Drawdown	29.6%	-28.9%
Return During GFC Drawdown	16.0%	-41.1%

\*BB U.S. Government: Long Index

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# Appendix: Potential Strategy Descriptions

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## CTAs/Systematic Trend Following

- Fairly synonymous terms:
  - Commodity Trading Advisors (CTAs)
  - Trend Following
  - Managed Futures
- Strategies that follow pre-defined rules (i.e., systematic implementations) for trading (long and short) liquid futures and forwards contracts
- Trade futures/forwards across global equity indices, interest rates/bonds, currencies, and commodities
- Simplistic explanation: strategies that buy an asset when it has a positive return over recent history and sell an asset when it has a negative return over recent history
- Both manager-composite and rules-based indices/benchmarks

# Appendix: Potential Strategy Descriptions

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## CTAs/Systematic Trend Following

- *Momentum* and *Trend Following* are somewhat interchangeable terms
- That which has done well recently will continue to do well
- That which has done poorly recently will continue to do poorly
- Buy what is going up; sell what is going down
  - Ex: if S&P 500 has a positive 1-year return, buy/go long
  - Ex: if oil has a negative 1-year return, sell/short
- This results in a volatile yet low correlation return vs. risky assets (e.g., equities) over a full market cycle
  - Often a positive correlation during bull markets and a negative correlation during bear markets

# Appendix: Potential Strategy Descriptions

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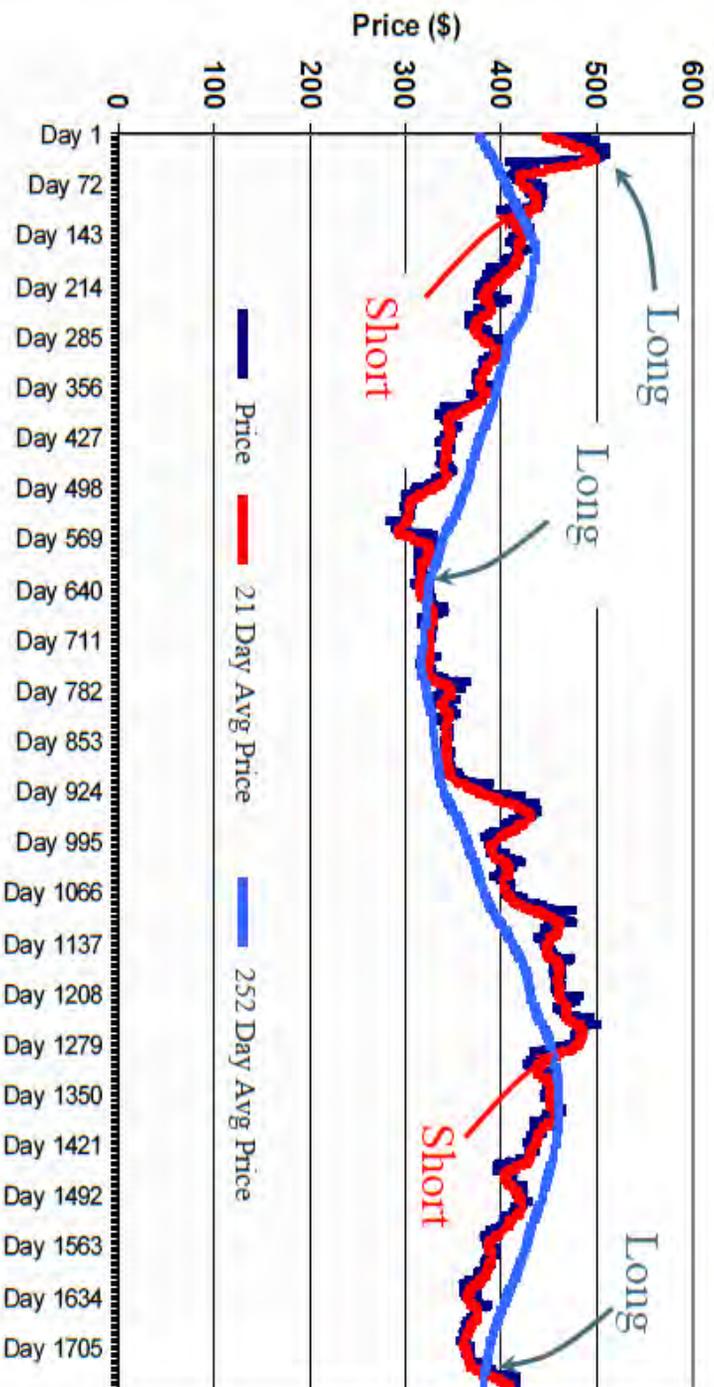
## CTAs/Systematic Trend Following

- Long and short positions; can be entirely net long or net short at any time
- Investable universe includes all liquid investments across the globe:
  - Equities = typically broad indices such as S&P 500, Nikkei 225, etc.
  - Fixed Income = typically sovereign bonds/rates such as U.S. 10-year Treasury
  - Currencies = typically major currencies such as JPY, GBP, EUR, AUD, CAD, CHF
  - Commodities = typically energy, metals, and agriculture components
- Strategy volatilities range from roughly 8%-20% (equity  $\approx$  18%-20%)
- Trend Following strategies have been utilized for decades
- Historically a 2%/20% hedge fund strategy
  - What was once thought to be “alpha” can now be obtained as “beta”

# Appendix: Potential Strategy Descriptions

## CIAs/Systematic Trend Following

- Single Asset Example:
  - 21 day average price > 252 day average price = long position
  - 21 day average price < 252 day average price = short position



# Appendix: Potential Strategy Descriptions

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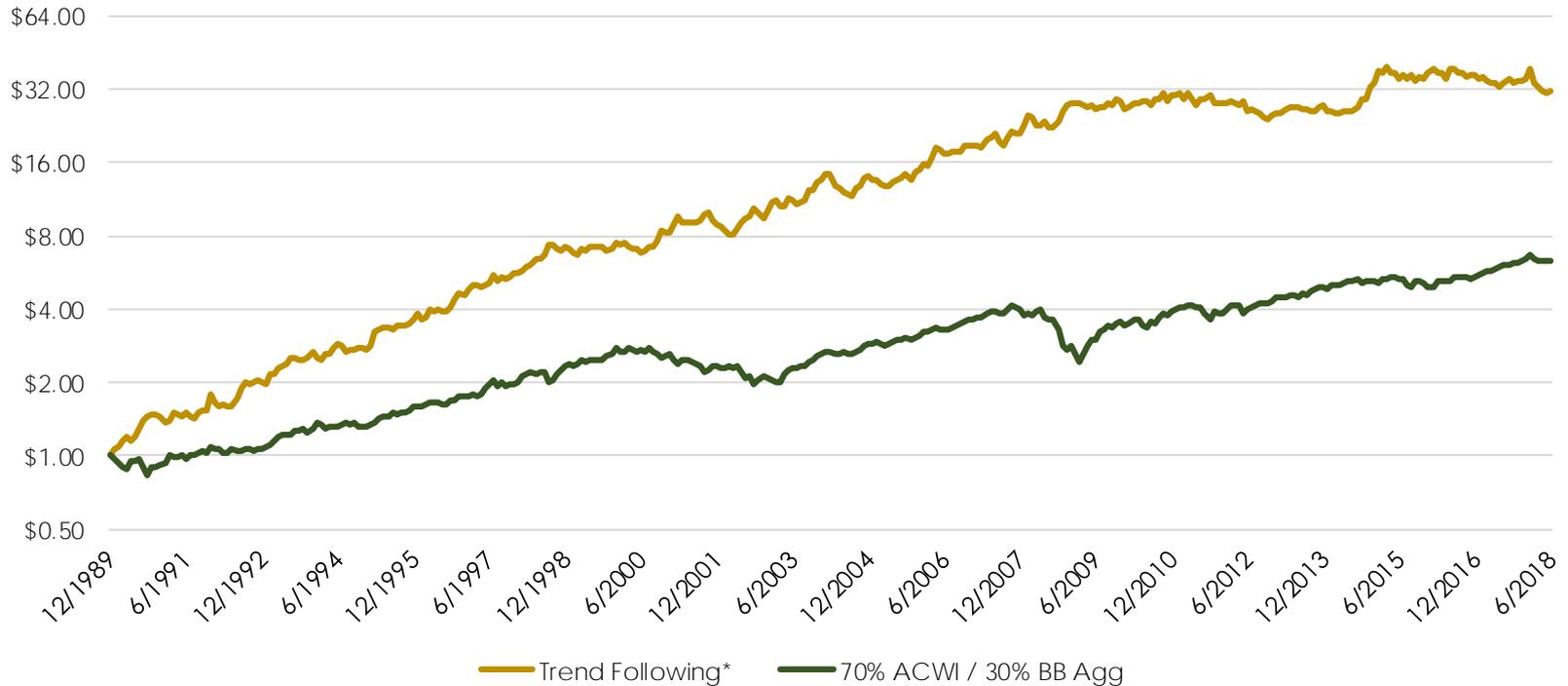
## CTAs/Systematic Trend Following

- Risk Mitigation-related Pros:
  - Liquid
  - Scalable; no foreseeable capacity limitations
  - Historically, material reactive movements during crisis situations (i.e., volatile)
    - Typically reacts to crisis situations with a lag (i.e., requires time to adjust)
  - Positive expected long-term real returns
  - Fairly low management costs ( $\approx 20$ -100 bps)
- Risk Mitigation-related Cons:
  - Economic theory for why these strategies work is unsettled
  - Can be positioned for “risk-on” at the onset of market declines

# Appendix: Potential Strategy Descriptions

## CTAs/Systematic Trend Following

Growth of \$1 - Trend Following and 70/30 Portfolio



	Trend Following*	70% ACWI / 30% BB Agg
Historical Return (1/1990 - 6/2018)	12.8%	6.7%
Historical Volatility (1/1990 - 6/2018)	14.8%	10.6%
Max Drawdown	-21.9%	-41.1%
Return During Tech Bubble Drawdown	43.0%	-28.9%
Return During GFC Drawdown	31.4%	-41.1%

\*Hybrid Track Record  
 1990-1997 = HFN CTA/Managed  
 Futures Index  
 1998-6/2018 = Credit Suisse 15%  
 Volatility Managed  
 Futures Index

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# Appendix: Potential Strategy Descriptions

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## Alternative Risk Premia

- Strategies that harvest alternative risk premia
  - Alternative = different than equity, credit, and interest rate risk premia
- Risk premium = a positive payment for being exposed to a risk
- Implemented in a long/short (i.e., market neutral) fashion
- Alternative Risk Premia Examples:
  - Value => Long “cheap” assets and short “expensive” assets
  - Carry => Long high-yielding assets and short low-yielding assets
  - Momentum => Long recent “winners” and short recent “losers”
  - Defensive => Long lower risk assets and short higher risk assets

# Appendix: Potential Strategy Descriptions

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## Alternative Risk Premia

- These strategies are focused more on “beta” than “alpha”
  - i.e., gaining returns from strategic risk exposures as opposed to skill
- Managers in the space are generally quantitative firms with long histories in factor investing and/or long/short strategies
- Currently, there are not any transparent/relevant indices that could be considered passive/replication approaches
- These factors/risk premiums can exist due to behavioral anomalies (i.e., mispricings) or actual risks
  - Behavioral anomalies/mispricings may eventually be corrected
  - Risk premiums are more likely to be sustainable in the future

# Appendix: Potential Strategy Descriptions

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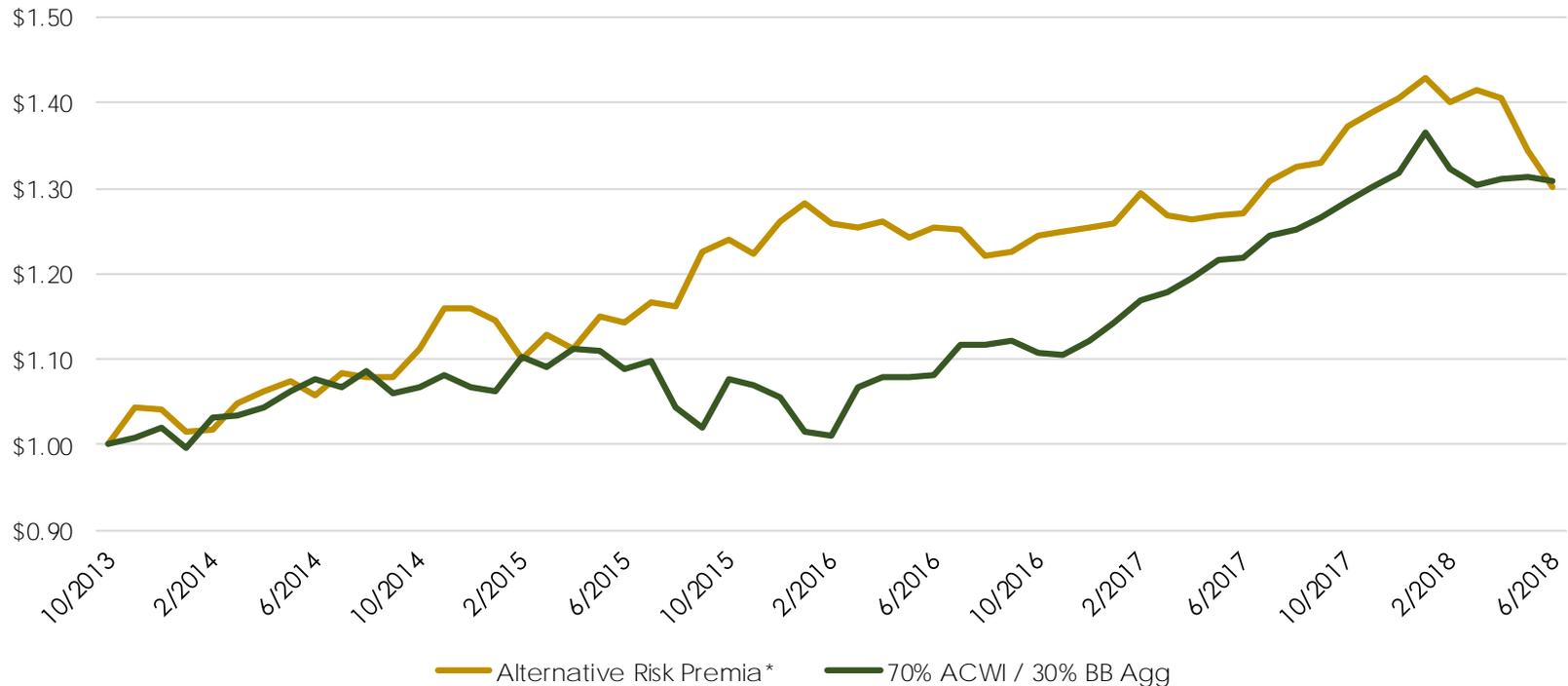
## Alternative Risk Premia

- Risk Mitigation-related Pros:
  - Generally liquid (more dependent upon vehicle structure than anything else)
  - Scalable to a certain degree
  - Positive expected long-term real returns
  - Unrelated to long-only equity and credit
  - Reasonable management costs ( $\approx 60-110$  bps)
- Risk Mitigation-related Cons:
  - Volatility levels can vary depending on implementation approach
  - Behavior during crisis situations is unpredictable (i.e., truly uncorrelated)
  - Economic theory behind most alternative risk premiums is unsettled
    - Despite decades of academic research
  - “Live” implementations have short histories

# Appendix: Potential Strategy Descriptions

## Alternative Risk Premia

Growth of \$1 - Alternative Risk Premia and 70/30 Portfolio



	Alternative Risk Premia*	70% ACWI / 30% BB Agg
Historical Return (11/2013 - 6/2018)	5.8%	5.9%
Historical Volatility (11/2013 - 6/2018)	7.2%	7.0%
Max Drawdown	-8.9%	-9.1%

\*AQR Style Premia Mutual Fund (1 shares)

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# Appendix: Potential Strategy Descriptions

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## Global Macro

- Broad, unconstrained strategies that seek to predict major market moves
- Typically focused on macroeconomic events and broad asset classes
  - Depending on the manager, may also have more micro-oriented strategies (e.g., relative value/market neutral trades)
- Similar to Global Tactical Asset Allocation (GTAA) strategies but with increased flexibility, latitude, and leverage
- Can be entirely net long or net short at any given time
- Systematic and discretionary approaches
- Bridgewater Pure Alpha can be viewed as a Global Macro strategy

# Appendix: Potential Strategy Descriptions

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## Global Macro

- Risk Mitigation-related Pros:

- Typically liquid (but dependent on vehicle structure)
- Potentially scalable
- Commonly unrelated to long-only equity and credit

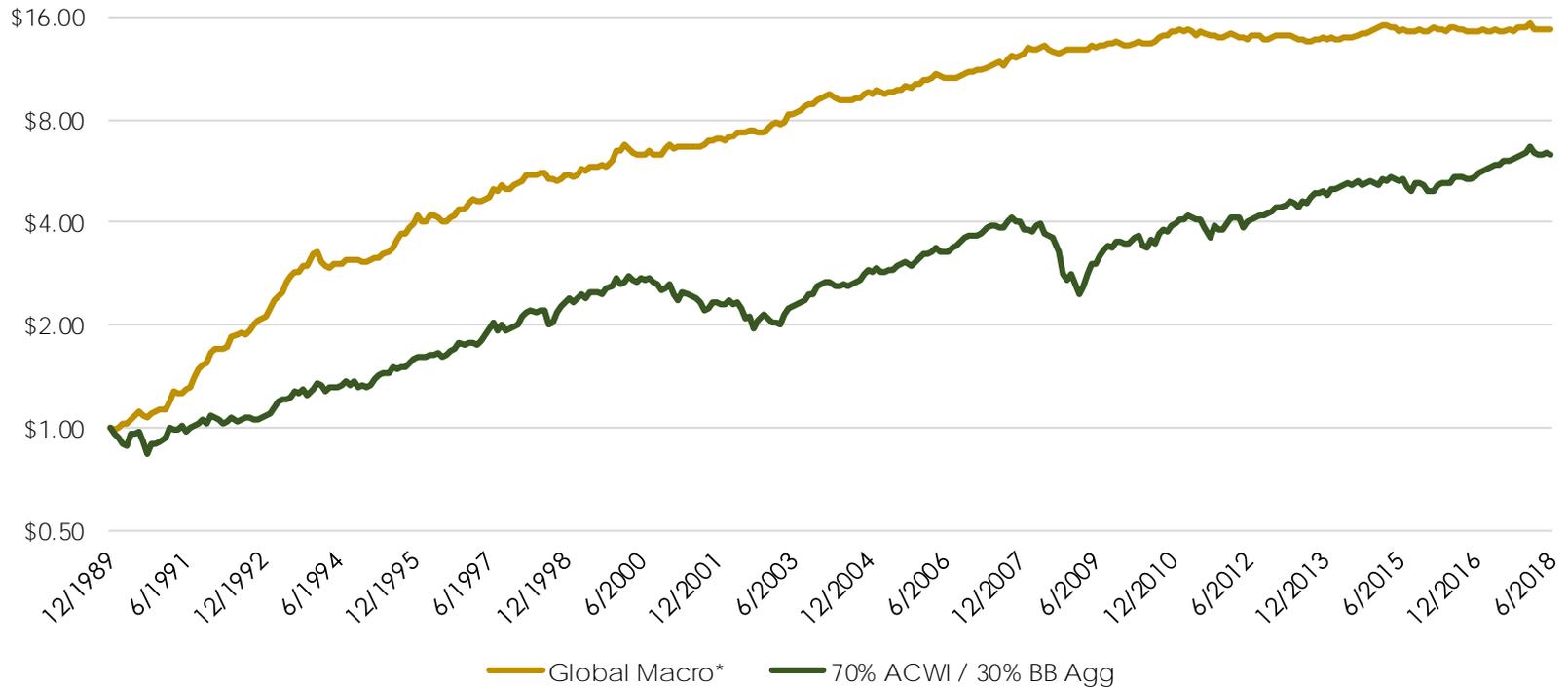
- Risk Mitigation-related Cons:

- Expected returns can vary and are often dependent upon manager skill
- Volatility levels can vary depending on implementation approach
- Economic intuition behind the efficacy of these strategies is debateable
- Behavior during crisis situations is variable
- Typically high management fees ( $\approx 100$ - $200$  bps plus a performance fee)

# Appendix: Potential Strategy Descriptions

## Global Macro

Growth of \$1 - Global Macro and 70/30 Portfolio



	Global Macro*	70% ACWI / 30% BB Agg
Historical Return (1/1990 - 6/2018)	9.9%	6.7%
Historical Volatility (1/1990 - 6/2018)	7.1%	10.6%
Max Drawdown	-10.7%	-41.1%
Return During Tech Bubble Drawdown	15.5%	-28.9%
Return During GFC Drawdown	4.7%	-41.1%

\*HFRI Macro Index

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# Appendix: Potential Strategy Descriptions

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## Tail Risk Strategies (e.g., Buying Put Options)

- The most direct form of equity drawdown insurance
- Equity put options give the buyer the right to sell a specified amount of equity at a given price within a certain time frame
  - The strike price (i.e., agreed sales price) and time frame both directly influence the cost of the put option
- Extremely expensive to buy on a strategic basis
  - Negative expected nominal returns
- Due to inherit leverage in derivatives, positive payoffs can be substantial during market crisis situations

# Appendix: Potential Strategy Descriptions

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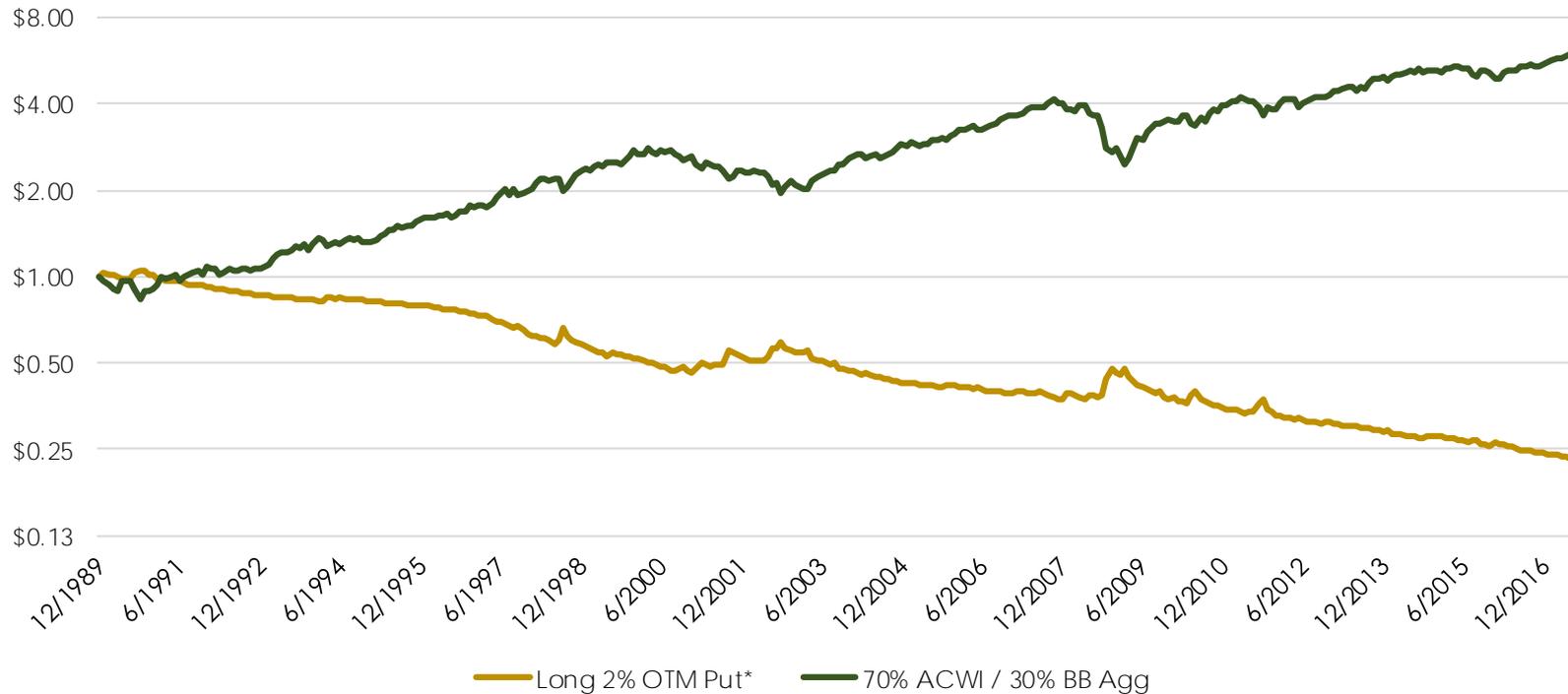
## Tail Risk Strategies (e.g., Buying Put Options)

- Risk Mitigation-related Pros:
  - Perfectly negatively correlated to equities
  - Liquid
  - Scalable
  - Potentially impactful (i.e., volatile)
  
- Risk Mitigation-related Cons:
  - Negative expected nominal returns
    - Material portfolio drag during most environments

# Appendix: Potential Strategy Descriptions

## Tail Risk Strategies (e.g., Buying Put Options)

Growth of \$1 - Buying Put Options and 70/30 Portfolio



	Long 2% OTM Put*	70% ACWI / 30% BB Agg
Historical Return (1/1990 - 6/2017)	-5.2%	6.7%
Historical Volatility (1/1990 - 6/2017)	7.3%	10.7%
Max Drawdown	-77.8%	-41.1%
Return During Tech Bubble Drawdown	26.4%	-28.9%
Return During GFC Drawdown	26.0%	-41.1%

\*Hypothetical historical example produced by Neuberger Berman

Includes cash collateral yield and costs/payoffs of 1-month, 2% OTM S&P 500 put option purchases

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# Appendix: Sources

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- Data sources:
  - Bloomberg
  - Barclays Live
  - HFR (Hedge Fund Research)
  - eVestment Alliance/HFN
  - State Street (OCERS data)
  - MPI
  - Neuberger Berman (hypothetical, gross-of-fee put option buying program example)
- Metrics calculated using:
  - MPI Stylus
  - Excel
  - R
- All replicable index returns are gross-of-fees
- All hedge fund related index returns are net-of-fees

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# What's Next For RMS



September 13, 2018

# OCERS' RMS Due Diligence Activities

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- OCERS' staff has been proactively meeting with potential risk mitigation managers
- Staff has conducted multiple calls with Meketa and PCA to discuss potential future portfolio structure of risk mitigation
- Staff has met with 10 CTA/Systematic Trend Following strategies in 2018
  - Strategy, time horizon, types of assets, portfolio construction, and volatility target
- Staff has met with 7 Alternative Risk Premia strategies in 2018
  - Strategy, style premia, portfolio construction, implementation, diversification, and defensive
- Future meetings with additional CTA, Alternative Risk Premia, and Global Macro managers planned as well as follow-up meetings with high conviction managers

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# Introduction to Alternative Risk Premia and Trend

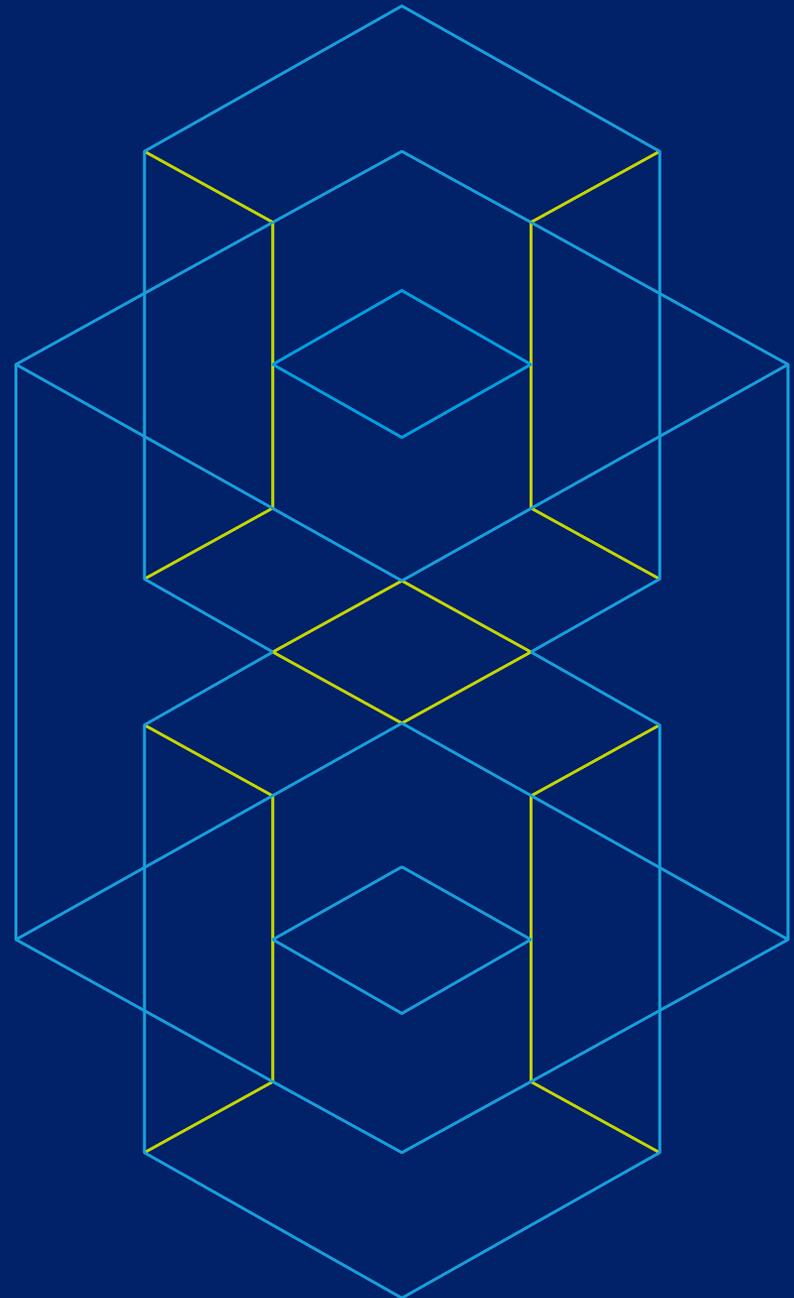
*Prepared Exclusively for Orange County  
Employees Retirement System*

September 2018



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# AQR Presenters

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## **Scott Metchick**

### ***Managing Director, Portfolio Management***

Scott is a portfolio manager on AQR's Global Alternative Premia team. He has nearly three decades of experience in alternative investments, having held senior positions at three fund-of-hedge-funds firms. Prior to AQR, he managed S.R. Metchick Associates, a hedge-fund consulting firm. Before that, Scott was chief investment officer at Tremont Capital Management, Twin Lights Capital and the EIM Group. Earlier, he analyzed alternative-investment funds for Evaluation Associates Capital Markets (now EACM Advisors). He began his career at Chase Manhattan Bank. Scott earned a B.S. in finance from Lehigh University.



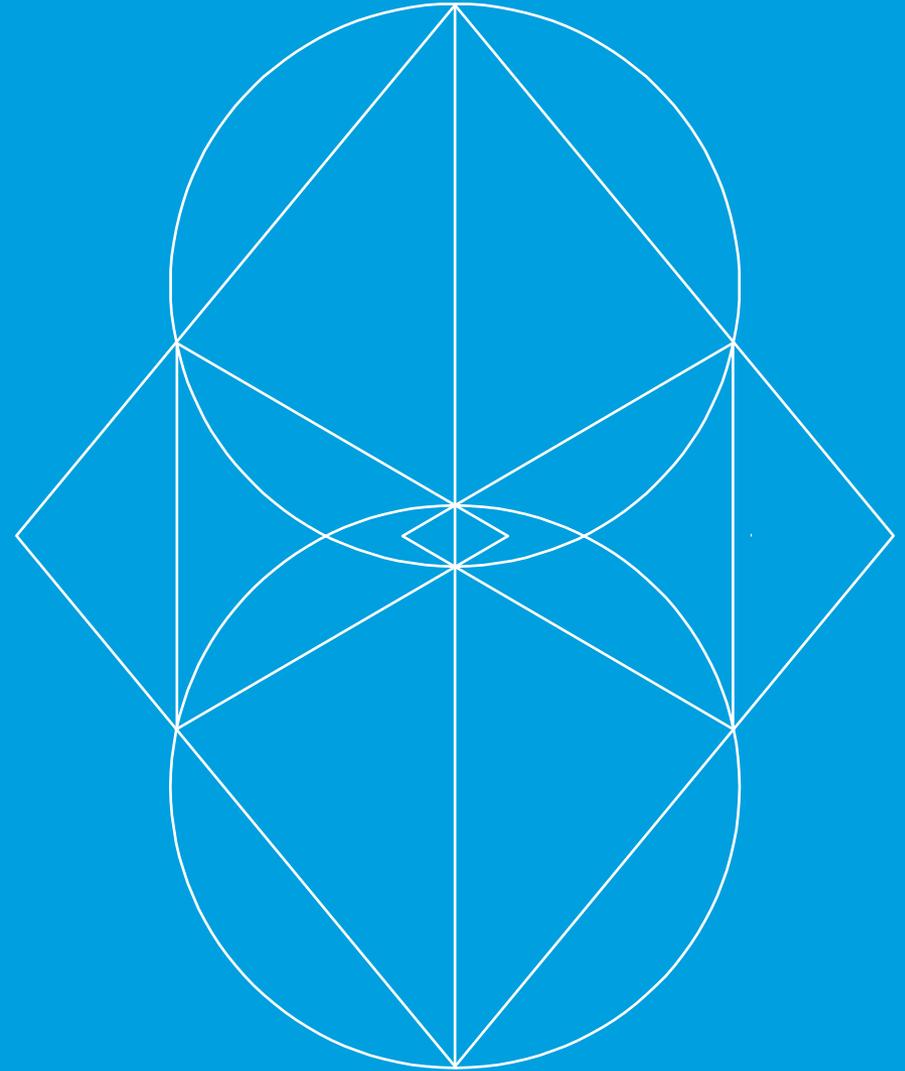
## **Joey Lee**

### ***Managing Director, Client Strategies***

Joey is a senior member of AQR's Business Development team, collaborating with institutional investors throughout the Western and Southwestern U.S. In this role, she is responsible for identifying and developing relationships with prospective investors and communicating AQR's investment philosophy and process across a range of traditional and alternative investment strategies. Prior to AQR, Joey worked in the White House as an aide in the Executive Office of the President, helping senior officials with communications and strategic planning. She earned a B.A., with distinction, in political science from Yale University, where she was a recipient of the Yale University–New Asia College Undergraduate Exchange fellowship and the Academic All-Ivy award, and was a four-year starter on the women's volleyball team; she earned an M.B.A. with concentrations in analytic finance and economics from the University of Chicago's Graduate School of Business, where she received the Lehman Brothers Fellowship.

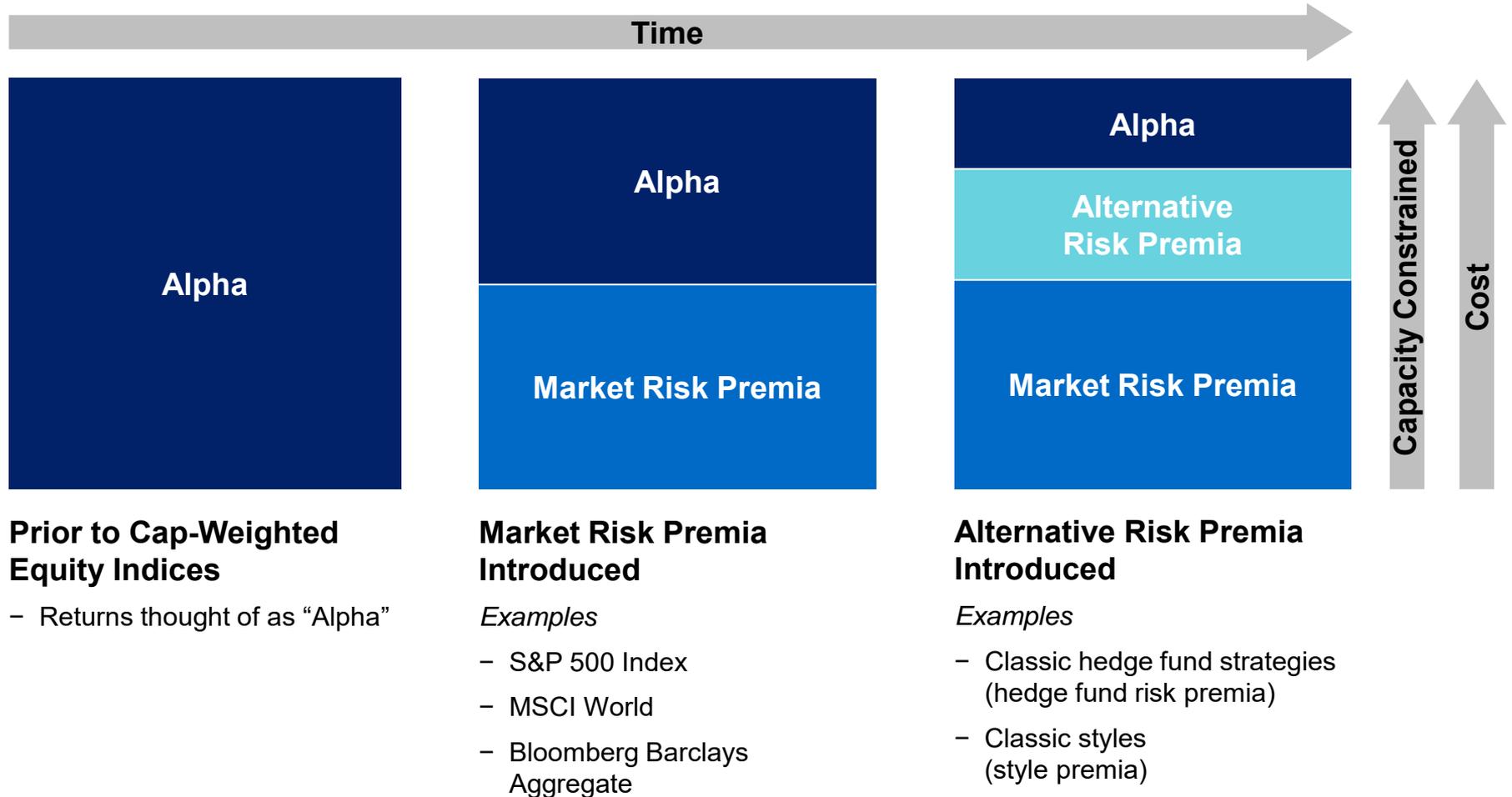


# Introduction to Alternative Risk Premia



# Introduction to Alternative Risk Premia

Evolution of return character



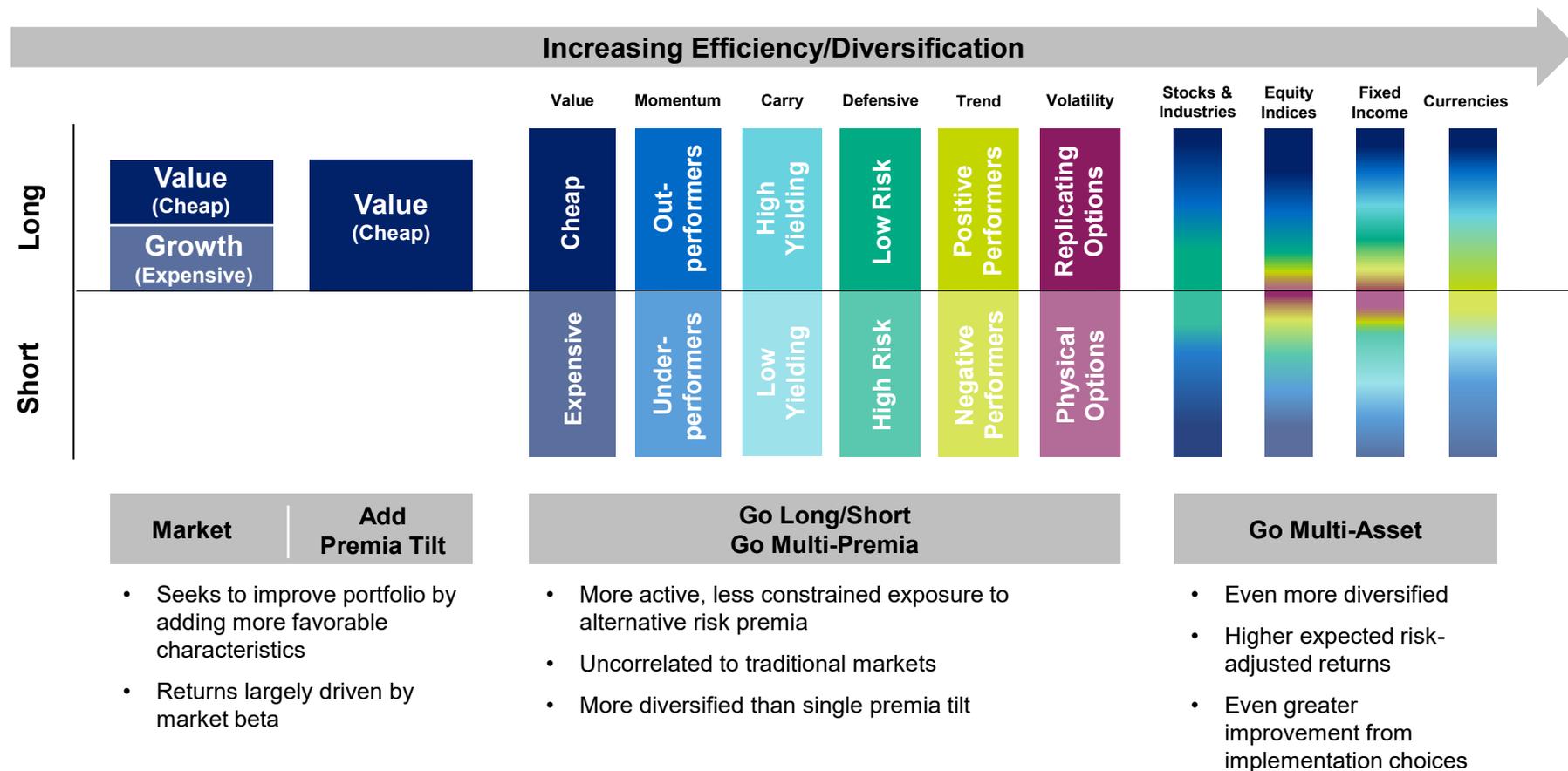
Source: AQR. For illustrative purposes only. Alternative risk premia are also sometimes referred to as exotic or smart betas. Bloomberg Barclays Aggregate is the Barclays U.S. Aggregate Bond Index.

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# Accessing Alternative Risk Premia

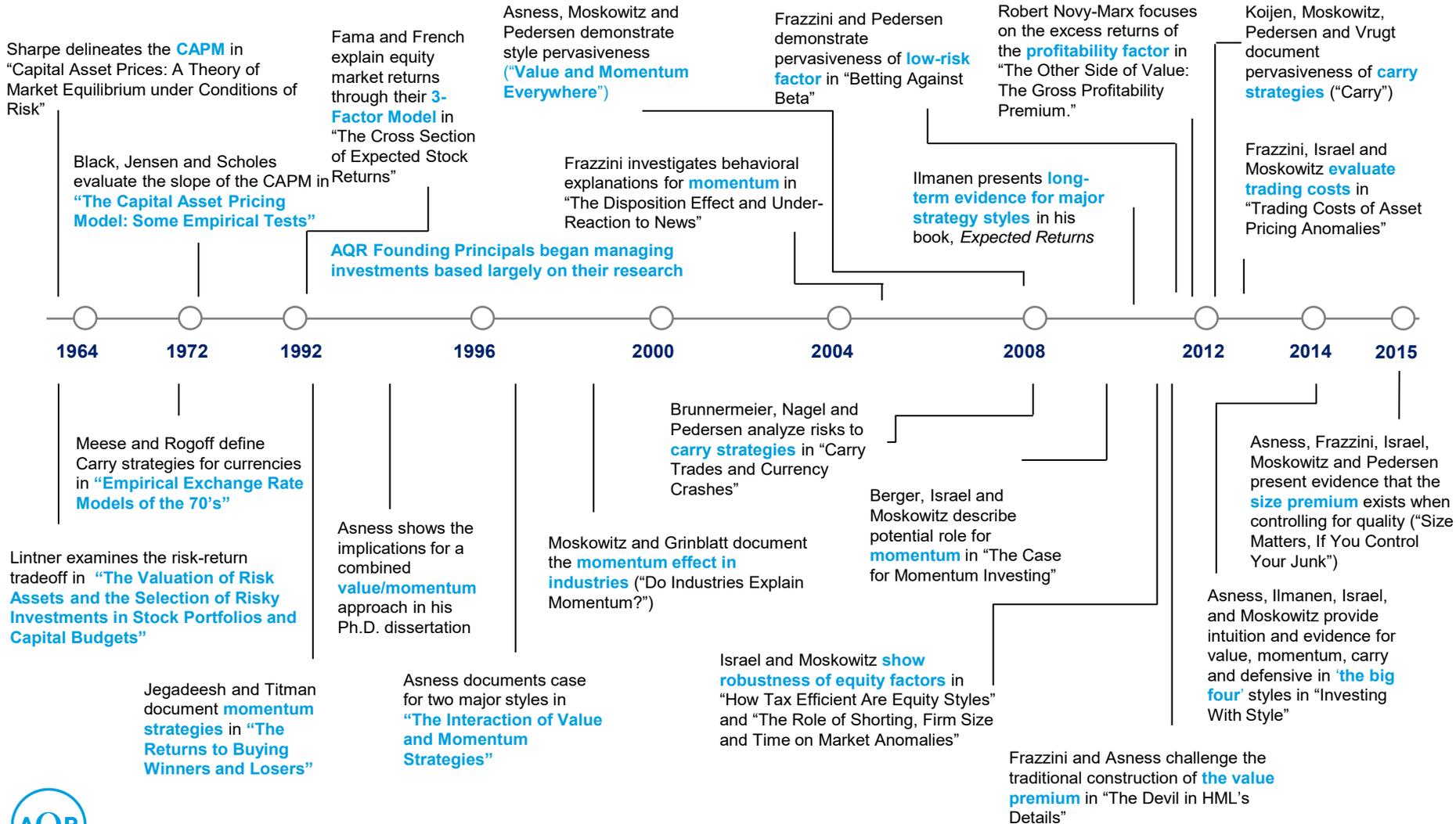
Increased efficiency in capturing alternative risk premia

Alternative risk premia investing exists along a spectrum



Source: AQR. For illustrative purposes only. Diversification does not eliminate the risk of experiencing investment losses. Note that Trend may be net long or net short at any given time (including being only long or only short), but should be market-neutral over the long-term.

# Significant History of Research on Alternative Risk Premia



# Alternative Risk Premia

Focusing on broad alternative risk premia

These alternative risk premia have historically generated positive long-run returns across a variety of asset groups.

<b>Value</b>	Relatively cheap assets tend to outperform relatively expensive ones	<b>Characteristics of Alternative Risk Premia:</b>  <b>Persistent</b> Long-term evidence supported by economic intuition  <b>Pervasive</b> Exist broadly across regions and asset groups  <b>Liquid</b> Can be captured by trading liquid instruments  <b>Dynamic</b> Limited static exposure to any asset or market
<b>Momentum</b>	An asset's recent <i>relative</i> performance tends to continue in the near future	
<b>Carry</b>	Higher-yielding assets tend to provide higher returns than lower-yielding assets	
<b>Defensive</b>	Lower-risk and higher-quality assets tend to generate higher risk-adjusted returns	
<b>Volatility</b>	Options tend to be richly priced due to financial insurance premium	
<b>Trend</b>	An asset's recent performance tends to continue in the near future	



# Backtests: How Should Investors Evaluate Them?

---

- ✓ Provides longer period to test the strategy's efficacy
- ✓ Reasonable reflection of strategy's expected correlation and volatility through various macroeconomic regimes

- × Historical implementation concerns (e.g., could we really short stocks in 1990 at low cost?)
- × Possibility of data mining

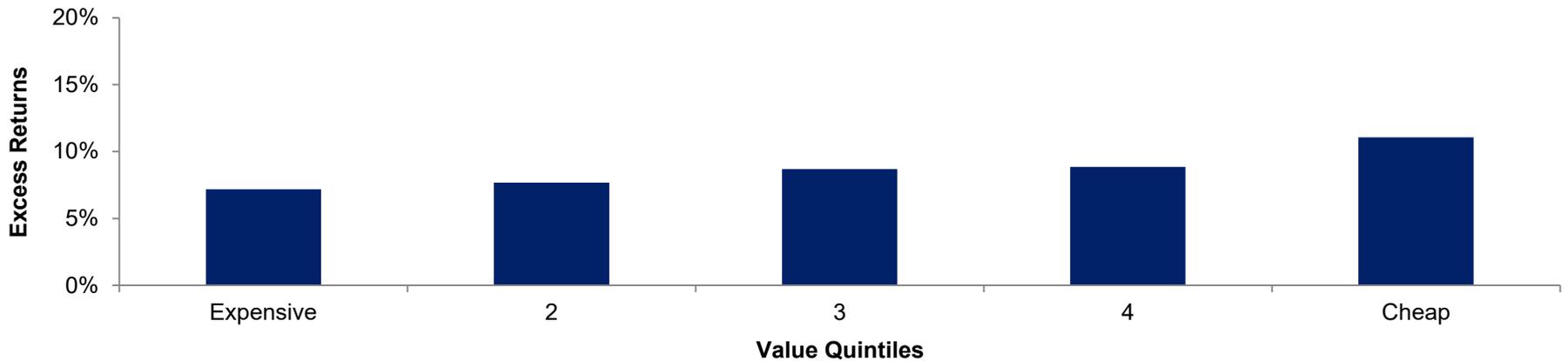
- Evaluate with some skepticism
- Use as guidance for future expectations
- One input among many in the due diligence process



# Value

## Intuition and academic evidence

### Annualized Return of U.S. Stocks Sorted by Book-to-Market 1951 – 2017



Intuition	Universe	Implementation Examples
<ul style="list-style-type: none"> <li>Value securities are “beaten up,” distressed, “unglamorous” or less-favored by investors</li> <li>Investors tend to over-extrapolate growth prospects, resulting in over/under valuation</li> <li>May be compensation for securities with greater default risk, or other risks, evidenced by co-movement</li> </ul>	<ul style="list-style-type: none"> <li>Stocks</li> <li>Equity Indices</li> <li>Fixed Income</li> <li>Currencies</li> <li>Commodities</li> </ul>	<ul style="list-style-type: none"> <li>Book-to-price</li> <li>Real Yields</li> <li>Purchasing power parity</li> <li>Three to five year reversals</li> </ul>



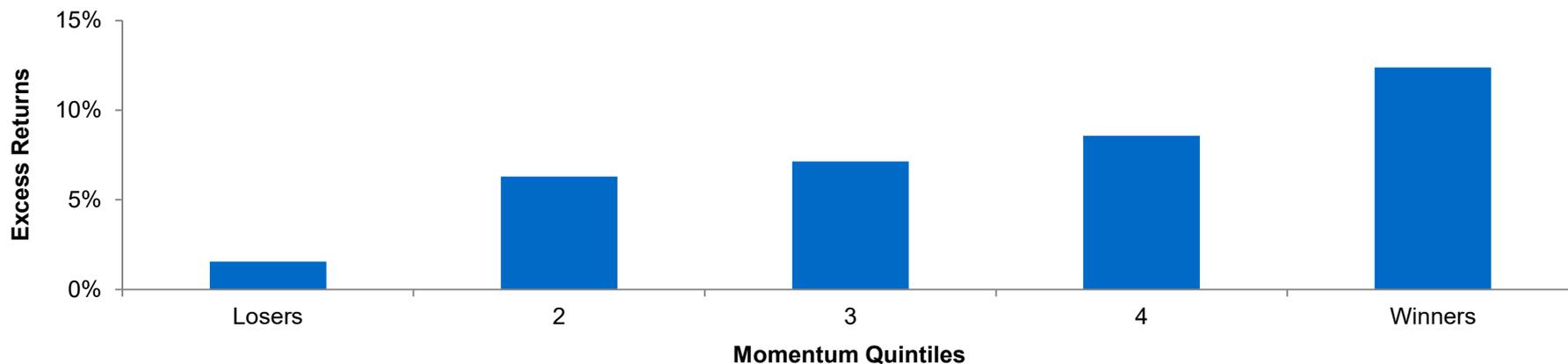
Sources: AQR and Kenneth R. French Data Library. Portfolios from Kenneth R. French Data Library formed based on book-to-market, quintiles are equal-weighted; returns are excess of cash. Returns sourced from “Portfolios Formed on Book-to-Market” from Kenneth R. French Data Library for further details. These are not the returns of an actual portfolio AQR manages and are for illustrative purposes only. Past performance is not a guarantee of future performance.

# Momentum

## Intuition and academic evidence

### Annualized Return of U.S. Stocks Sorted by Price Momentum

1951 – 2017



#### Intuition

- Investors are inclined to initially underreact to news and subsequently overreact, perhaps due to behavioral biases such as anchoring, disposition effect and herding
- Momentum securities tend to move together, which may denote a common risk

#### Universe

- Stocks
- Equity Indices
- Fixed Income
- Currencies
- Commodities

#### Implementation Examples

- Relative price- and fundamental-based measures
- Relative price-based measures



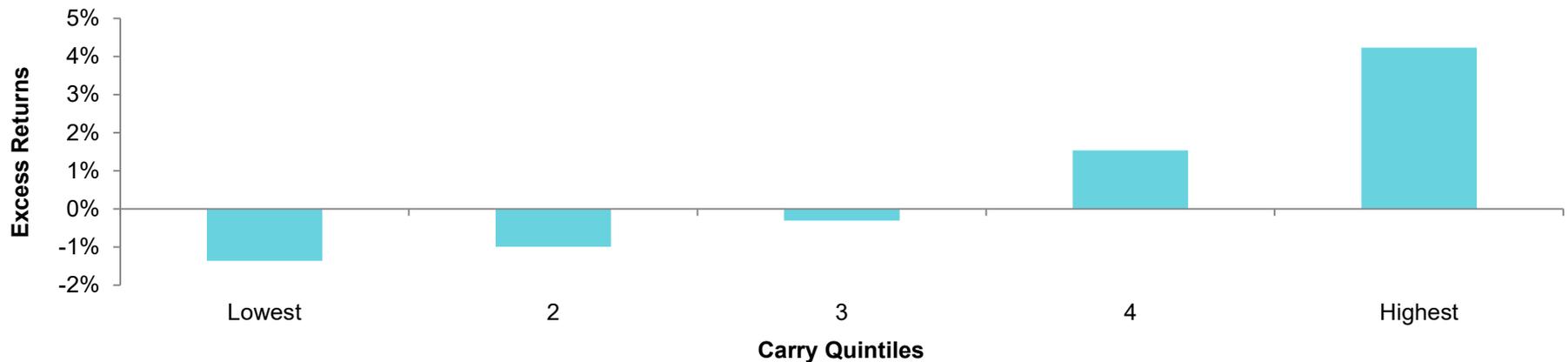
Source: AQR and Kenneth R. French Data Library. Portfolios from Kenneth R. French Data Library formed based on 12 month momentum, skipping most recent month; quintiles are equal-weighted; returns are excess of cash. Returns sourced from [https://www.aqr.com/~/media/Files/Research/Portfolios%20Formed%20on%20Momentum.pdf](#). See Kenneth R. French Data Library for further details. These are not the returns of an actual portfolio AQR manages and are for illustrative purposes only. Past performance is not a guarantee of future performance.

# Carry

## Intuition and academic evidence

### Annualized Return of G10 Currencies Sorted by Carry

1978 – 2017



#### Intuition

- High (or low) yields may indicate excess demand (or supply) of capital
- In currencies, non-profit-seeking market participants may prevent expected capital offsets (appreciation/depreciation)
- May be compensation for negative skewness and losses in periods of increased risk aversion, especially in currencies

#### Universe

- Stocks
- Equity Indices
- Fixed Income
- Currencies
- Commodities

#### Implementation Examples

- Measures of yield curve slope
- Real or nominal cash rates
- Slope of the futures curve



Source: AQR. Portfolios are formed by sorting G-10 currencies on short-term interest rates and dividing the currencies into quintile portfolios; returns are excess of cash. Quintile portfolio returns are equal-weighted returns of the currencies in that portfolio. These are not the returns of an actual portfolio AQR manages and are for illustrative purposes only. Please read important disclosures in the Appendix. Past performance is not a guarantee of future performance.

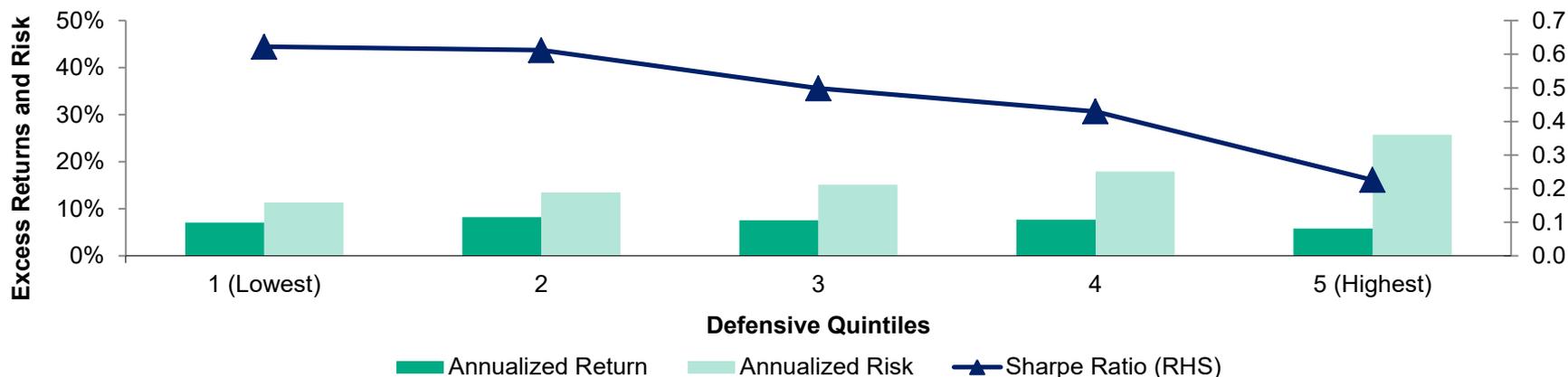
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# Defensive

## Intuition and academic evidence

### Annualized Risk, Return and Sharpe Ratio of U.S. Stocks Sorted by Beta

1951 – 2017



#### Intuition

- Leverage aversion may explain why low-risk assets offer higher risk-adjusted returns
- Unlevered investors typically seek high-beta assets for more “bang for the buck”
- Investors tend to overpay for “lottery” characteristics

#### Universe

- Stocks
- Equity Indices
- Fixed Income
- Currencies
- Commodities

#### Implementation Examples

- Forecasted beta and quality measures
- Forecasted beta



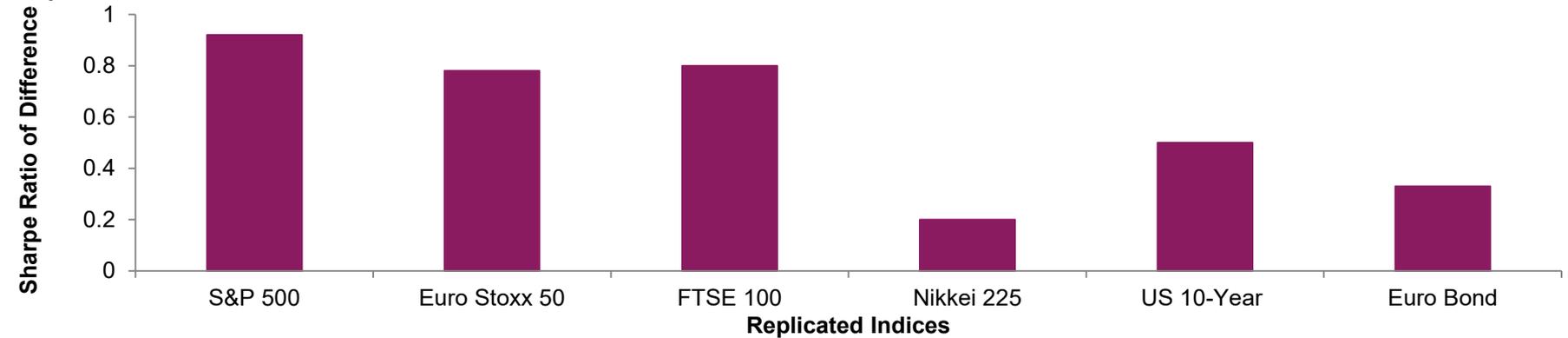
Source: AQR. U.S. Equities is the Russell 3000. Prior to 1980, U.S. Equities is represented by the CRSP U.S. Total Market Index. The ICE BofAML U.S. 3-Mo. T-bill is the risk-free rate used to derive the Sharpe ratio. Portfolios are formed by sorting stocks on realized market beta and dividing the stocks into quintile portfolios; returns are excess of cash. Quintile portfolio returns are equal-weighted returns of the stocks in the portfolio. These are not the returns of an actual portfolio AQR manages and are for illustrative purposes only. Past performance is not a guarantee of future performance. Please read important disclosures in the Appendix.

# Volatility

## Intuition and empirical evidence

### Hypothetical Average Volatility Risk Premium Sharpe Ratios: Difference between Replicating & Physical Options

May 1996 – December 2017



#### Intuition

- Buyers of financial insurance, such as options, often overestimate likelihood of extreme loss
- Sellers need to be enticed to underwrite financial insurance
- Options may therefore be richly priced, providing profits to sellers

#### Universe



#### Implementation Examples

- Sell options and hedge beta

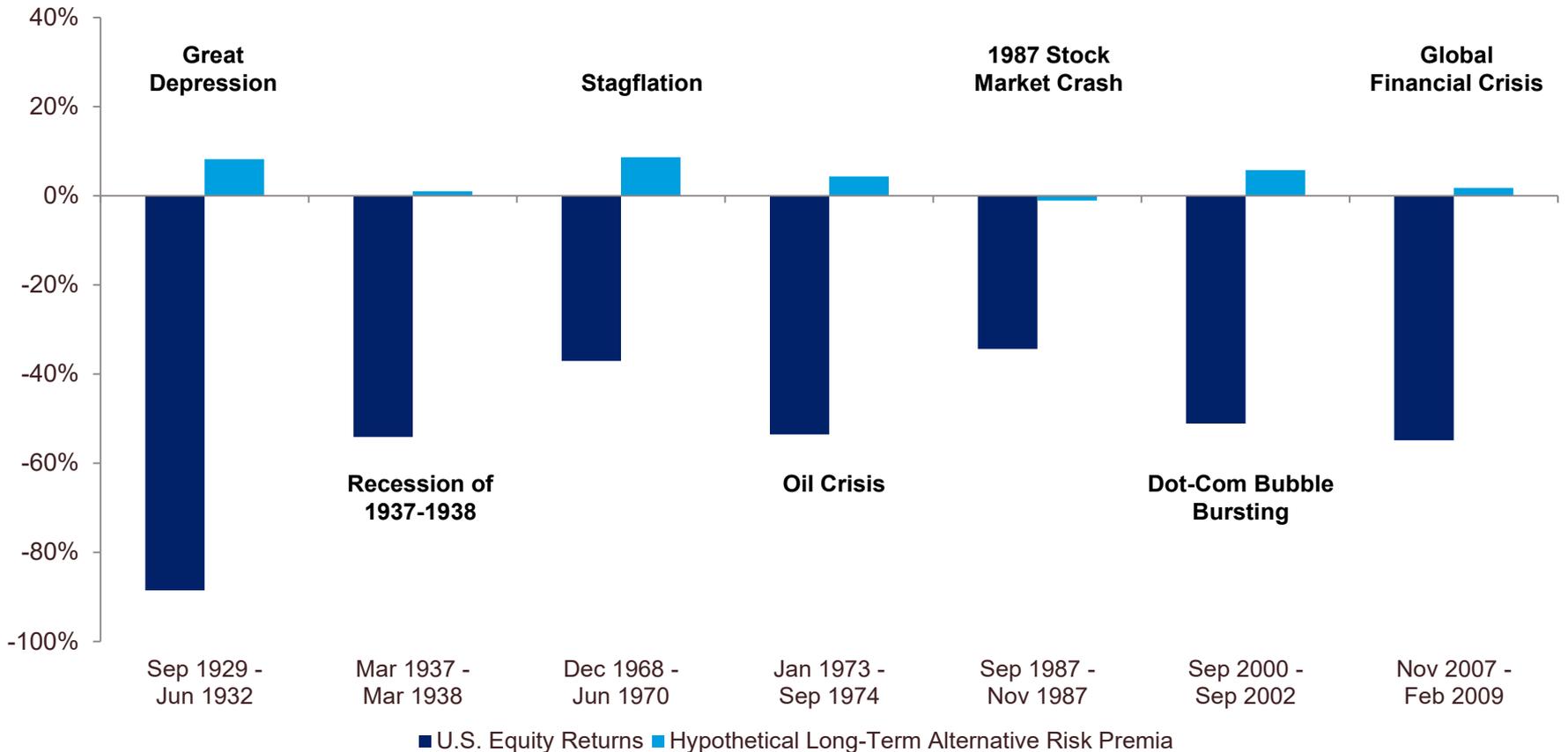


Source: AQR. Includes data for 4 indices: S&P 500 Index (May 1996-December 2017), Eurostoxx 50 Index (January 2002-December 2017), FTSE 100 Index (January 2002-December 2017), and Nikkei 225 Index (July 2004-December 2017). Returns were created by selling a diversified basket of options across multiple strikes and with less than or equal to 2 months to expiry, and using futures to replicate the options' underlying exposure. Options were sized to target a constant 5-7% stress loss. The risk-free rate used is US 3-month LIBOR. For illustrative purposes only. Please read important disclosures in the Appendix. Hypothetical data has inherent limitations, some of which are disclosed in the Appendix.

# How Do Alternative Risk Premia Behave During Crises?

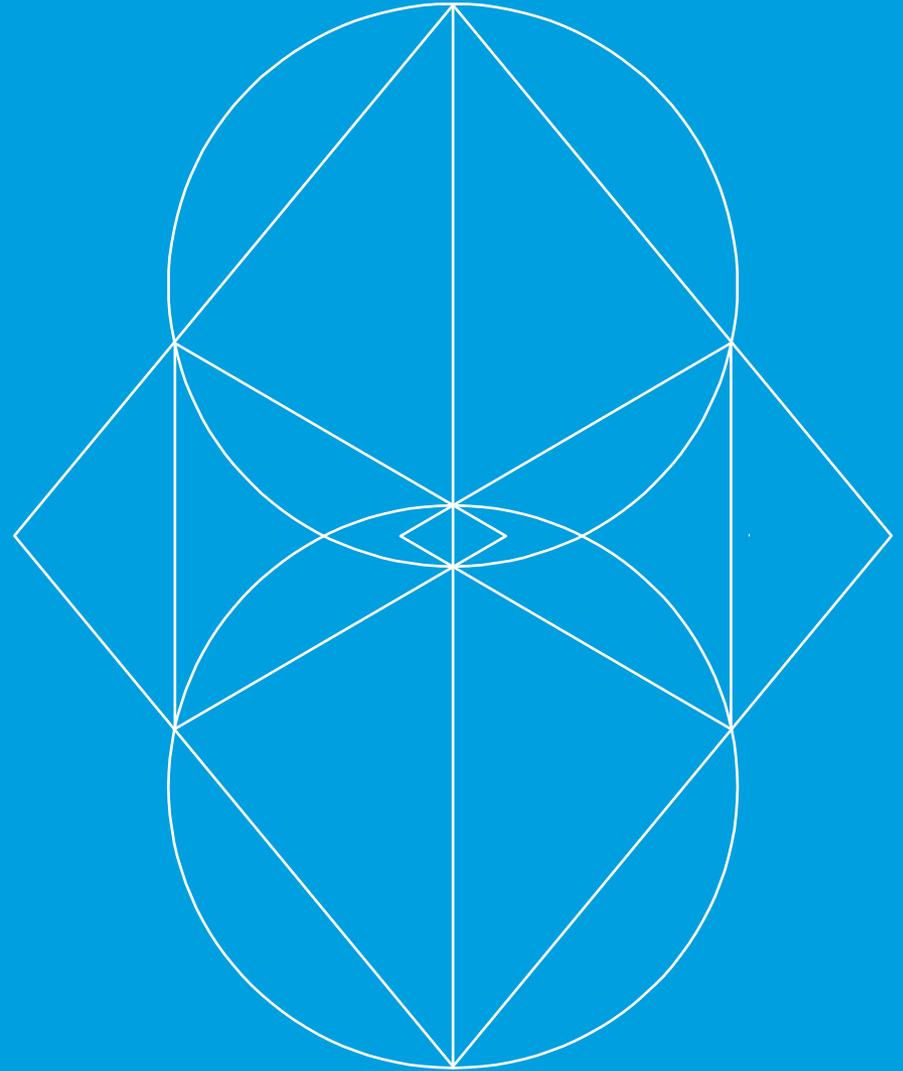
Performance positive in most major market crashes

## U.S. Equities and Hypothetical Long-Term Alternative Risk Premia in Major Equity Market Drawdowns



Source: AQR, Global Financial Data, Bloomberg, Datastream, Chicago Board of Trade, Commodity Systems Inc. The full sample period starts 1/1920 and ends 2/2017. Time periods for pre-sample, post-sample, and original sample can be found in the Appendix. U.S. Equity returns here is the S&P 500. All returns are excess of U.S. treasury bills. Asset class and style definitions can be found in the Appendix. Not representative of an actual portfolio that AQR currently manages. For methodology of the Hypothetical Long-Term Alternative Risk Premia portfolio, please refer to the Appendix for descriptions of the data sources used and definitions for each style. Hypothetical data has inherent limitations some of which are discussed in the Appendix. Please read important disclosures in the Appendix. Please refer to the Appendix for descriptions of the data sources used and definitions for each style.

# Introduction to Trend



# Trend

## Intuition and empirical evidence

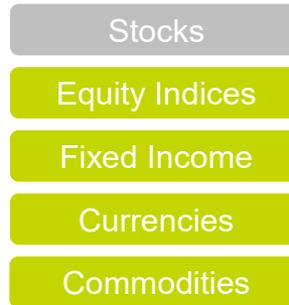
### Hypothetical Trend Following Sharpe Ratios for Individual Assets and Asset Classes January 1880 – December 2017



#### Intuition

- Investor behavioral biases and non-profit-seeking market participants may explain why trends exist
- Slow adjustment to news, anchoring to recent prices, portfolio rebalancing, and central bank actions can cause initial underreactions
- Herding, performance chasing and hedging/risk management can exacerbate trends past fundamentals

#### Universe



#### Implementation Examples

- Short- and Long- term price trends
- Measures of overextension

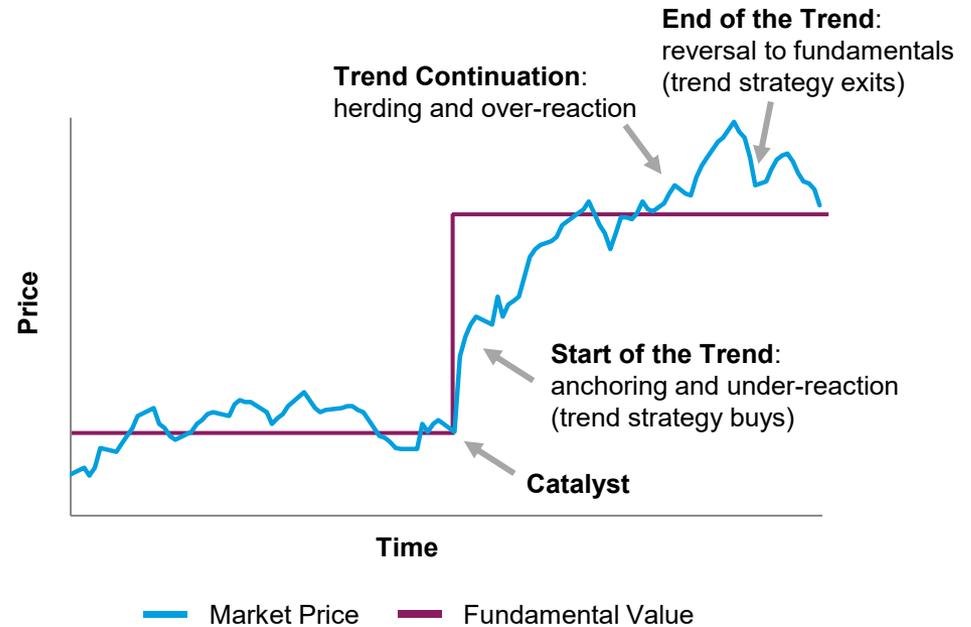


Source: AQR. The Sharpe ratios are based on the Hypothetical Trend-Following Strategy backtest, gross of fees and estimated transaction costs. The ICE BofAML U.S. 3-Mo. T-bill is the risk-free rate used to derive the Sharpe ratio. This analysis is provided for illustrative purposes only and is not based on an actual portfolio AQR manages. Markets considered only where data existed during the time period. Please read performance disclosures in the Appendix for a description of the investment universe and the allocation methodology used to construct the Trend-Following Strategy. Hypothetical data has limitations, some of which are disclosed in the Appendix. Sharpe ratios are based on the average annual return and volatility for the full period that asset class data is available.

# Why Do Markets Trend?

We believe trends exist due to investor behavior and non-profit-seeking market participants.

- Initial under-reaction
  - Slow adjustment to news
  - Anchoring, disposition effect
  - Central bank actions
- Delayed over-reaction
  - Herding, positive feedback
  - Fund flows, risk management

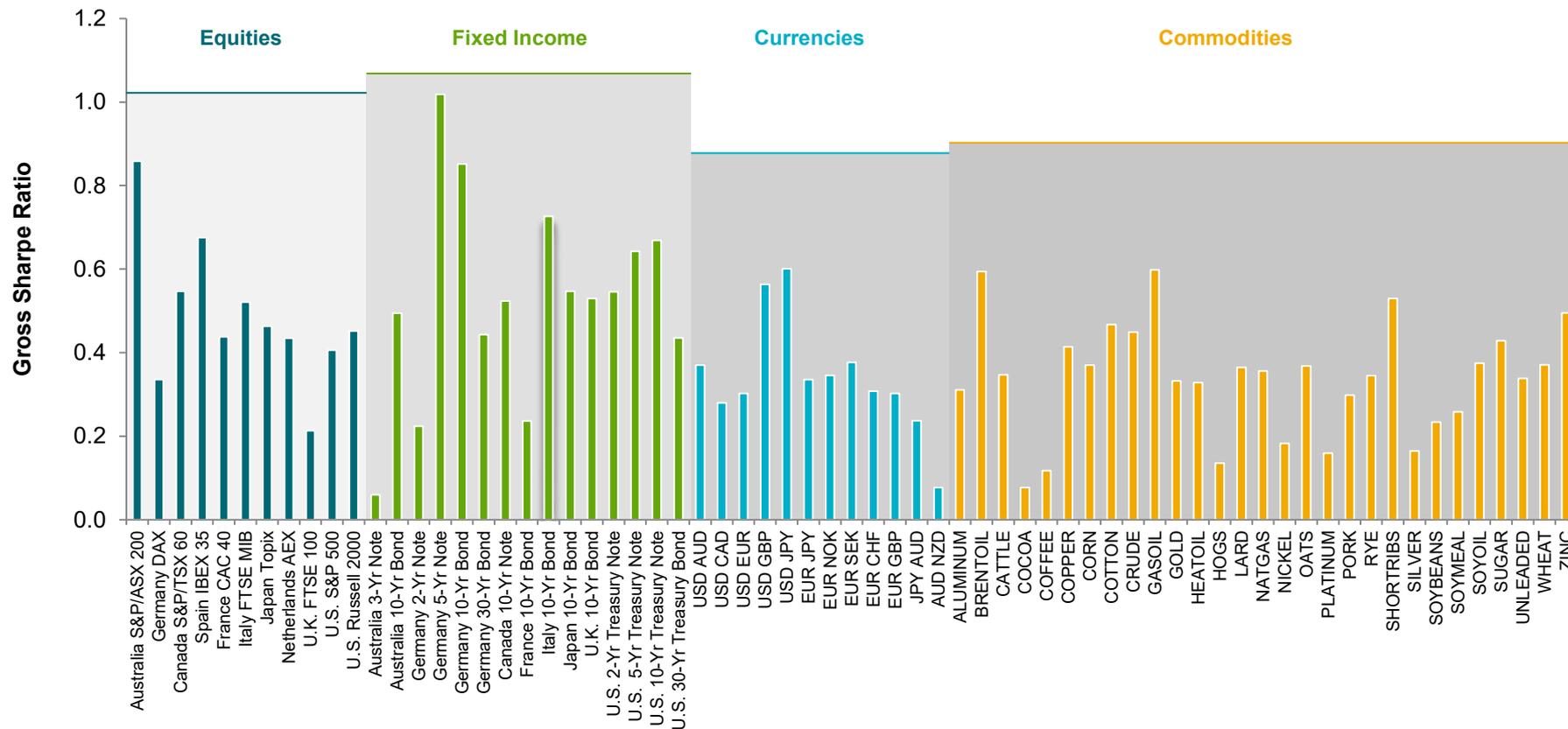


# Why Trend?

Trend following has worked in many markets

## Hypothetical Trend-Following Sharpe Ratios for Individual Assets and Asset Classes

January 1880 – December 2017



Source: AQR. The Sharpe ratios are based on the Hypothetical Trend-Following Strategy targeting 17% volatility. The results are based on backtest, gross of fees and estimated transaction costs. The 3-month T-Bill is the risk-free rate used to derive the Sharpe ratio. This analysis is provided for illustrative purposes only and is not based on an actual portfolio AQR manages. Not all markets have return data going back to 1880, calculations are based on the longest time period available for each asset. Please read performance disclosures in the Appendix for a description of the investment universe and the calculation methodology used to construct the Trend-Following Strategy. Hypothetical data has inherent limitations, some of which are disclosed in the Appendix.

# Why Trend?

Exhibited meaningful backtest returns with low correlations

## Hypothetical Performance of Trend-Following Strategy

January 1880 – December 2017

Time Period	Gross of Fee Returns (Annualized)	Net of 2/20 Fee Returns (Annualized)	Realized Volatility (Annualized)	Sharpe Ratio	U.S. Equity Correlation	U.S. 10-Year Bond Correlation
<b>Full Sample:</b>						
Jan 1880 – Dec 2017	21.1%	16.3%	16.5%	0.77	(0.01)	(0.03)
<b>By Decade:</b>						
Jan 1880 – Dec 1889	11.7%	8.7%	16.3%	0.29	(0.11)	(0.04)
Jan 1890 – Dec 1899	20.0%	15.4%	15.2%	0.75	(0.02)	(0.15)
Jan 1900 – Dec 1909	13.4%	10.3%	16.3%	0.37	0.02	(0.35)
Jan 1910 – Dec 1919	10.1%	7.3%	21.6%	0.15	0.12	(0.01)
Jan 1920 – Dec 1929	25.5%	20.0%	14.4%	1.12	0.15	0.06
Jan 1930 – Dec 1939	16.2%	11.8%	14.7%	0.76	(0.11)	0.20
Jan 1940 – Dec 1949	24.7%	18.8%	18.1%	1.01	0.33	0.31
Jan 1950 – Dec 1959	30.9%	24.9%	15.5%	1.47	0.23	(0.19)
Jan 1960 – Dec 1969	19.1%	14.6%	18.8%	0.57	(0.09)	(0.37)
Jan 1970 – Dec 1979	40.1%	32.5%	15.4%	1.72	(0.25)	(0.25)
Jan 1980 – Dec 1989	30.3%	24.5%	16.2%	0.97	0.18	(0.17)
Jan 1990 – Dec 1999	24.8%	19.5%	14.4%	1.01	0.01	0.21
Jan 2000 – Dec 2009	18.6%	13.8%	17.7%	0.62	(0.34)	0.27
Jan 2010 – Dec 2017	7.2%	3.8%	13.5%	0.27	(0.14)	0.30



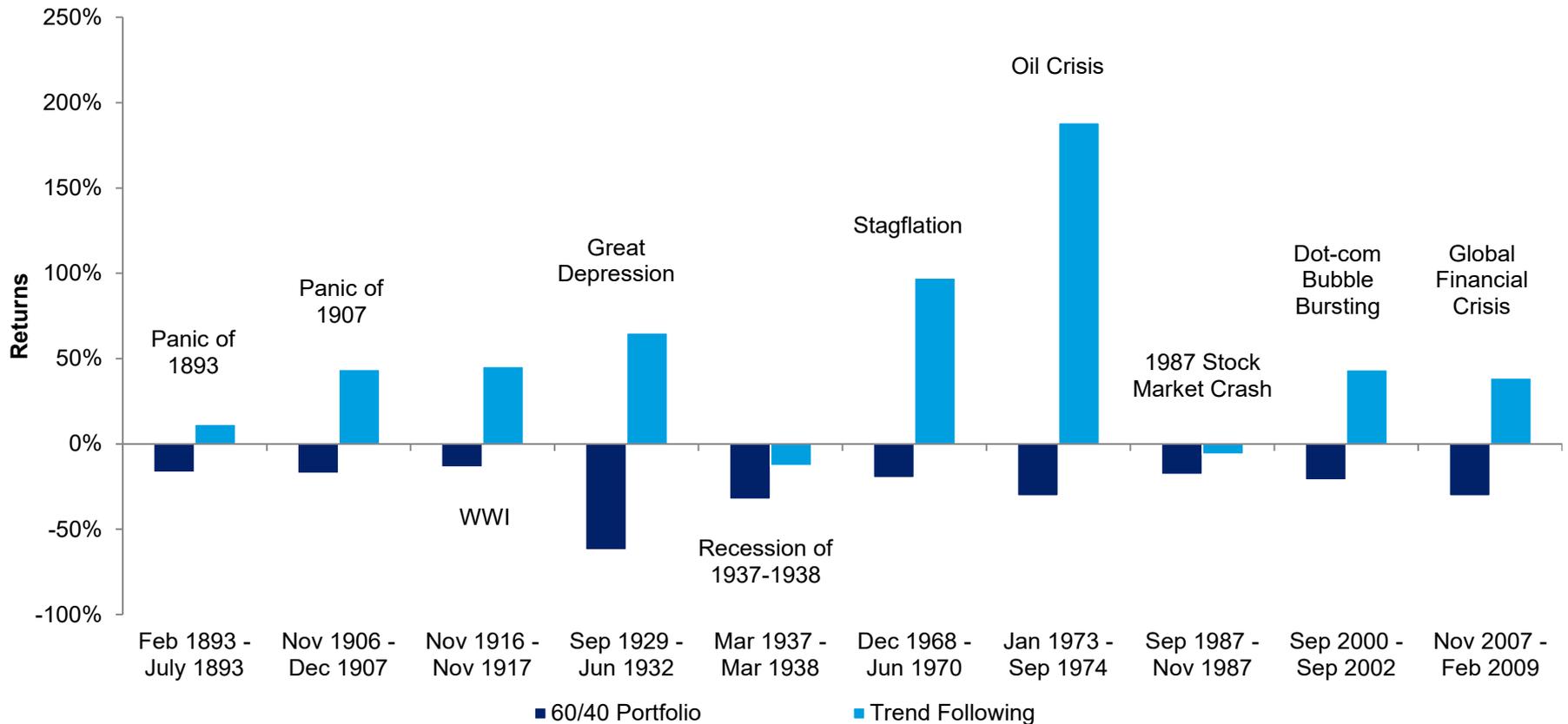
Source: AQR. The results are based on the Hypothetical Trend-Following Strategy targeting 17% volatility. Performance is a backtest, net of 2/20 fees and estimated transaction costs. The 3-Month T-Bill is the risk-free rate used to derive the Sharpe ratio. Gross performance does not reflect the deduction of fees. This analysis is provided for illustrative purposes only and is not based on an actual portfolio AQR manages. Please read performance disclosures in the Appendix for a description of the investment universe and the allocation methodology used to construct the Trend-Following Strategy and for details on the construction of the U.S. Equity series. Markets considered only where data existed during the time period. Hypothetical data has inherent limitations, some of which are disclosed in the Appendix.

# Why Trend?

Performed well in severe market downturns

## Hypothetical Performance During the 10 Largest Drawdowns for a 60/40 Portfolio

January 1880 – December 2017



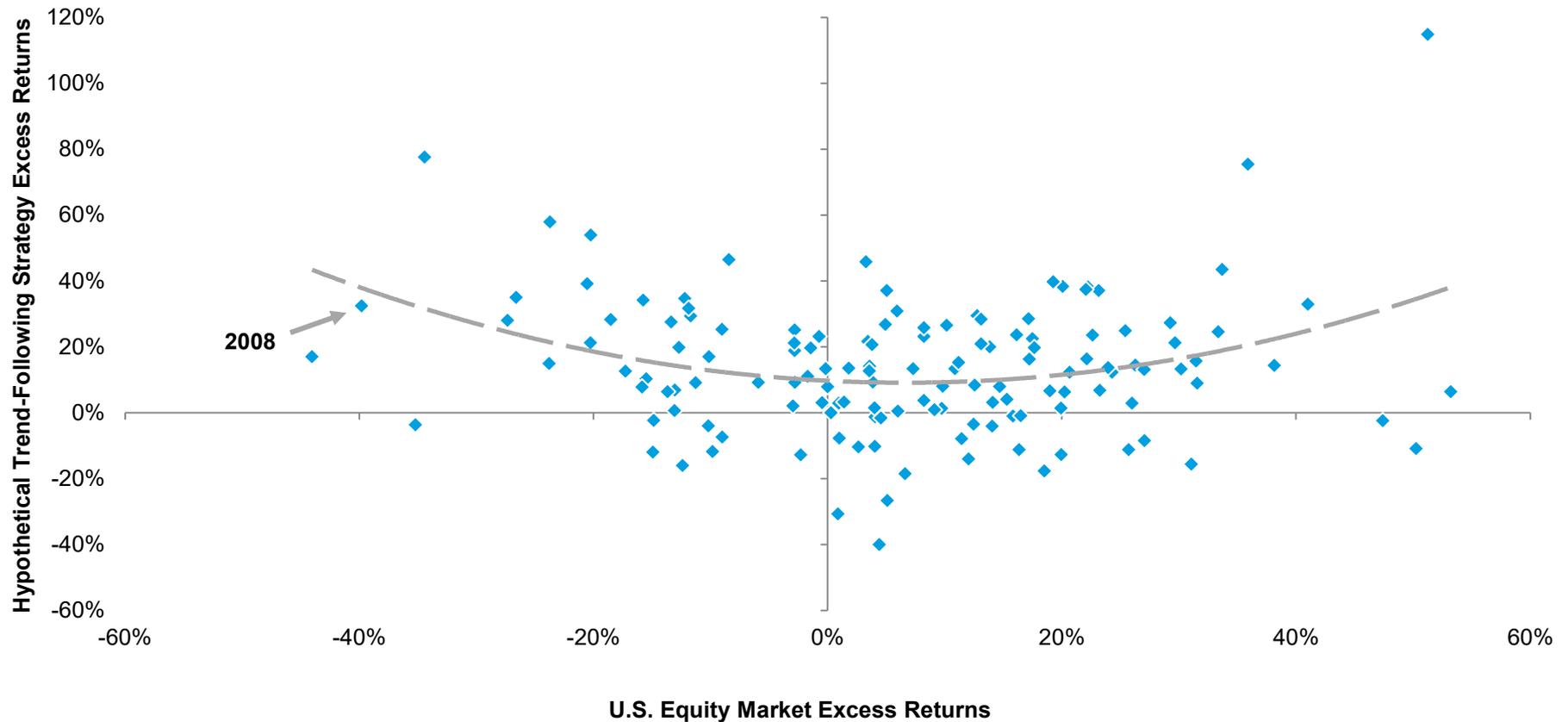
Source: AQR. The results are based on the Hypothetical Trend-Following Strategy targeting 17% volatility. Performance is a backtest, net of 2/20 fees and estimated transaction costs. The 60/40 portfolio has 60% invested in S&P 500 and 40% invested in U.S. 10-year bonds. The 60/40 portfolio is rebalanced monthly, and no fees or transaction costs are subtracted from the returns. Please read performance disclosures in the Appendix for a description of the investment universe and the allocation methodology used to construct the Trend-Following Strategy and for details on the construction of the 60/40 portfolio. Markets considered only where data existed during the time period. Chart is provided for illustrative purposes only and is not based on an actual portfolio AQR manages. Hypothetical data has inherent limitations, some of which are disclosed in the Appendix.

# Why Trend?

Performed well in bull and bear equity markets

## Hypothetical Annual Returns

January 1880 – December 2017



Source: AQR. The results are based on the Hypothetical Trend-Following Strategy targeting 17% volatility. Performance is a backtest, net of 2/20 fees and estimated transaction costs. This analysis is provided for illustrative purposes only and is not based on an actual portfolio AQR manages. Please read performance disclosures in the Appendix for a description of the investment universe and the allocation methodology used in the Trend-Following Strategy and for details on the construction of the U.S. Equity series. Markets considered only where data existed during the time period. Hypothetical data has inherent limitations, some of which are disclosed in the Appendix.

# Trend Will Face Challenges in Certain Markets

## Peak-to-trough drawdowns

### Reflects Hypothetical Trend-Following Strategy (Net)

January 1880 – June 2018

Rank	Start of Drawdown (Peak)	Lowest Point of Drawdown (Trough)	End of Drawdown (Recovery)	Size of Peak-to-Trough Drawdown	Excess Return Attribution	Cash Attribution	Next 3-Year Annualized Total Return	Next 3-Year Sharpe Ratio
1	Mar 1910	Jan 1913	Nov 1915	-41.8%	-51.0%	9.1%	24.7%	0.81
<b>2</b>	<b>Mar 2015</b>	<b>May 2018</b>	—	<b>-43.6%</b>	<b>-45.0%</b>	<b>1.4%</b>	—	—
3	Aug 1947	Dec 1948	Jan 1952	-42.0%	-43.2%	1.1%	18.1%	1.36
4	Mar 1918	Feb 1919	Apr 1920	-36.4%	-40.8%	4.4%	28.8%	1.62
5	Feb 1937	Jun 1940	May 1943	-39.8%	-40.1%	0.3%	19.6%	1.51
6	Jun 1964	Aug 1965	Jan 1966	-29.8%	-33.3%	3.6%	26.1%	0.97
7	Apr 1885	Jan 1887	Sep 1887	-27.9%	-32.5%	4.6%	20.4%	0.89
8	Aug 1896	Jun 1898	Jul 1899	-27.2%	-32.4%	5.2%	15.9%	0.91
9	Aug 1966	May 1967	Jul 1968	-27.6%	-30.4%	2.9%	37.2%	2.50
10	Feb 1904	Jul 1904	Sep 1907	-24.5%	-25.4%	0.9%	6.7%	0.15
<b>Average</b>							<b>22.0%</b>	<b>1.19</b>
<b>Full Sample</b>							<b>16.1%</b>	<b>0.76</b>



Source: AQR. The Hypothetical Trend-Following Strategy is currently in a drawdown since March 2015. The max drawdown for this time period is -43.6% as of June 2018. Dates listed represent month-ends. The Hypothetical Trend-Following Strategy performance is a backtest, net of 2/20 fees and estimated transaction costs. The relevant cash rate is assumed to be 3-month Treasury bills. This analysis is provided for illustrative purposes only and is not based on an actual portfolio AQR manages. Please read performance disclosures in the Appendix for a description of the investment universe and the methodology used to construct the Trend-Following Strategy. Markets considered only where data existed during the time period. Hypothetical data has inherent limitations, some of which are disclosed in the Appendix.



# Overview of Alternative Risk Premia and Asset Groups

Harvest alternative risk premia across multiple asset groups

The 6 different alternative risk premia can be implemented across 4 asset classes, resulting in 18 distinct potential sources of return. Certain alternative risk premia are not applicable across all asset classes.

	Value	Momentum	Carry	Defensive	Trend	Volatility
Stocks & Industries	✓	✓		✓		
Equity Indices	✓	✓		✓	✓	✓
Fixed Income	✓	✓	✓	✓	✓	✓
Currencies	✓	✓	✓		✓	

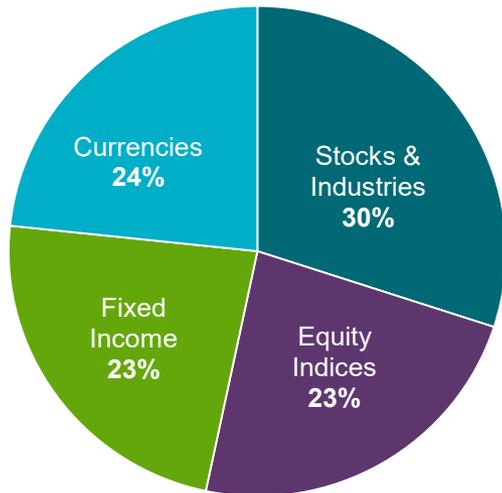
**Instruments Used** Stocks, Futures, Swaps, Currency Forwards, and Options



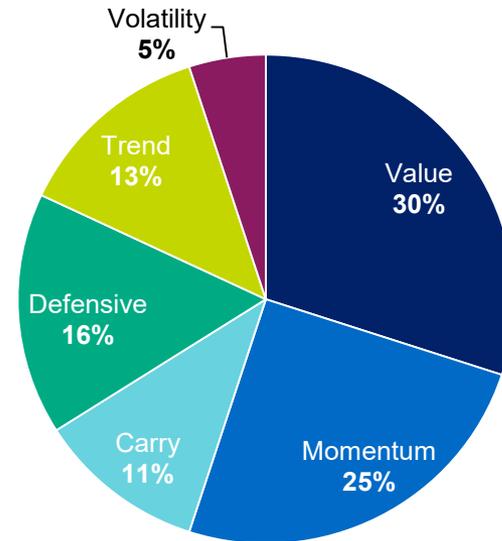
# Diversification across Asset Groups and Alternative Risk Premia

Sample strategic risk allocation

## Target Asset Group Risk Allocation



## Resulting Alternative Risk Premia Risk Allocation



- Risk is first allocated to asset groups to take advantage of natural netting and alternative premia interaction.
- Asset group allocation seeks to balance maximum diversification with breadth, liquidity and leverage considerations.
- Within each asset group, risk is allocated in a balanced manner to available alternative risk premia.
- Resulting overall alternative premia exposure is balanced and diversified.



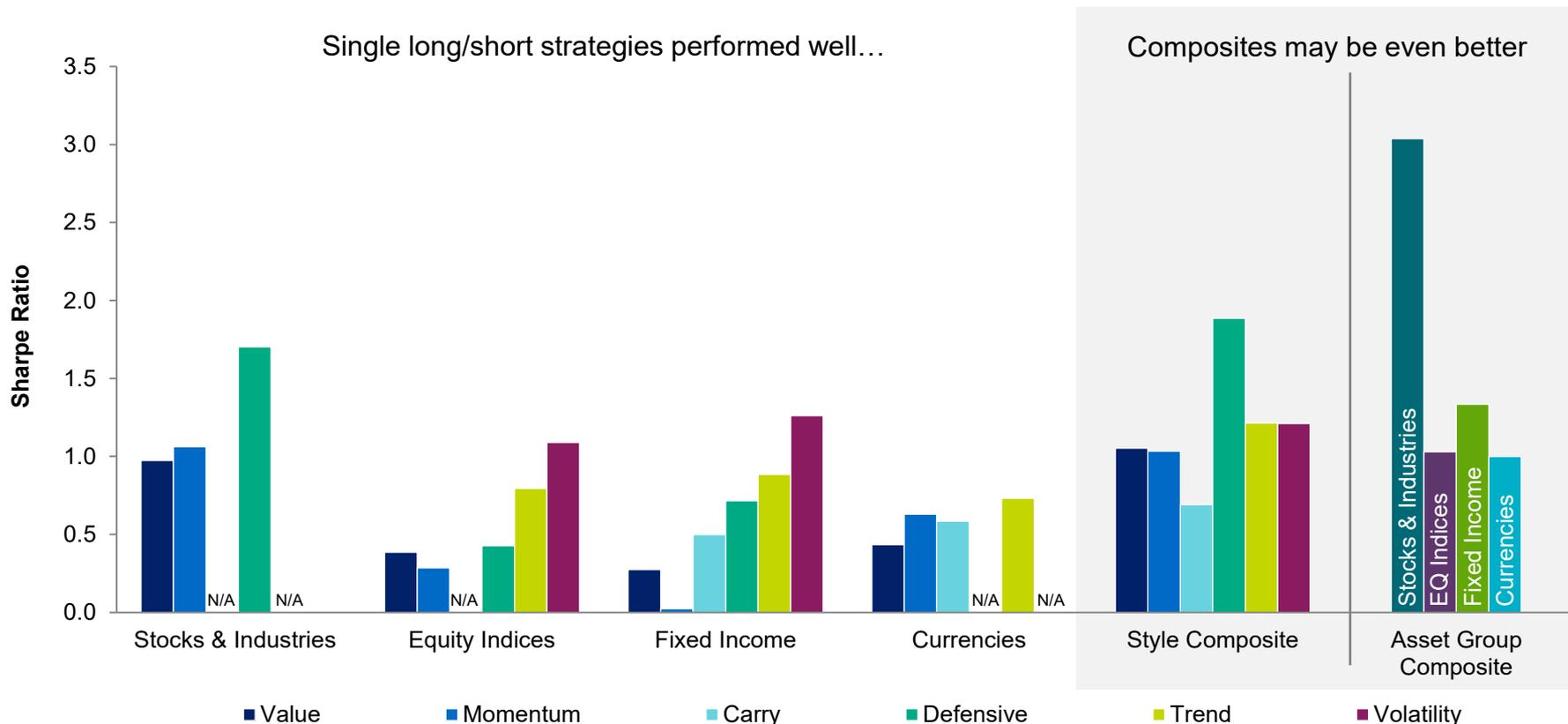
Source: AQR. For illustrative purposes only. There is no guarantee that the target risk allocations will be achieved, and actual allocations may be significantly different than that shown here. Diversification does not eliminate the risk of experiencing investment losses.

# Evidence across Many Asset Groups and Alternative Risk Premia

Single long/shorts and composites

## Hypothetical Gross Sharpe Ratios of Long/Short Alternative Risk Premia Components Across Asset Groups

January 1990 – December 2017



Source: AQR. Above analysis reflects a backtest of theoretical long/short alternative premia components based on AQR definitions across identified asset groups, and is for illustrative purposes only and not based on an actual portfolio AQR manages. Risk-free rate used to calculate the Sharpe ratios shown above is the ICE BofAML U.S. 3-Mo. T-bill. The results shown do not include advisory fees or transaction costs; if such fees and expenses were deducted the Sharpe ratios would be lower; returns are excess of cash. Please read performance disclosures in the Appendix for a description of the investment universe and the allocation methodology used to construct the Hypothetical Alternative Premia Backtest. Hypothetical data has inherent limitations, some of which are disclosed in the Appendix.

# Low Correlations

Among alternative risk premia and asset groups

## Hypothetical Correlations Between Alternative Risk Premia

January 1990 – December 2017

	Value	Momentum	Carry	Defensive	Trend	Volatility
Value	1.00					
Momentum	-0.61	1.00				
Carry	-0.10	0.09	1.00			
Defensive	-0.05	0.11	-0.15	1.00		
Trend	-0.12	0.33	0.12	0.17	1.00	
Volatility	0.04	0.02	0.16	-0.12	-0.10	1.00

## Hypothetical Correlations Between Alternative Risk Premia Asset Portfolios

January 1990 – December 2017

	Stocks & Industries	Equity Indices	Fixed Income	Currencies
Stocks & Industries	1.00			
Equity Indices	0.06	1.00		
Fixed Income	0.06	0.12	1.00	
Currencies	0.10	0.14	0.10	1.00

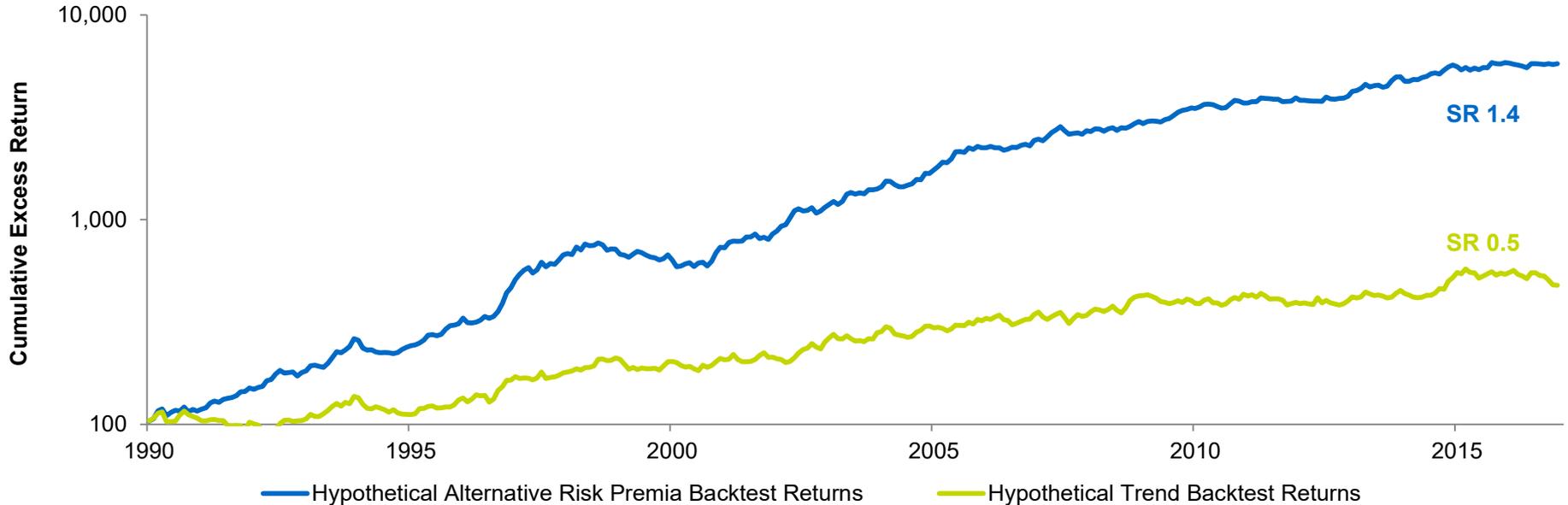


Source: AQR. The Trend-Following Strategy, Volatility Strategy, and theoretical long/short alternative premia components are based on AQR definitions across identified asset groups and reflect undiscounted results. Correlations are from January 1, 1990 to December 31, 2017. Chart is provided for illustrative purposes only and is not based on an actual portfolio AQR manages. Please read performance disclosures in the prospectus for a description of the investment universe and the allocation methodology used to construct the Hypothetical Alternative Premia Backtest. Hypothetical data has certain inherent limitations, some of which are disclosed in the Appendix. All correlations based on monthly data, excess of cash.

# Hypothetical Alternative Risk Premia and Trend Portfolios

## Cumulative Hypothetical Excess Returns

January 1990 – December 2016



## Hypothetical Correlations to Indices

January 1990 – December 2016

	Global 60/40	HFRI	Equities	Bonds	Commodities
Alternative Risk Premia	0.03	0.37	0.00	0.25	0.02
Trend	-0.06	0.46	-0.09	0.25	0.01

Source: AQR, Global Financial Data, Bloomberg, Datastream, Chicago Board of Trade, Commodity Systems Inc. 'Global 60/40' is 60% MSCI World Index, 40% Bloomberg Barclays Aggregate Bond Index (hedged); 'Equities' is MSCI World Index; 'Bonds' is Barclays Global Aggregate Bond Index (hedged); 'Commodities' is S&P GSCI; and 'HFRI' is HFRI Macro (Total) Index. All returns are excess of U.S. treasury bills. The graph is for illustrative purposes only and not based on an actual portfolio AQR manages. Hypothetical data has inherent limitations some of which are discussed in the Appendix. "Hypothetical Alternative Risk Premia Backtest" is the Hypothetical Liquid Enhanced Alternative Premia (LEAP) strategy backtest for the period January 1990 through December 2016. Please see the Appendix for an explanation of the hypothetical LEAP backtest construction. The "Hypothetical Trend Backtest" is the Hypothetical Managed Futures backtest scaled to 12% volatility from January 1990 through August 2009 then from September 2009 through December 2016 is Managed Futures Full Volatility Strategy hypothetically scaled to 12% volatility. Volatility adjusted performance has been scaled to match a different volatility target and is not the actual performance of the respective portfolio(s). All volatility scaled performance are hypothetical and for illustrative purposes only. Please see Appendix for an explanation of the Hypothetical Managed Futures Strategy backtest. This information is supplemental to the GIPS® compliant presentation for the Liquid Enhanced Alternative Premia Composite inception on January 1, 2017 and the Managed Futures Full Volatility Private Composite inception on September 1, 2009 included in the Appendix. Please read important disclosures in the Appendix.



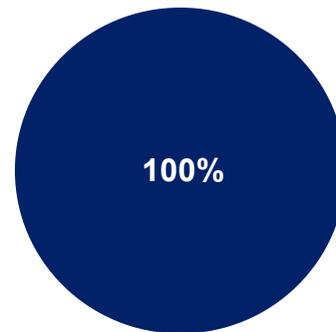
# Adding Alternative Risk Premia

To traditional assets

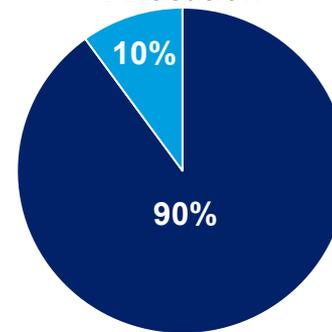
## Hypothetical Returns of a Portfolio of Stocks, Bonds, and Alternative Risk Premia

January 1990 – December 2016

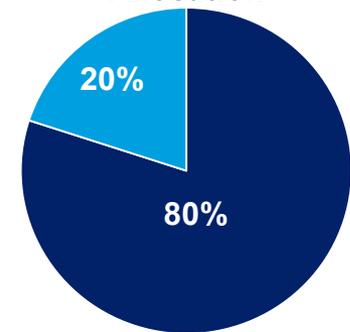
60/40 Portfolio



Adding 10% Hypothetical Alternative Risk Premia Allocation



Adding 20% Hypothetical Alternative Risk Premia Allocation



 60/40 Portfolio  
 Alternative Risk Premia

<b>Annualized Return, Net of Fees</b>	8.5%	9.2%	9.9%
<b>Annualized Volatility</b>	8.9%	8.2%	7.7%
<b>Sharpe Ratio, Net of Fees</b>	0.6	0.8	0.9
<b>Worst Month</b>	-11.1%	-9.8%	-8.5%
<b>Worst Drawdown</b>	-30.5%	-26.8%	-23.0%



Source: AQR. The 60/40 portfolio has 60% invested in S&P 500 and 40% invested in U.S. 10-year bonds. The 60/40 portfolio is rebalanced monthly. The 3-Month T-Bill is the risk-free rate used to derive the Sharpe ratio. "Hypothetical Alternative Risk Premia Backtest" is the Hypothetical Liquid Enhanced Alternative Premia (LEAP) strategy backtest for the period January 1990 through December 2016. Please see the Appendix for an explanation of the hypothetical LEAP backtest construction. This information is supplemental to the GIPS® compliant presentation for the Liquid Enhanced Alternative Portfolio website accepted on January 1, 2017. Hypothetical data has inherent limitations, some of which are disclosed in the Appendix.

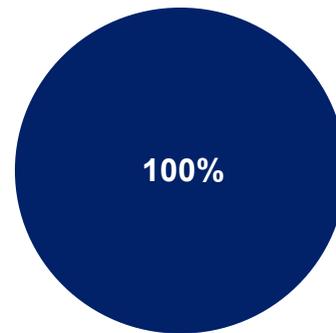
# Adding Trend

To traditional assets

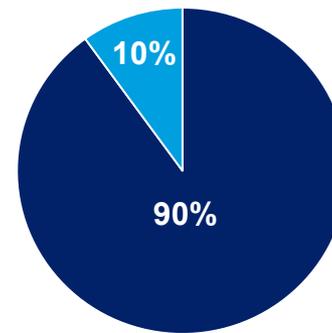
## Hypothetical Returns of a Portfolio of Stocks, Bonds, and Trend

January 1990 – December 2016

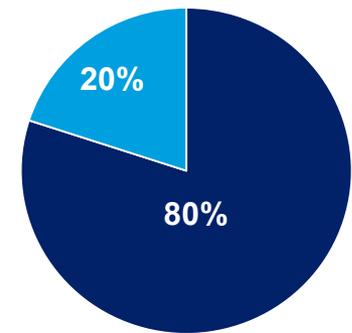
**60/40 Portfolio**



**Adding 10% Hypothetical Trend Backtest**



**Adding 20% Hypothetical Trend Backtest**



■ 60/40 Portfolio  
■ Trend-Following Strategy

<b>Annualized Return, Net of Fees</b>	8.5%	8.3%	8.1%
<b>Annualized Volatility</b>	8.9%	8.1%	7.4%
<b>Sharpe Ratio, Net of Fees</b>	0.6	0.7	0.7
<b>Worst Month</b>	-11.1%	-9.1%	-7.1%
<b>Worst Drawdown</b>	-30.5%	-26.0%	-21.3%



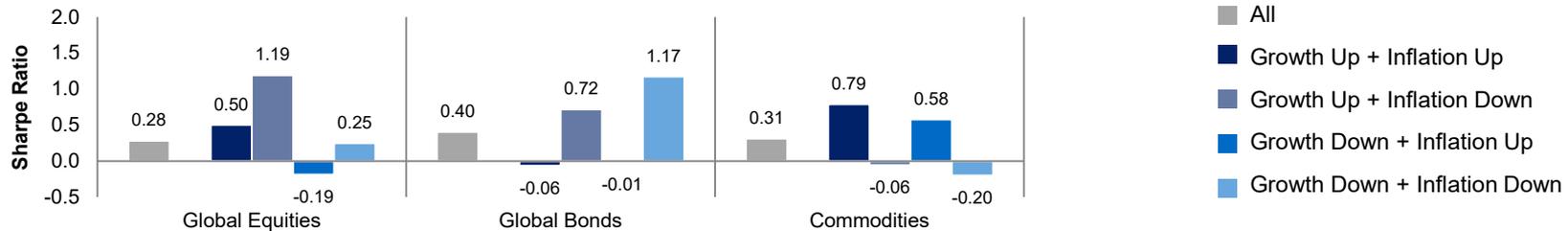
Source: AQR. The 60/40 portfolio has 60% invested in S&P 500 and 40% invested in U.S. 10-year bonds. The 60/40 portfolio is rebalanced monthly. The 3-Month T-Bill is the risk-free rate used to derive the Sharpe ratio. The "Hypothetical Trend Backtest" is the Hypothetical Managed Futures backtest scaled to 12% volatility from January 1990 through August 2009 then from September 2009 through December 2016 is Managed Futures Full Volatility Strategy hypothetically scaled to 12% volatility. Volatility adjusted performance has been scaled to match a different volatility target and is not the actual performance of the respective portfolio(s). All volatility scaled performance are hypothetical and for illustrative purposes only. Chart is provided for illustrative purposes only and is not based on an actual portfolio AQR manages. Please see Appendix for an explanation of the Hypothetical Managed Futures Strategy backtest. This information is supplemental to the GIPS-compliant presentation for the Managed Futures Full Volatility Private Composite inception on September 1, 2009 included in the Appendix. Hypothetical data has inherent limitations, some of which are disclosed in the Appendix.

# Performance Across Growth and Inflation Environments

Macro diversification: mapping investments to macro risks

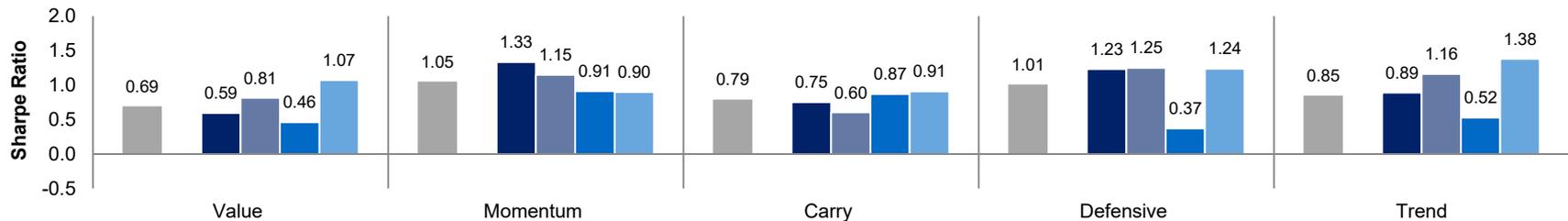
## Long-Only Market Risk Premia

1972 – 2017



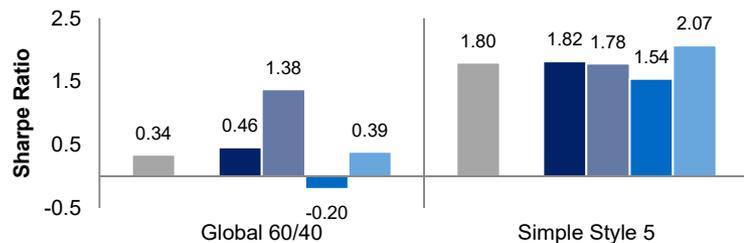
## Hypothetical Long/Short Style Premia

1972 – 2017



## Hypothetical Simple Portfolios

1972 – 2017



Source: Bloomberg, AQR. Data from January 1972 – December 2017. Global Equities is the MSCI World Index. Global Bonds is a GDP weighted composite of Australian, European, Canadian, Japanese, U.K. and U.S. 10-year government bonds. Commodities is an equal dollar-weighted index of 24 commodities. Long-Short Style Premia are backtests of style premia as described herein. Global 60/40 takes 60% Global Equities and 40% Global Bonds. Simple Style 5 is an equal dollar-weighted composite of the five long/short style premia. Please see Appendix for more details on the construction of the return series and macroeconomic environmental indicators. The analysis is based on hypothetical returns gross of trading costs and fees. Hypothetical performance results have several inherent limitations, some of which are disclosed in the Appendix. Past performance is not a guarantee of future performance.

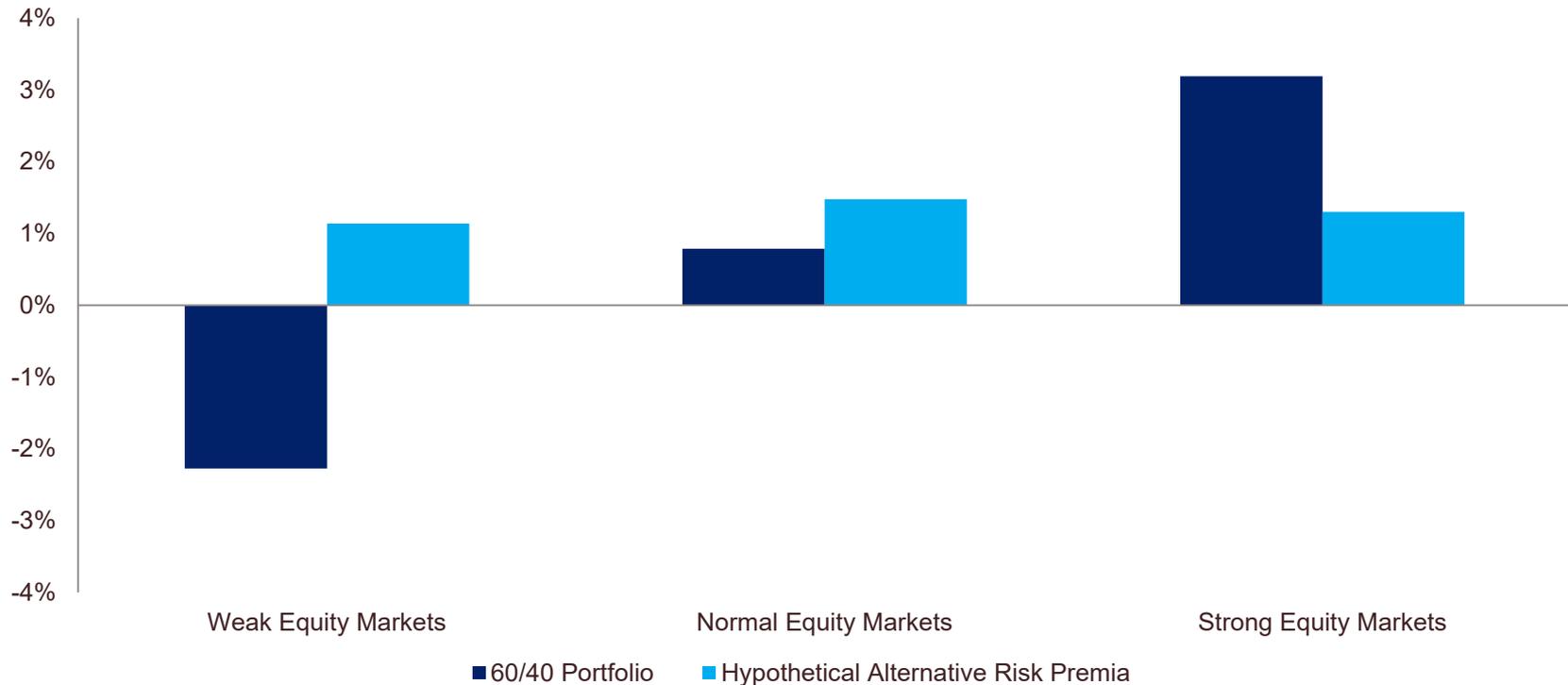


# Low Correlation Against Equity Market

## Performance in Different Types of Equity Markets

### Average Monthly 60/40 and Hypothetical Alternative Risk Premia Performance\*

January 1990 – December 2016



Source: AQR, Bloomberg. \*Weak equity markets is defined as those months in which MSCI World Net Total Return performance is in the 33rd percentile or lower during the period; normal equity markets, the 34th-67th percentile; and strong equity markets in the 68th percentile or higher during the period. 60/40 portfolio consists of 60% allocated to the MSCI World Net Total Return Index and 40% to the Bloomberg Barclays Global Aggregate Total Return Index Value Hedged. All returns are excess of U.S. treasury bills. "Hypothetical Alternative Risk Premia Bcktest" is the Hypothetical Liquid Enhanced Alternative Premia (LEAP) strategy backtest for the period January 1990 through December 2016. Please see the Appendix for an explanation of the hypothetical LEAP backtest construction. This information is supplemental to the GIPS® compliant presentation for the Liquid Enhanced Alternative Premia Composite inception on January 1, 2017. Hypothetical performance has inherent limitations, some of which are disclosed in the Appendix. Past performance is not a guarantee of future performance.



# Conclusion

Intuitive and well-known, but effective implementation is difficult

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# Composite Performance

January 1, 2017 – June 30, 2018

## Net Performance

Q1 2017	-1.7%
Q2 2017	-0.7%
Q3 2017	5.0%
Q4 2017	2.4%
Q1 2018	-1.1%
Q2 2018	-9.9%

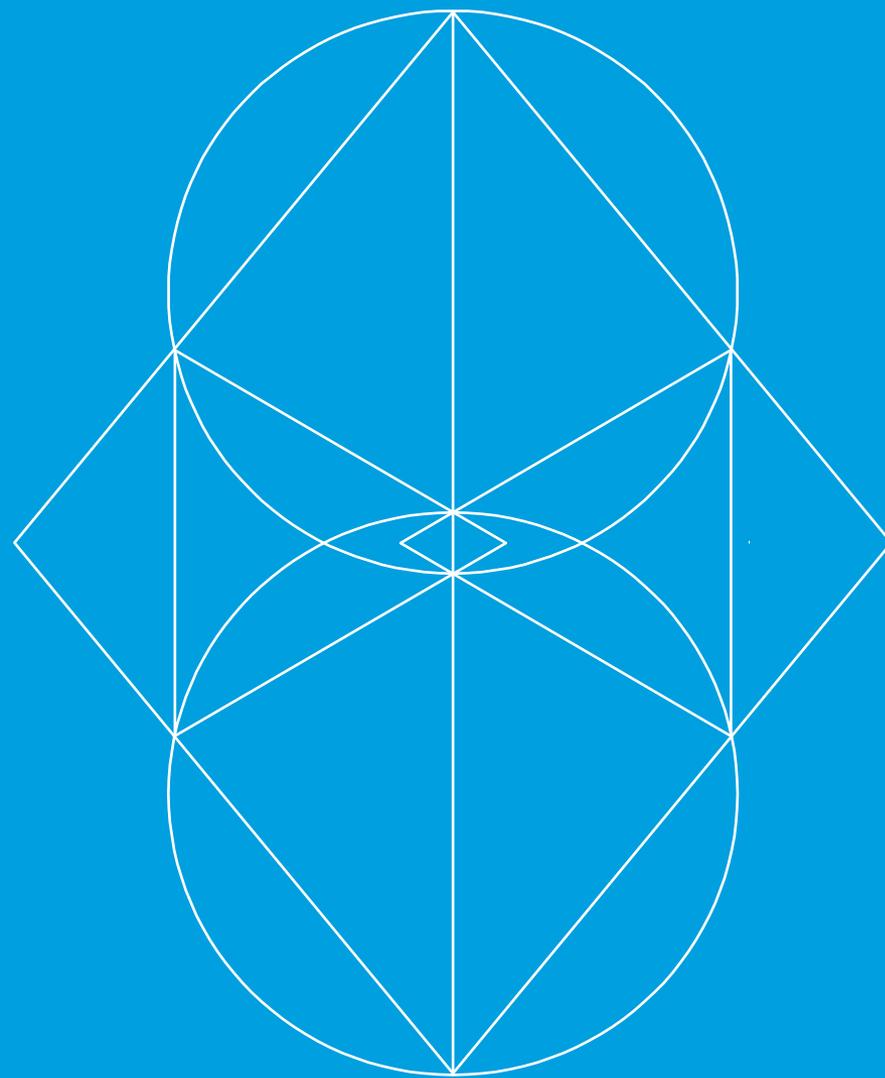
## Summary (Since 1/1/2017)

<b>Annualized Return</b>	<b>-4.3%</b>
<b>Realized Volatility</b>	<b>7.7%</b>
<b>Sharpe Ratio</b>	<b>-0.7</b>
<b>Beta to MSCI World</b>	



Source: AQR. Composite performance is performance of AQR Liquid Enhanced Alternative Premia Composite. Performance for the month ending June 30, 2018 is estimated and subject to change. Risk-free rate is the ICE BofAML U.S. 3 Month T-Bill. Beta to MSCI World above is calculated using gross cumulative overlapping 3-day returns. Net performance in USD uses a 0.75% fixed fee and 10% performance fee. This information is supplemental to the GIPS® compliant presentation for the Liquid Enhanced Alternative Premia Composite incepted on January 1, 2017. Past performance is not a guarantee of future performance. Please read important disclosures in the Appendix.

# Appendices



# Performance Disclosures

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**HYPOTHETICAL PERFORMANCE RESULTS HAVE MANY INHERENT LIMITATIONS, SOME OF WHICH, BUT NOT ALL, ARE DESCRIBED HEREIN. NO REPRESENTATION IS BEING MADE THAT ANY FUND OR ACCOUNT WILL OR IS LIKELY TO ACHIEVE PROFITS OR LOSSES SIMILAR TO THOSE SHOWN HEREIN. IN FACT, THERE ARE FREQUENTLY SHARP DIFFERENCES BETWEEN HYPOTHETICAL PERFORMANCE RESULTS AND THE ACTUAL RESULTS SUBSEQUENTLY REALIZED BY ANY PARTICULAR TRADING PROGRAM. ONE OF THE LIMITATIONS OF HYPOTHETICAL PERFORMANCE RESULTS IS THAT THEY ARE GENERALLY PREPARED WITH THE BENEFIT OF HINDSIGHT. IN ADDITION, HYPOTHETICAL TRADING DOES NOT INVOLVE FINANCIAL RISK, AND NO HYPOTHETICAL TRADING RECORD CAN COMPLETELY ACCOUNT FOR THE IMPACT OF FINANCIAL RISK IN ACTUAL TRADING. FOR EXAMPLE, THE ABILITY TO WITHSTAND LOSSES OR TO ADHERE TO A PARTICULAR TRADING PROGRAM IN SPITE OF TRADING LOSSES ARE MATERIAL POINTS THAT CAN ADVERSELY AFFECT ACTUAL TRADING RESULTS. THERE ARE NUMEROUS OTHER FACTORS RELATED TO THE MARKETS IN GENERAL OR TO THE IMPLEMENTATION OF ANY SPECIFIC TRADING PROGRAM WHICH CANNOT BE FULLY ACCOUNTED FOR IN THE PREPARATION OF HYPOTHETICAL PERFORMANCE RESULTS, ALL OF WHICH CAN ADVERSELY AFFECT ACTUAL TRADING RESULTS.** The hypothetical performance results contained herein represent the application of the quantitative models as currently in effect on the date first written above and there can be no assurance that the models will remain the same in the future or that an application of the current models in the future will produce similar results because the relevant market and economic conditions that prevailed during the hypothetical performance period will not necessarily recur. Discounting factors may be applied to reduce suspected anomalies. This backtest's return, for this period, may vary depending on the date it is run. Hypothetical performance results are presented for illustrative purposes only. In addition, our transaction cost assumptions utilized in backtests, where noted, are based on AQR Capital Management, LLC's, ("AQR")'s historical realized transaction costs and market data. Certain of the assumptions have been made for modeling purposes and are unlikely to be realized. No representation or warranty is made as to the reasonableness of the assumptions made or that all assumptions used in achieving the returns have been stated or fully considered. Changes in the assumptions may have a material impact on the hypothetical returns presented. Actual advisory fees for products offering this strategy may vary.

Gross performance results do not reflect the deduction of investment advisory fees, which would reduce an investor's actual return. For example, assume that \$1 million is invested in an account with the Firm, and this account achieves a 10% compounded annualized return, gross of fees, for five years. At the end of five years that account would grow to \$1,610,510 before the deduction of management fees. Assuming management fees of 1.00% per year are deducted monthly from the account, the value of the account at the end of five years would be \$1,532,886 and the annualized rate of return would be 8.92%. For a 10-year period, the ending dollar values before and after fees would be \$2,593,742 and \$2,349,739, respectively. AQR's asset based fees may range up to 2.85% of assets under management, and are generally billed monthly or quarterly at the commencement of the calendar month or quarter during which AQR will perform the services to which the fees relate. Where applicable, performance fees are generally equal to 20% of net realized and unrealized profits each year, after restoration of any losses carried forward from prior years. In addition, AQR funds incur expenses (including start-up, legal, accounting, audit, administrative and regulatory expenses) and may have redemption or withdrawal charges up to 2% based on gross redemption or withdrawal proceeds. Please refer to AQR's ADV Part 2A for more information on fees. Consultants supplied with gross results are to use this data in accordance with SEC, CFTC, NFA or the applicable jurisdiction's guidelines.

There is a risk of substantial loss associated with trading commodities, futures, options, derivatives and other financial instruments. Before trading, investors should carefully consider their financial position and risk tolerance to determine if the proposed trading style is appropriate. Investors should realize that when trading futures, commodities, options, derivatives and other financial instruments one could lose the full balance of their account. It is also possible to lose more than the initial deposit when trading derivatives or using leverage. All funds committed to such a trading strategy should be purely risk capital.



# Performance Disclosures

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## Hypothetical Long Short Alternative Premia Components

AQR backtests of Value, Momentum, Carry, Defensive, Trend and Volatility theoretical alternative premia components are based on monthly returns, undiscounted, gross of fees and estimated transaction costs, excess of a cash rate proxied by the Merrill Lynch 3-Month T-Bill Index, and scaled to 12% annualized volatility. Value, Momentum, Carry and Defensive strategies are designed to take long positions in the assets with the strongest style attributes and short positions in the assets with the weakest style attributes, while seeking to ensure each portfolio is market-neutral. The Trend strategy will take long or short positions in assets based on short-term and long-term trend signals in addition to over-extended signals. It will typically buy when prices rise and sell when prices decline. The Volatility Strategy trades a diversified basket of options across multiple strikes and with less than or equal to 2 months to expiry. Options are sized so that the strategy targets a constant stress loss level, defined as the expected loss over a day on which the SP500 loses 20%. The Alternative Risk Premia and Asset Group Composites, are based on an allocation to the alternative premia components and asset group components based on their liquidity and breadth. Please see below for a description of the Universe selection.

**Stock and Industry Selection:** approximately 2,000 stocks across Europe, Japan, and U.S. **Country Equity Indices:** Australia, Canada, Eurozone, Hong Kong, Japan, Singapore, Sweden, Switzerland, U.K., U.S. **Within Europe:** Italy, France, Germany, Netherlands, Spain. **Bond Futures:** Australia, Canada, France, Germany, Italy, Japan, U.K., U.S. **Currencies:** Australia, Canada, Euro, Japan, New Zealand, Norway, Singapore, Sweden, Switzerland, U.K., U.S. **Country Index Options:** S&P 500, Euro Stoxx 50, FTSE 100, Nikkei 225.

Broad-based securities indices are unmanaged and are not subject to fees and expenses typically associated with managed accounts or investment funds. Investments cannot be made directly in an index.

The Morgan Stanley Capital International World Index is a market-capitalization-weighted index composed of company's representative of the market structure of 23 developed market countries in North America, Europe and the Asia/Pacific Region. There are material differences between an index and the strategy.

The Barclays Global Aggregate Index is a flagship measure of global investment grade debt from 23 different local currency markets. This multicurrency benchmark includes fixed-rate Treasury, government-related, corporate and securitized bonds from both developed and emerging markets issuers. There are material differences between an index and the strategy. One significant difference between the indices and the performance presented is that the index performance is weighted on the basis of capitalization whereas the strategy performance reflects a risk-weighted calculation. This difference may have a material affect on the comparison of the indices with the performance of the strategy.

The S&P GSCI® is a composite index of commodity sector returns representing an unleveraged, long-only investment in commodity futures that is broadly diversified across the spectrum of commodities.

## Hypothetical AQR Managed Futures Strategy Backtest (referred to in this presentation as the Hypothetical Trend Backtest)

Limitations of Backtested Performance. The returns presented reflect hypothetical performance an investor would have obtained had it invested in the manner shown and do not represent returns that any investor actually attained. The information presented is based upon the following hypothetical assumptions:

The AQR Managed Futures Strategy model uses data from January 1985 onward. The investment strategy consists of short-term and long-term trend signals in addition to over-extended signals. All signals in aggregate determine the direction, long or short, and the size of each trade for each individual market in the model. The investment strategy is primarily based on trend-following investing which involves going long markets that have been rising and going short markets that have been falling, betting that those trends over the examined look-back periods will continue. The strategy analyzes and trades more than 100 markets across 4 major asset classes: commodities including agriculturals, energies, and metals; global developed and emerging equity indices; developed bond futures and short-term interest rates; and developed and emerging currency pairs. The strategy targets balanced risk exposures over time, and limits the amount of concentrated risk that can be taken in any one asset or asset class. The strategy targets a long-term volatility target of 17%, but does allow ex-ante volatility at any point in time to be either higher or lower than this number.

Hypothetical performance is gross of advisory fees and net of transaction costs, unless stated otherwise. The transactions costs used in the model are based on AQR's proprietary estimates of transaction costs for each market traded, including market impact and commissions. Backtested returns for the strategy are discounted such that the Sharpe ratio is reduced to account for potential differences in backtested implementation of a strategy versus hypothetical real-world implementation, including differences in trade execution, constraints, and transaction costs over time. Without this discount, backtested returns would be greater.

The returns presented reflect the hypothetical backtested performance of the AQR Managed Futures 17% Volatility Strategy. The backtested performance may be greater or less than the live performance of the AQR Managed Futures Strategy due to, among other things, differences in the number of the holdings in and composition of the AQR Managed Futures Strategy.

The benchmark and relevant cash rate is assumed to be 3-month Treasury bills.



# Performance Disclosures

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## **Hypothetical LEAP Strategy Hypothetical Carve-out and Backtest Returns Methodology (referred to in this presentation as the Hypothetical Alternative Risk Premia Backtest)**

The AQR Liquid Enhanced Alternative Premia Strategy aims to deliver well balanced, diversified exposure to a set of alternative premia, across several asset groups. The long term risk weighting to asset groups is 30% to Stocks and Industries, 23% to Equity Indices, 23% to Fixed Income and 23% to Currencies. Within each asset group, the strategy will allocate risk roughly evenly to the alternative premia within that asset group. Combining the risk weights to asset groups, with the risk weight to alternative premia within each asset group results in the following long term risk allocation to alternative premia: 32% to Value, 28% to Momentum, 15% to Defensive, 12% to Trend, 10% to Carry and 3% to Volatility. The strategy's long term risk target is 12% volatility. The strategy may take long and short positions across the following investment universe, all within developed markets: single stocks, equity index futures, government bond futures, interest rate futures, currency forwards and futures, equity index options and government bond options.

The AQR Liquid Enhanced Alternative Premia Strategy hypothetical returns are calculated by appending, when and where available, proforma performance to the backtest, as described below. Hypothetical returns are calculated on a monthly basis, in excess of a cash rate proxied by the ICE BofAML U.S. 3-Month T-Bill Index. Backtest returns are calculated net of estimated transaction costs and are heavily discounted to reflect uncertainty in historical costs and opportunities. The proforma performance is undiscounted and net of transaction costs.

Proforma performance is based on: Carve-out performance for relative value alternative premia (Value, Momentum, Carry and Defensive) starts in September of 2012, from the AQR Style Premia Strategy, adjusted by selecting single stocks, developed equity indices, developed government bonds and developed currencies strategies and scaled to the appropriate volatility target. Carve-out performance for Trend starts in September 2009 from the AQR Managed Futures Strategy, adjusted by selecting government bonds, developed currencies, and developed equities strategies and scaled to the appropriate volatility target. Performance for Volatility starts in December 2015 from the AQR Volatility Risk Premium Strategy and scaled to the appropriate volatility target.

The Style Premia strategy seeks to deliver efficient exposure to a well-diversified portfolio of long-short style strategies across six asset group contexts including Stock and Industry Selection, Equity Indices, Bonds, Interest Rates, Currencies, and Commodities. AQR pursues these goals by investing in instruments not limited to Stocks, Futures, Swaps, and Currency Forwards. The Composite's strategy targets the highest ex ante volatility relative to all of the Firm's Style Premia Composites.

The Managed Futures strategy includes investments in a diversified portfolio of equity, currency, fixed-income and commodity-linked instruments, both long and short, in an effort to provide exposure and performance that is, on average, lowly correlated to the equity markets. Accounts included target the highest volatility level relative to the all Firm's Managed Futures Composite. The positions taken in each instrument are based on a systematic, quantitative investment process that pursues short to intermediate-term price trends in the corresponding market for the instrument, while mitigating risk by assessing short or long-term over-extensions of trends in that market.

The Volatility Risk Premium Strategy seeks to capture the volatility risk premium across multiple asset classes. The strategy is implemented through selling exchange-traded options. The strategy seeks to be market neutral by hedging options with listed futures and/or ETFs. Option positions are sized based on stress scenarios, and therefore the strategy does not have a volatility target. The strategy currently trades equity and fixed income options, and will potentially expand to additional asset classes in the future.

Carve-out performance results are based upon a segment of the strategy and were not managed separately but as part of a larger strategy. Volatility adjusted performance has been scaled to match a different volatility target and is not the actual performance of the respective portfolio(s). All carve-out and volatility scaled performance are hypothetical and for illustrative purposes only.



# Performance Disclosures

## Hypothetical Long-Term Alternative Risk Premia: dates of sample periods

Asset Class	Style	Pre-Sample Period	Original Sample Period	Post-Sample Period
Multi-Asset	Value	Mar-1926 - Dec-1963	Jan-1963 - Dec-1990	Jan-1990 - Feb-2017
Multi-Asset	Momentum	Feb-1926 - Dec-1964	Jan-1964 - Dec-1989	Jan-1989 - Feb-2017
Multi-Asset	Carry	Feb-1926 - Dec-1973	Jan-1973 - Dec-1981	Jan-1981 - Feb-2017
Multi-Asset	Defensive	Feb-1926 - Dec-1960	Jan-1960 - Dec-2009	Jan-2009 - Feb-2017
Multi-Asset	Multi-style	Feb-1926 - Dec-1960	Jan-1960 - Dec-1990	Jan-1990 - Feb-2017
U.S. Stocks	Value	Jul-1927 - Dec-1963	Jan-1963 - Dec-1990	Jan-1990 - Jun-2015
U.S. Stocks	Momentum	Feb-1928 - Dec-1964	Jan-1964 - Dec-1989	Jan-1989 - Jun-2015
U.S. Stocks	Defensive	Mar-1928 - Dec-1960	Jan-1960 - Dec-2009	Jan-2009 - Jun-2015
U.S. Stocks	Multi-style	Jul-1927 - Dec-1960	Jan-1960 - Dec-1990	Jan-1990 - Jun-2015
Commodities	Value	Jan-1920 - Dec-1963	Jan-1963 - Dec-1990	Jan-1990 - Feb-2017
Commodities	Momentum	Jan-1920 - Dec-1964	Jan-1964 - Dec-1989	Jan-1989 - Feb-2017
Commodities	Carry	Jan-1920 - Dec-1973	Jan-1973 - Dec-1981	Jan-1981 - Feb-2017
Commodities	Defensive	Jan-1920 - Dec-1960	Jan-1960 - Dec-2009	Jan-2009 - Feb-2017
Commodities	Multi-style	Jan-1920 - Dec-1960	Jan-1960 - Dec-1990	Jan-1990 - Feb-2017
Equity Indices	Value	Feb-1925 - Dec-1963	Jan-1963 - Dec-1990	Jan-1990 - Feb-2017
Equity Indices	Momentum	Feb-1923 - Dec-1964	Jan-1964 - Dec-1989	Jan-1989 - Feb-2017
Equity Indices	Carry	Feb-1923 - Dec-1973	Jan-1973 - Dec-1981	Jan-1981 - Feb-2017
Equity Indices	Defensive	Feb-1923 - Dec-1960	Jan-1960 - Dec-2009	Jan-2009 - Feb-2017
Equity Indices	Multi-style	Feb-1923 - Dec-1960	Jan-1960 - Dec-1990	Jan-1990 - Feb-2017
Fixed Income	Value	Mar-1923 - Dec-1963	Jan-1963 - Dec-1990	Jan-1990 - Sep-2015
Fixed Income	Momentum	Feb-1923 - Dec-1964	Jan-1964 - Dec-1989	Jan-1989 - Sep-2015
Fixed Income	Carry	Feb-1923 - Dec-1973	Jan-1973 - Dec-1981	Jan-1981 - Sep-2015
Fixed Income	Defensive	Feb-1923 - Dec-1960	Jan-1960 - Dec-2009	Jan-2009 - Sep-2015
Fixed Income	Multi-style	Feb-1923 - Dec-1960	Jan-1960 - Dec-1990	Jan-1990 - Sep-2015

Asset Class	Style	Original Sample Period	Post-Sample Period
Currencies	Value	Jan-1974 - Dec-1990	Jan-1990 - Feb-2017
Currencies	Momentum	Jan-1974 - Dec-1989	Jan-1989 - Feb-2017
Currencies	Carry	Jan-1974 - Dec-1981	Jan-1981 - Feb-2017
Currencies	Multi-style	Jan-1974 - Dec-1990	Jan-1990 - Feb-2017



Source: AQR. Please refer to the Appendix for descriptions of the data sources used and definitions for each style.

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# Performance Disclosures

## Hypothetical Long-Term Alternative Risk Premia asset class descriptions

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### **U.S. Stocks**

Individual stock-level data from the CRSP database from July 1926 for Value, July 1927 for Momentum, and July 1931 for Defensive strategies.

### **Equity Indices**

Returns on equity indices from 23 equity markets international which include all countries in the MSCI World Index as of 10/31/2016. Since most countries have multiple equity indices, we use the index that is investable, has the most coverage of the total sock market of that country, and has the longest history. We source monthly total returns from Global Financial Data and futures returns from Bloomberg and Datastream.

### **Fixed Income**

Nominal yield and total returns data of 10-year local currency government bonds as well as 3-month interest rates for 13 countries covering North America, Northern Europe, Japan, and Australia/New Zealand, sourced from Global Financial Data, Bloomberg, and Datastream.

### **Commodities**

Monthly futures prices of 40 commodities starting in 1877, sourced from the Annual Report of the Trade and Commerce of the Chicago Board of Trade, Commodity Systems Inc., and Bloomberg. For base metals and platinum, rolled return series from the S&P, Goldman Sachs, and Bloomberg are used.

### **Currencies**

Spot and 1-, 2-, 3-, and 6-month forward exchange rates from AQR's production data base and interpolate the forward exchange rate for the next quarterly IMM date. This simulates a strategy of buying and holding the forward contract maturing at the near IMM date and rolling to the far contract 5 days before the maturity date. Before 1990, we use changes in spot exchange rates plus the carry of the currency for the total return. This includes data from 20 developed market currencies (Australia, Eurozone, Canada, Japan, Norway, New Zealand, Sweden, Switzerland, United Kingdom, and the U.S., and Belgium, Spain, Finland, France, Germany, Ireland, Italy, Netherlands, Austria, and Portugal).



# Performance Disclosures

## Hypothetical Long-Term Alternative Risk Premia definitions

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### U.S. Stocks

Value: Book-to-Price Ratio

Momentum: Past 12 Month Return, Excluding Last Month

Defensive: Beta

### Equity Indices

Value: Cyclically-Adjusted Earnings-to-Price Ratio

Momentum: Past 12 Month Return, Excluding Last Month

Carry: Dividend Yield

Defensive: Beta

### Fixed Income

Value: Real Bond Yield

Momentum: Past 12 Month Return, Excluding Last Month

Carry: Term Premium

Defensive: Beta

### Commodities

Value: 5 Year Reversal

Momentum: Past 12 Month Return, Excluding Last Month

Carry: Futures Curve Rolldown

Defensive: Beta

### Currencies

Value: Purchasing Power Parity

Momentum: Past 12 Month Return, Excluding Last Month

Carry: Short Term Interest Rate

**Multi-style** equal capital weights the styles within each asset class.



# Performance Disclosure

## Constructing macro indicators

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Each of our macro indicators combines two series, which are first normalized to Z-scores: that is, we subtract a historical mean from each observation and divide by a historical volatility. We use rolling 10-year windows for means and volatilities when normalizing the last three macro indicators. However, for growth and inflation indicators we use in-sample 1972-2013 means and volatilities because we do not have long histories of economist forecasts needed to construct the surprise series below. This choice does not seem to change any major results. When we classify our quarterly 12-month periods into, say, “growth up” and “growth down” periods, we compare actual observations to the median so as to have an equal number of up and down observations (because we are not trying to create an investable strategy where data should be available for investors in real time, we use the full sample median).

The underlying series for our *Growth Indicator* are the Chicago Fed National Activity Index (CFNAI) and the “surprise” in industrial production growth over the past year. Since there is no uniquely correct way to capture any risk factor, averaging may make the results more robust and signals humility. CFNAI takes this averaging idea to extremes as it combines 85 regular indicators of U.S. economic activity. The other series — the difference between actual annual growth in industrial production and the consensus economist forecast a year earlier — is narrower but more directly captures the surprise effect in economic developments. The *Inflation Indicator* is also an average of two normalized series. One series measures the de-trended level of inflation (CPIYOY minus its mean, divided by volatility), while the other measures the surprise element in realized inflation (CPIYOY minus consensus economist forecast a year earlier). The three other macro indicators combine the level and change aspects of real yield, volatility and liquidity conditions. (This is a design decision; someone else could have chosen indicators based on changes only.) For example, both high and rising real yields can imply adverse conditions for many investors. We study real long-term bond yields (subtracting a survey-based forecast of long-term inflation from the 10-year Treasury yield) and real short yields (subtracting a survey-based forecast of next-year inflation from the three-month Treasury bill rate). We normalize both their levels and one-year changes, and then average these to give us a composite *Real Yield Indicator*. Likewise, we estimate the volatility of the S&P500 and 10-year Treasuries using a one-year window. We normalize both the level of volatility and its change from a year ago, and average these to give a composite *Volatility Indicator*. Finally, we proxy market illiquidity using the “TED” spread of funding liquidity and Amihud’s “ILLIQ” price impact measure in equity markets. We normalize both the levels and one-year changes, and average these to give a composite *Illiquidity Indicator*. We use median forecasts from the Survey of Professional Forecasters data published by the Philadelphia Fed. While data surprises a priori have a zero mean, this series has exhibited a downward trend in recent decades, reflecting the (partly unexpected) relative decline of the U.S. manufacturing sector. The TED spread is the yield difference between Eurodollar and Treasury bill rates (we use the 3-month maturity). This spread tends to widen when market concerns on banking sector credit risk rise or funding liquidity conditions deteriorate. The ILLIQ measure of a stock’s market impact costs, developed by Amihud (2002) and often used in empirical studies, is the ratio of absolute return over volume. Intuitively, the price change induced by a given dollar volume is higher for less liquid stocks. The aggregate measure widens when overall market liquidity worsens.



# Performance Disclosures

## Trend-Following Strategy

The Hypothetical Trend-Following Strategy model uses data from January 1880 onward. The investment strategy is based on trend-following investing which involves going long markets that have been rising and going short markets that have been falling, betting that those trends over the examined look-back periods will continue. The strategy was constructed with an equal-weighted combination of 1-month, 3-month, and 12-month trend-following strategies for 67 markets across 4 major asset classes: 29 commodities, 11 equity indices, 15 bond markets, and 12 currency pairs. Since not all markets have return data going back to 1880, we construct the strategies using the largest number of assets for which return data exist at each point in time. We use futures returns when they are available. Prior to the availability of futures data, we rely on cash index returns financed at local short rates for each country. Please see Figure 2 for additional details. The strategy targets a long-term volatility target of 10% but does not limit volatility during periods where realized volatility may be higher or lower than this number.

Hypothetical performance is gross of advisory fees and net of transaction costs, unless stated otherwise. In order to calculate net-of-fee returns, we subtracted a 2% annual management fee and a 20% performance fee from the gross-of-fee, net-of-transaction-cost returns to the strategy. Actual fees may vary depending on, among other things, the applicable fee schedule. AQR's fees are available upon request and also may be found in Part 2A of its Form ADV. The transactions costs used in the strategy are based on AQR's estimates of average transaction costs for each of the four asset classes, including market impact and commissions. The transaction costs are assumed to be twice as high from 1993 to 2002 and six times as high from 1880–1992. The transaction costs used are shown in Figure 1.

This model is not based on an actual portfolio AQR manages. The performance of the AQR Managed Futures Strategy may be greater or less than the performance of the Trend-Following Strategy due to, among other things, differences in the investment strategy pursued by the AQR Managed Futures Strategy and the number of the holdings in and composition of the AQR Managed Futures Strategy's portfolio.

The benchmark and relevant cash rate is assumed to be 3-month Treasury bills. Prior to 1929 when 3-month Treasury bills became available, the benchmark and relevant cash rate is assumed to be the NYSE call money rates (the rates for collateralized loans) through 1920, and returns on short-term government debt (certificates of indebtedness) from 1920 until 1929.

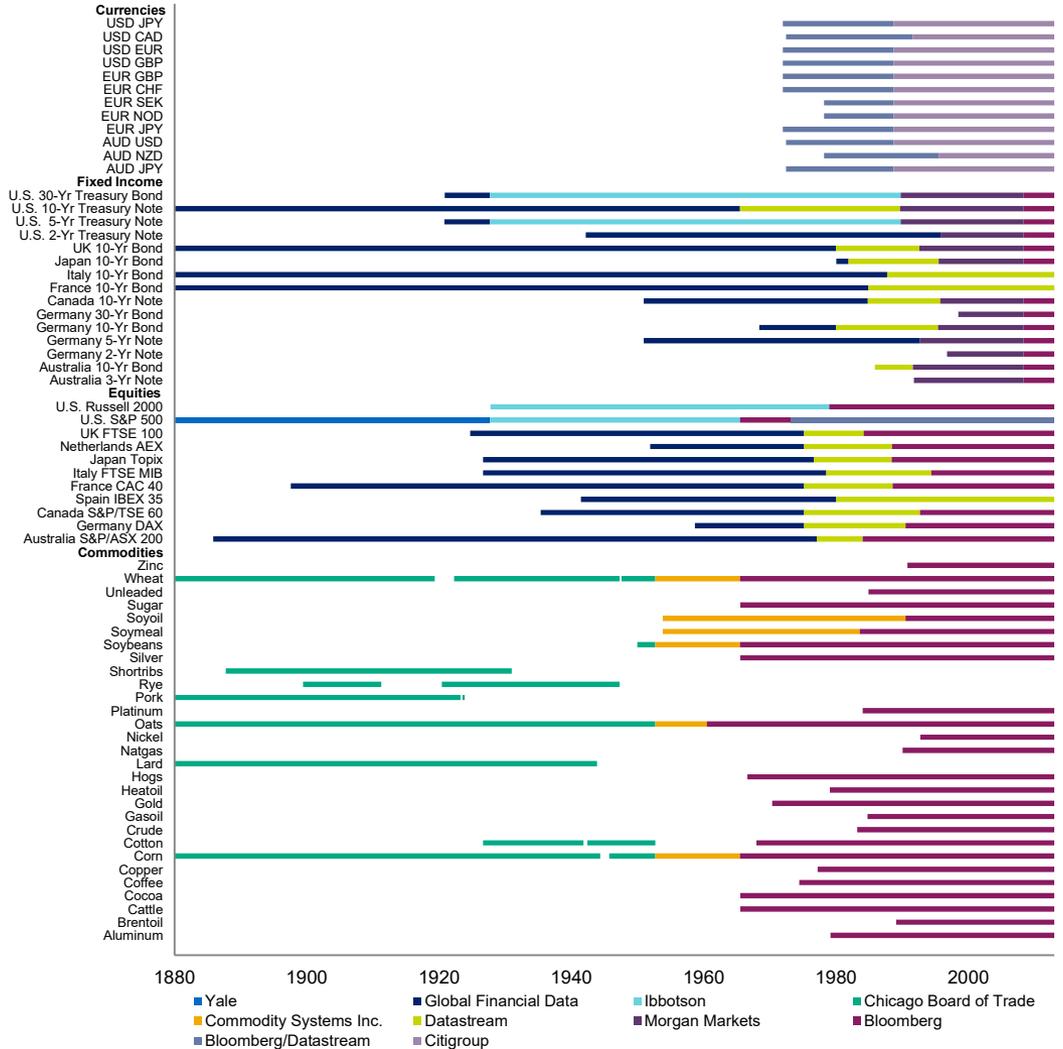
Figure 1

Asset Class	Time Period	One-Way Transaction Costs (as a % of notional traded)
Equities	1880 – 1992	0.34%
	1993 – 2002	0.11%
	2003 – Present	0.06%
Fixed Income	1880 – 1992	0.06%
	1993 – 2002	0.02%
	2003 – Present	0.01%
Currencies	1880 – 1992	0.18%
	1993 – 2002	0.06%
	2003 – Present	0.03%
Commodities	1880 – 1992	0.58%
	1993 – 2002	0.19%
	2003 – Present	0.10%



# Performance Disclosures

Figure 2



# Performance Disclosures

AQR Capital Management, LLC  
Firm-wide Disclosures

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**This presentation cannot be used in a general solicitation or general advertising to offer or sell interest in its Funds. As such, this information cannot be included in any advertisement, article, notice or other communication published in any newspaper, magazine, or similar media or broadcast over television or radio; and cannot be used in any seminar or meeting whose attendees have been invited by any general solicitation or general advertising.**

**Firm Information:** AQR Capital Management, LLC (“AQR”) is a Connecticut based investment advisor registered with the Securities and Exchange Commission under the Investment Advisors Act of 1940. AQR conducts trading and investment activities involving a broad range of instruments, including, but not limited to, individual equity and debt securities, currencies, futures, commodities, fixed income products and other derivative securities. For purposes of firm-wide compliance and firm-wide total assets, AQR defines the “Firm” as entities controlled by or under common control with AQR (including voting right). The Firm is comprised of AQR and its advisory affiliates, including CNH Partners, LLC (“CNH”).

Upon request, AQR will make available a complete list and description of all Firm composites, as well as additional information regarding the policies for valuing portfolios, calculating performance, and preparing compliant presentations.

**GIPS Compliance:** AQR claims compliance with the Global Investment Performance Standards (GIPS®) and has prepared and presented this report in compliance with the GIPS standards. AQR has been independently verified for the period August 1, 1998 through December 31, 2017. The verification reports are available upon request. Verification assesses whether (1) the Firm has complied with all composite construction requirements of the GIPS standards on a firm-wide basis and (2) the Firm’s policies and procedures are designed to calculate and present performance in compliance with the GIPS standards. Verification does not ensure the accuracy of any specific composite presentation.

**Composite Characteristics:** New accounts that fit a composite definition are added at the start of the first full calendar month after the assets come under management, or after it is deemed that the investment decisions made by the investment advisor fully reflect the intended investment strategy of the portfolio. A composite will exclude terminated accounts after the last full calendar month performance measurement period that the assets were under management. The composite will continue to include the performance results for all periods prior to termination. For periods beginning July 1, 2010 through February 28, 2015, AQR defined a significant cash flow as an external cash flow within a portfolio of 50%. Additional information is available upon request.

**Calculation Methodology:** All portfolios are valued daily, weekly, intra-monthly or monthly as defined by Firm policy. The Modified Dietz calculation methodology is used when calculating monthly and intra-month returns. Mutual funds and UCITS are valued daily and performance is calculated on a daily basis. Gross of fees returns are calculated gross of management and performance fees, administrative and custodial costs, and net of transaction costs beginning January 1, 2010. Prior to January 1, 2010, gross of fees returns are gross of management and performance fees, and net of administrative, custodial, and transaction costs. Additional information regarding fees and the calculation of gross and net performance is available upon request.

The dispersion measure is the equal-weighted standard deviation of accounts in a composite for the entire year. Dispersion is not considered meaningful for periods shorter than one year or for periods during which a composite contains five or fewer accounts for the full period. The three-year annualized ex-post standard deviation measure is inapplicable when 36 monthly returns are not available.

Returns are calculated net of all withholding taxes on foreign dividends. Accruals for fixed income and equity securities are included in calculations. AQR’s management or advisory fees are described in Part 2A of its Form ADV. In addition, AQR funds may have a redemption charge up to 2.00% based on gross redemption proceeds that may be charged upon early withdrawals. Consultants supplied with gross results are to use this data in accordance with SEC, CFTC and NFA guidelines.

**Other Disclosures:** AQR may engage in leveraged, derivative, and short positions in order to meet its performance objectives. The use of these positions may have a material impact on performance results. Additionally, there may be subjective unobservable inputs used in the valuation of certain financial instruments utilized by certain AQR managed investment vehicles. The risks inherent to the strategies employed by accounts included are set forth in the applicable offering documents and other information provided to potential subscribers, from where more detailed information regarding the extent to which leverage, derivatives, and short positions can be obtained. These are available upon request, if not provided along with this presentation itself.

**Past performance is not an indication of future performance.**



# A3. Performance Disclosures

AQR Capital Management, LLC  
Liquid Enhanced Alternative Premia Composite  
1/1/2017 – 12/31/2017

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Year	Gross Return %	Net Return %	Number of Portfolios	Composite 3-Yr StDev %	Composite Assets (\$M)	Total Firm Assets (\$M)
2017	6.43	4.85	1	N/A	629.52	223,432.52

**Composite Description:** The Liquid Enhanced Alternative Premia Composite (the “Composite”) was created in January 2017. The Composite’s strategy seeks to deliver efficient exposure to a well-diversified portfolio of long-short alternative risk premia across four asset group contexts including Stock and Industry Selection, Equity Indices, Bonds, and Currencies. AQR pursues these goals by investing in instruments not limited to stocks, futures, swaps, currency forwards, equity index options and options on bond futures. The Composite’s strategy targets the highest ex-ante volatility relative to all of the Firm’s Liquid Enhanced Alternative Premia composites. The Composite is denominated in USD.

**Benchmark:** The Composite strategy is benchmark-agnostic and therefore this composite has no benchmark

**Fees:** Composite net of fees returns are calculated by deducting the maximum model management or advisory fee AQR could charge from the composite monthly gross returns. AQR’s asset-based fees for portfolios within the Composite may range up to 1.50% of assets under management and are generally billed monthly or quarterly at the commencement of the calendar month or quarter during which AQR will perform the services to which the fees relate. Composite assets may have been exposed to the impact of performance fees.

**Past performance is not an indication of future performance.**



# Performance Disclosures

AQR Capital Management, LLC  
 Managed Futures Full Volatility Private Composite  
 9/1/2009 – 12/31/2017

Year	Gross Return %	Net Return 1 %	Net Return 2 %	Benchmark * Return %	Number of Portfolios	Composite 3-Yr StDev %	Benchmark * 3-Yr StDev %	Composite Assets (\$M)	Total Firm Assets (\$M)	% Non-Fee Paying Portfolios
2009	4.01	3.32	3.30	0.07	1	N/A	N/A	5.20	23,571.55	100
2010	11.57	9.37	9.42	0.13	1	N/A	N/A	22.82	32,701.21	-
2011	-10.91	-12.69	-11.80	0.10	1	N/A	N/A	22.66	43,540.99	-
2012	4.35	2.29	3.31	0.11	1	15.37	0.03	205.58	71,122.42	-
2013	19.18	16.85	17.18	0.07	1	14.72	0.03	546.22	98,302.69	-
2014	23.99	21.57	20.50	0.03	1	15.81	0.02	1,113.78	122,655.99	-
2015	6.51	4.51	4.91	0.05	1	16.42	0.02	1,464.87	142,173.39	-
2016	-14.55	-16.02	-15.42	0.33	1	17.92	0.05	1,907.55	175,089.36	-
2017	-1.01	-2.68	-1.99	0.86	1	15.52	0.11	2,492.37	223,432.52	-

\*Bank of America ML US 3-Month Treasury Bill Index

Net Return 1 calculated based on 1.70% management fee per annum (2.00% management fee per annum prior to September 2015)

Net Return 2 calculated based on 1.00% management fee and 10.00% performance fee per annum

**Composite Description:** The Managed Futures Full Volatility Private Composite (the "Composite") was created in September 2009. Accounts included invest in a diversified portfolio of equity, currency, fixed-income and commodity-linked instruments, both long and short, in an effort to provide exposure and performance that is, on average, lowly correlated to the equity markets. Accounts included target the highest volatility level relative to all of the Firm's Managed Futures composites. The positions taken in each instrument are based on a systematic, quantitative investment process that pursues short to intermediate-term price trends in the corresponding market for the instrument, while mitigating risk by assessing short or long-term over-extensions of trends in that market. There is no guarantee that these objectives will be met. It is expected that the strategy will invest primarily in financial futures, commodity futures and currency forwards, but it may also invest in option and swap contracts, fixed income securities, pooled investment vehicles (largely money market funds), and other investments intended to serve as margin or collateral for the derivative positions held by accounts included. Accounts included utilize an instrument set and risk allocation geared to best suit private investors. The Composite is denominated in USD.

**Benchmark:** The Composite benchmark is the Bank of America ML US 3-Month Treasury Bill Index (the "Benchmark"). The index measures the rate of return an investor would realize when purchasing a single U.S. 3 month treasury bill, holding it for one month, selling it, and rolling it into a newly selected issue at the beginning of the next month. The investments in the Composite vary substantially from those in the Benchmark. The index has not been selected to represent an appropriate benchmark to compare an investor's performance, but rather is disclosed to allow for comparison of the investor's performance to that of a certain well-known and widely recognized index.

**Fees:** Composite net of fees returns are calculated by deducting the maximum model management or advisory fee AQR could charge from the composite monthly gross returns. Effective September 2015, AQR's asset-based fees for portfolios within the Composite may range up to 1.70% of assets under management. Prior to September 2015, the Composite's model fee schedule was 2.00% management fee per annum. Fees are generally billed monthly or quarterly at the commencement of the calendar month or quarter during which AQR will perform the services to which the fees relate. Composite assets may have been exposed to the impact of performance fees.

The Composite was formerly known as the Managed Futures High Volatility Composite.

**Past performance is not an indication of future performance.**





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## Memorandum

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DATE: September 7, 2018  
TO: Members of the Board of Retirement  
FROM: Steve Delaney, Chief Executive Officer  
SUBJECT: **TAFT HARTLEY PLANS – A COMPARATIVE REVIEW**

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Ms. Sally Choi, a consultant with experience in oth public and multi-employer pension plans, will discuss lessons to be learned from the Taft Hartley pension world. Ms. Choi will be bringing a PowerPoint packet to the Thursday session.

Her professional bio is provided here.

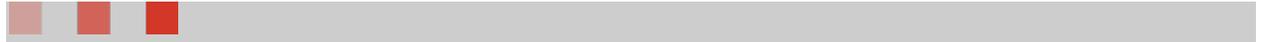
**Submitted by:**



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Steve Delaney  
Chief Executive Officer

## Sally Choi Bio



Sally Choi is co-founder of Agile Progress, LLC, a management and IT consulting firm specializing in public pension and healthcare administration. She has over 20 years of experience in leading large and complex projects, programs and organizations. Ms. Choi oversaw the administration of pension and self-funded health benefit plans for the Motion Picture Industry Pension & Health Plans, where she implemented new business processes, a change management program, and operational improvements. She also served as the General Manager of the Los Angeles City Employees City Retirement System. In this role, she oversaw the management of trust assets and developed a new strategic vision and plan for the administration of pension and retiree health benefits for 45,000 members. Ms. Choi also served as Deputy Mayor of Finance and Performance Management for then Los Angeles Mayor Antonio Villaraigosa. She provided advice on all fiscal and operational matters, prepared the city's \$7 billion budget, and developed a system to track a system to track performance on policy initiatives and programs. Ms. Choi's experience includes extensive work with county and state pension plans, county and state agencies, and health insurance carriers. She has assisted and guided organizations and leaders lead change through Agile transformation and development, business process improvement, performance and project management, and leadership and team development. Her clients include Washington State Health Benefit Exchange, Washington State Health Care Authority, Los Angeles County Department of Public Social Services, Teachers Retirement System of Illinois, Chicago Teachers Pension Fund, District and County Retirement System, San Diego County Employees' Retirement Association, Orange County Employees' Retirement System, Blue Shield of California, LA Care Health Plan and Farrington Partners. Ms. Choi holds an BS in Public Administration from USC and an MBA from UCLA Anderson School of Management. She is also a certified Prosci/ADKAR change management practitioner.

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## Memorandum

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DATE: September 7, 2018  
TO: Members of the Board of Retirement  
FROM: Steve Delaney, Chief Executive Officer  
SUBJECT: **SAN BERNARDINO CERA EMPLOYEES – A CASE STUDY**

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Similar to OCERS, San Bernardino County Employees Retirement Association (SBCERA) for many years had a split staff of County employees and SBCERA direct employees. In recent years, SBCERA was able to move their county employees into a direct hire relationship.

Ms. Christie Porter, Chief Operating Officer at SBCERA will share her thoughts on what OCERS may wish to consider in pursuing a similar move.

Ms. Porter will be bringing a Powerpoint packet to the Thursday session. Her professional bio is provided here.

**Submitted by:**



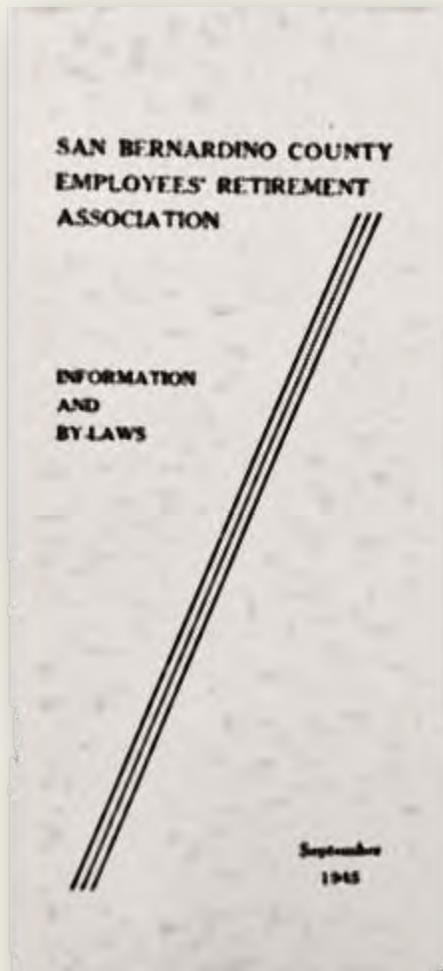
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Steve Delaney  
Chief Executive Officer

# SPECIAL DISTRICT TRANSITION

Christie Porter  
Chief Operating Officer  
September 13, 2018

# In the Beginning



313/358

- Established in 1944 by a vote of the people of San Bernardino County
  - *Began operating in 1945*
- Originally a Defined Contribution Plan (Money Purchase)
- A department of San Bernardino County

# Evolution



- Became a Defined Benefit Plan
  - 1959 for Safety Members
  - 1964 for General Members
- Began investing in equities in 1980
- PEPRA

# Today



- Manages over \$10 billion in assets
- 18 employers
- Two tiers of members
- Over 40,000 members and beneficiaries
- Currently an independent Special District

# How Did We Get Here?

Special District History



# Background

- Difficulty retaining talent
  - *Compensation limitations led to high turnover*
- Revolving door
  - *Staff would routinely leave to work for other County departments*
- Difficulty in setting a distinct culture
- Desire for incentives to align interests and foster administrative effectiveness



# Purpose

- Belief #1: Attracting and retaining quality staff is paramount to success
- Belief #2: The Board, with Fiduciary Duty, must control compensation and benefit structures to have even a remote opportunity for consistent success
- Belief #3: We manage two discreet businesses – customer service and investment management organizations
- Belief #4: The government civil service model is not ideal in managing these businesses

# Questions at the Time

- How will County and labor groups respond?
- Will job descriptions fit the Government Code?
  - *Had to demonstrate that all staff fit the Government Code for Special Districts*
  - *Had to adopt code sections and articles specific to the County*
- Can all administrative positions be included?
  - *G.C. §31522.5 is not consistent in its description of covered classifications*
  - *Sometimes it uses a description position title (ex. chief investment officer); other times it uses an organizational function (ex. legal counsel)*
  - *Minimalist or maximalist approach (re-structure to include more positions)?*
- Who do we contract with for benefits, payroll and human resource services?

# The Path Forward



# Preliminary Steps

2002

Discussion about compensation, retention and incentive programs began to take place.

County deemed programs unworkable for various reasons, thus leading to SBCERA's pursuit of Special District status

2004

County Board of Supervisors adopts resolution supporting SACRS' Legislative Proposal to give SBCERA Special District status

Board of Retirement approves recommendation on Separate District Status

2006

County Board of Supervisors adopts resolution supporting SACRS' Legislative Proposal to give SBCERA Special District status

# Phase I – The Original 13

2006

**Governor approves S.B. 777**

Paves the way for certain positions to become District employees

2007

Board Chair appoints members to Ad Hoc Committee on HR issues for assistant managers and above

Following Board approvals, R.F.I. published for compensation program design and consulting services

Board approved Resolution to adopt G.C. § 31468(1)(2) and § 31522.5 making SBCERA a district

Board approved compensation program; Watson Wyatt hired for Compensation Program Implementation

# Phase II - Staff

2008

Board approved creation of a Compensation Committee; meeting held several weeks later

Board approved committee recommendations and later approved annual incentive plan

2009

Governor approves A.B. 1406

Board approved incentive plan update & modifications

Several Benefits and Compensation Committee meetings held

2010

Board approved consulting agreement with Towers Watson for organizational review

Board approved recommendation to offer separate district employment to County employees who work in SBCERA positions and fall within GC 31522.7

Board approved recommended salary ranges at the 60<sup>th</sup> percentile, and maximum incentive awards; as well as the recommended re-organization of the current staffing structure

# Hiring and Selection

- No pushback from union
  - *Staff had option to become employees of SBCERA or remain County employees*
- Uniform hiring guidelines and procedures created
- Everyone was hired on their own at-will contract (no probation period)
- Performance Education Resource Centers (PERC) training available if needed
- We do our own hiring and selection
  - *Faster to get individuals in place*

# Re-Organization

- A.B. 1406 added G.C. § 31522.7 to the 1937 Act
  - *Allowed SBCERA to offer separate district employment to more County employees working for SBCERA*
  - *Pertinent portion of sub-section (a) of 31522.7 stated that Board may appoint as personnel: supervisors and employees with specialized training and knowledge in*
    - Pension benefit member services
    - Investment reporting compliance
    - Investment accounting
    - Pension benefit tax reporting
    - Pension benefit financial accounting
    - Pension law
- We successfully demonstrated that everyone fit the Government Code

# Compensation

- Compensation Philosophy/Objective
  - *To attract, retain and motivate high performing and highly engaged employees*
  - *Support SBCERA's mission, vision, culture and core values*
  - *Reward exemplary team and individual performance, with emphasis on team results*
- Compensation Design
  - *Salary ranges set at 60<sup>th</sup> percentile*
  - *Total compensation based on fixed salary component plus variable and at-risk incentive component*
- Compensation Application
  - *Towers Watson reviewed organizational structures and reporting relationships among a wide range of California retirement systems*
- PEP
  - *Center for Organizational Effectiveness*

# Deferred Compensation

- SBCERA offers the same deferred compensation plans as the County of San Bernardino, but staff member had to be separate
  - *457(b) and match for all staff*
  - *401(k) and match for employees with exempt benefits*
- Plans administered by Voya Financial

# Medical Trust

- SBCERA employees had to have own RMT plan
- Must contribute 100% of cash value of sick leave balance to the Retirement Medical Trust (RMT) at termination/retirement
- No maximum
- No vesting requirement
- Unlike San Bernardino County, SBCERA does not make contributions to the RMT

# Services

- Payroll
  - *Employee Management and Compensation System (EMACS)*
  - *Account information, transmittals, access to address book*
- Benefits Administration
  - *San Bernardino County Employee Benefits and Services Division (EBSD)*
  - *Greater affordability via large cost pool*
- Risk Management
  - *San Bernardino County*
- Accounts Payable/General Accounting
  - *In House*
- Server hosting
  - *San Bernardino County Information Services Department*

# Subsequent Updates

2013

Board approves updated Employment Resolution

2015 - 2016

Salary study conducted and reclassification recommendations provided to Board for certain positions

Administrative Committee and Board approve reclassification recommendations

2017

Staff voted for labor representation

# What does the future hold?



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Thank you!



348 W. Hospitality Lane, Third Floor  
San Bernardino, California 92415-0014  
(909) 885-7980  
(877) 722-3721  
[www.SBCERA.org](http://www.SBCERA.org)

**Christie L. Porter**, CEBS, PMP  
Chief Operating Officer

Ms. Porter has served as the Chief Operating Officer and Chief of Member Services for the San Bernardino County Employees' Retirement Association (SBCERA) since March 2004. She is responsible for managing SBCERA's day-to-day retirement and disability counseling, benefits and communications services on behalf of our more than 40,000 members and beneficiaries.

Previously, Ms. Porter was a Project Coordinator/Retirement System Specialist for Levi, Ray & Shoup, Inc. and provided support to a variety of clients engaged in pension software application design and development decisions. She also spent more than four years with the Orange County Employees' Retirement System (OCERS) in progressively responsible positions including directing a staff of 10 Retirement Program Specialists and Benefits Technicians.

Ms. Porter earned a Certified Employee Benefit Specialist (CEBS) designation from the International Foundation of Employee Benefit Plans (IFEBP) and the Wharton School of the University of Pennsylvania. She also achieved her Project Management Professional (PMP) designation and earned a certificate in Project Management from University of California, Riverside.

Ms. Porter serves on the San Bernardino County Employees' Benefit Advisory Committee (EBAC). She is also an active member of industry associations including the State Association of County Retirement Systems (SACRS) and the California Association of Public Retirement Systems (CALAPRS) where she has served on several committees and led discussions on retirement and defined benefit topics.

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Orange County Employees Retirement System  
2223 East Wellington Avenue | Santa Ana | 92701

# 2019-2021 STRATEGIC PLAN

# MISSION, VISION AND VALUES

## **MISSION STATEMENT:**

We provide secure retirement and disability benefits with the highest standards of excellence.

## **VISION STATEMENT:**

To be a trusted partner providing premier pension administration, distinguished by consistent, quality member experiences and prudent financial stewardship.

## **VALUES:**

- **O**pen and Transparent
- **C**ommitment to Superior Service
- **E**ngaged and Dedicated Workforce
- **R**eliable and Accurate
- **S**ecure and Sustainable

# 2019 BUSINESS PLAN

## 2019-2021 STRATEGIC GOALS

- Fund Sustainability
- Excellent Service and Support
- Risk Management
- Talent Management

# FUND SUSTAINABILITY

## STRENGTHEN THE LONG-TERM STABILITY OF THE PENSION FUND

**Objective:** Mitigate the risk of significant investment loss

**Objective:** Develop procedures for new employers entering the system

**Objective:** Employ a governance structure that supports a dynamic investment program

**Objective:** Prudent use of resources

# EXCELLENT SERVICE AND SUPPORT

**ACHIEVE EXCELLENCE IN THE SERVICE AND SUPPORT WE PROVIDE TO OUR MEMBERS AND PLAN SPONSORS**

**Objective:** Provide accurate and timely benefits

**Objective:** Provide education to our members and plan sponsors

# RISK MANAGEMENT

## CULTIVATE A RISK-INTELLIGENT ORGANIZATION

**Objective:** Provide system and data security and a robust business continuity solution

**Objective:** Implement operational risk management program

**Objective:** Ensure a safe and secure workplace and public service facility

# TALENT MANAGEMENT

## RECRUIT, RETAIN AND INSPIRE A HIGH-PERFORMING WORKFORCE

**Objective:** Recruit and retain a high-performing workforce to meet organizational priorities

**Objective:** Develop and empower every member of the team

**Objective:** Cultivate a collaborative, inclusive and creative culture





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Orange County Employees Retirement System  
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# 2019 BUSINESS PLAN



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# 2019-2021 STRATEGIC GOALS

- Fund Sustainability
- Excellent Service and Support
- Risk Management
- Talent Management

# FUND SUSTAINABILITY

## **GOAL: STRENGTHEN THE LONG-TERM STABILITY OF THE PENSION FUND**

### ***Business Plan Initiatives***

Objective: Mitigate the Risk of Significant Investment Loss  
*Executive Lead – Molly Murphy*

1. Fund the Risk Mitigating asset class
2. Explore and evaluate investment/risk management systems

Objective: Develop procedures for new employers entering the system  
*Executive Leads – Gina Ratto*

1. Create an Administrative Procedure
2. Create a worksheet for staff's use in evaluating new plan sponsors
3. Create a new template for Participation Agreement with plan sponsors

Objective: Employ a Governance Structure that Supports a Dynamic Investment Program  
*Executive Lead – Molly Murphy*

1. Evaluate governance best practices (year two)

Objective: Prudent Use of Resources  
*Executive Leads – Molly Murphy;*

1. Investigate actionable items to reduce fees in the future

# EXCELLENT SERVICE AND SUPPORT

**GOAL: ACHIEVE EXCELLENCE IN THE SERVICE AND SUPPORT WE PROVIDE TO OUR MEMBERS AND PLAN SPONSORS**

## *Business Plan Initiatives*

Objective: Provide Accurate and Timely Benefits  
*Executive Leads – Suzanne Jenike; Gina Ratto*

1. Develop and communicate OCERS Administrative Procedures on Final Average Salary (year two)
2. Streamline the initial disability determination process by implementing; (year two)
  - a. LEAN action items
  - b. Application packets
3. Update and create desk manuals and procedures for staff (year two)
4. Improve customer service standards by enhancing V3 workflows, monitoring and reporting

Objective: Provide Education to our Members and Plan Sponsors  
*Executive Lead – Suzanne Jenike*

1. Web site redesign (year three)

2. Enhance participation in Plan Sponsors' New Employee Orientation
3. Create white board videos that will provide education to members and stakeholders about OCERS benefits

# RISK MANAGEMENT

## **GOAL: CULTIVATE A RISK-INTELLIGENT ORGANIZATION**

### ***Business Plan Initiatives***

Objective: Provide System and Data Security and a Robust Business Continuity Solution

*Executive Leads – Brenda Shott, Matt Eakin & Jenny Sadoski*

1. Select Cyber Security Framework and develop implementation plan for best practice controls
2. Continuously assess current Information Security environment and address identified risks:
  - a. Perform third party penetration test of OCERS network
  - b. Perform third party penetration test of new OCERS web site
  - c. Review and enhance information security training for new hires and all staff
  - d. Develop incident response and management program
  - e. Develop OCERS data map, data classification structure and data exchange flows and identify associated risks
  - f. Evaluate risks associated with external third party IT business partners

3. Implement tools to mitigate the risk of data or financial loss or information disclosure:
  - a. Implement enhanced Email Security protections and features
  - b. Implement Managed Security / Managed Detection & Response services
  - c. Implement continuous vulnerability assessment and remediation program
  - d. Implement automated hardware and software inventory tool
  - e. Implement security patch management solution
  
4. Continue development of the Business Continuity Plan:
  - a. Establish alternate work space / work site plan
  - b. Develop manual workaround and alternate procedure plans

Objective: Implement Operational Risk Management Program  
*Executive Lead – Brenda Shott*

1. Continue to implement the Operational Risk Management Program

Objective: Ensure a Safe and Secure Workplace and Public Service Facility  
*Executive Lead – Brenda Shott*

1. Plan and implement building security upgrades and space management projects (year two)

# TALENT MANAGEMENT

## **GOAL: RECRUIT, RETAIN AND INSPIRE A HIGH-PERFORMING WORKFORCE**

### ***Business Plan Initiatives***

Objective: Recruit and Retain a High-Performing Workforce to Meet Organizational Priorities

*Executive Lead – Cynthia Hockless*

1. Enhance onboarding and transitioning of new hires into the organization
  - a. Evaluation of newly implemented onboarding process
2. Implement recommendations from workforce analysis (year two)

Objective: Develop and empower every member of the team

*Executive Lead – Steve Delaney*

1. Implement a comprehensive training program covering OCERS policies, processes and procedures (year two)
2. Recognize individual needs and career goals within OCERS (year two)
3. Create succession plans across the agency (year two)

Objective: Cultivate a Collaborative, Inclusive and Creative Culture

*Executive Lead – Steve Delaney*

1. Foster OCERS culture of engagement and continuous improvement (year two)

ORANGE COUNTY EMPLOYEES RETIREMENT SYSTEM  
[www.ocers.org](http://www.ocers.org)



## OCERS 2019 Business Initiatives Budget Impact Estimates

<b>Strategic Plan Goal:</b>	<b>Strengthen the Long-Term Stability of the Pension Fund</b>		
<b>Objective:</b>	<b>Mitigate the Risk of Significant Investment Loss</b>	<b>Coordinator: Molly Murphy</b>	
		<b>Budget Impact: one time costs</b>	<b>Budget Impact: on-going costs</b>
Initiative #1:	Fund the Risk Mitigating asset class		
Initiative #2:	Explore and evaluate investment/risk management systems		
<b>Objective:</b>	<b>Develop procedures for new employers entering the system</b>	<b>Coordinator: Gina Ratto</b>	
		<b>Budget Impact: one time costs</b>	<b>Budget Impact: on-going costs</b>
Initiative #1:	Create Administrative Procedure		
Initiative #2:	Create a worksheet for staff's use in evaluating new plan sponsors		
Initiative #3:	Create new template for Participation Agreement with plan sponsors		
<b>Objective:</b>	<b>Employ a Governance Structure that Supports a Dynamic Investment Program</b>	<b>Coordinator: Molly Murphy</b>	
		<b>Budget Impact: one time costs</b>	<b>Budget Impact: on-going costs</b>
Initiative #1:	Evaluate governance best practices (year two)		
<b>Objective:</b>	<b>Prudent Use of Resources</b>	<b>Coordinator: Molly Murphy</b>	
		<b>Budget Impact: one time costs</b>	<b>Budget Impact: on-going costs</b>
Initiative #1:	Investigate actionable items to reduce fees in the future		
<b>Budget Impact</b>	<b>FUND SUSTAINABILITY 2019 BUSINESS INITIATIVES</b>	<b>\$ -</b>	<b>\$ -</b>



OCERS 2019 Business Initiatives Budget Impact Estimates

Strategic Plan Goal:		Achieve Excellence in the Service and Support We Provide To Our Members and Plan Sponsors	
<b>Objective:</b>	<b>Provide Accurate and Timely Benefits</b>	<b>Coordinators: Suzanne Jenike, Gina Ratto</b>	
		<b>Budget Impact: one time costs</b>	<b>Budget Impact: on-going costs</b>
Initiative #1:	Develop and communicate OCERS Administrative Procedures on Final Average Salary (year two)		
Initiative #2:	Streamline the initial disability determination process by implementing LEAN action items and application packets (year two)		
Initiative #3:	Update and create desk manuals and procedures (year two)		
Initiative #4:	Improve customer service standards by enhancing V3 workflows, monitoring and reporting	\$ 100,000	
<b>Objective:</b>	<b>Provide Education to our Members and Plan Sponsors</b>	<b>Coordinator: Suzanne Jenike</b>	
		<b>Budget Impact: one time costs</b>	<b>Budget Impact: on-going costs</b>
Initiative #1:	Web site redesign (year three)	\$ 100,000	
Initiative #2:	Enhance participation in Plan Sponsors' New Employee Orientation		
Initiative #3:	Create white board videos that will provide education to members and stakeholders about OCERS benefits	50,000	
<b>Budget Impact</b>	<b>EXCELLENT SERVICE AND SUPPORT 2019 BUSINESS INITIATIVES</b>	<b>\$ 250,000</b>	<b>\$ -</b>



OCERS 2019 Business Initiatives Budget Impact Estimates

Strategic Plan Goal:		Cultivate a Risk-Intelligent Organization	
<b>Objective:</b>	<b>Provide System and Data Security and a Robust Business Continuity Solution</b>	<b>Coordinator: Brenda Shott, Matt Eakin &amp; Jenny Sadoski</b>	
		<b>Budget Impact: one time costs</b>	<b>Budget Impact: on-going costs</b>
Initiative: #1:	Select Cyber Security Framework and develop implementation plan for best practice controls		
Initiative #2:	Continuously assess current Information Security environment and address identified risks		
	a. Perform 3rd party penetration test of OCERS networks	\$ 50,000	
	b. Perform 3rd party penetration test of new OCERS website	\$ 50,000	
	c. Review and enhance information security training for new hires and all staff		\$ 7,000
	d. Develop incident response and management program		
	e. Develop OCERS data map, data classification structure and data exchange flows and identify associated risks	\$ 25,000	
	f. Evaluate risks associated with external 3rd party IT business partners		\$ 35,000
Initiative #3:	Implement tools to mitigate the risk of data or financial loss or information disclosure		
	a. Implement enhanced Email security protections and features		\$ 35,000
	b. Implement Managed Security/Managed Detection and Response services		\$ 100,000
	c. Implement continuous vulnerability assessment and remediation program		\$ 50,000
	d. Implement automated hardware and software inventory tool		\$ 25,000
	e. Implement security patch management solution		\$ 50,000
Initiative #4	Continue development of the Business Continuity Plan		
	a. Establish alternate work space/work site plan		\$ 30,000
	b. Develop manual workaround and alternate procedure plans		
<b>Objective:</b>	<b>Implement Operational Risk Management Program</b>	<b>Coordinator: Brenda Shott</b>	
		<b>Budget Impact: one time costs</b>	<b>Budget Impact: on-going costs</b>
Initiative: #1:	Continue to implement the Operational Risk Management Program		
<b>Objective:</b>	<b>Ensure a Safe and Secure Workplace and Public Service Facility</b>	<b>Coordinator: Brenda Shott</b>	
		<b>Budget Impact: one time costs</b>	<b>Budget Impact: on-going costs</b>
Initiative: #1:	Plan and implement building security upgrades and space management projects (year two)	TBD	TBD
<b>Budget Impact</b>	<b>RISK MANAGEMENT 2019 BUSINESS INITIATIVES</b>	<b>\$ 125,000</b>	<b>\$ 332,000</b>



OCERS 2019 Business Initiatives Budget Impact Estimates

<b>Strategic Plan Goal:</b>	<b>Recruit, Retain and Inspire a High-Performing Workforce</b>		
<b>Objective:</b>	<b>Recruit and Retain a High-Performing Workforce to Meet Organizational Priorities</b>	<b>Coordinator: Cynthia Hockless</b>	
		<b>Budget Impact: one time costs</b>	<b>Budget Impact: on-going costs</b>
Initiative #1:	Enhance onboarding and transitioning of new hires into the organization		
Initiative #2:	Implement recommendations from workforce analysis (year two)		
<b>Objective:</b>	<b>Develop and Empower Every Member of the Team</b>	<b>Coordinator: Steve Delaney</b>	
		<b>Budget Impact: one time costs</b>	<b>Budget Impact: on-going costs</b>
Initiative #1:	Implement a comprehensive training program covering OCERS policies, processes and procedures (year two) (note: ongoing cost for Training Manager will be offset by unfunding an Accounting position)	\$ 25,000	\$ 130,000
Initiative #2:	Recognize individual needs and career goals within OCERS (year two)		
Initiative #3:	Create succession plans across the agency (year two)		
<b>Objective:</b>	<b>Cultivate a Collaborative, Inclusive and Creative Culture</b>	<b>Coordinator: Steve Delaney</b>	
		<b>Budget Impact: one time costs</b>	<b>Budget Impact: on-going costs</b>
Initiative #1:	Foster OCERS culture of engagement and continuous improvement (year two)		
<b>Budget Impact</b>	<b>TALENT MANAGEMENT 2018 BUSINESS INITIATIVES</b>	<b>\$ 25,000</b>	<b>\$ 130,000</b>