Portfolio Structure Review

San Diego City Employees' Retirement System

July 10, 2020

Aon

Investment advice and consulting services provided by Aon Investments USA Inc, an Aon Company.

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Discussion Guide

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Agenda Tracker

Introduction

- Portfolio structure refers to the implementation of the long-term strategic asset allocation and is critical to the success of the investment program
- Similar to the asset allocation, once thoughtfully set, portfolio structure is not intended to change materially or frequently
- Aon conducts a structure review on an annual basis to ensure SDCERS' strategic asset allocation is being implemented in an efficient and risk controlled manner and to identify any areas for improvement
- We believe the SDCERS' portfolio structure remains broadly appropriate and provide one minor recommendation to enhance the portfolio:
- Recommendation:
  - Expand the active core fixed income managers' investment guidelines to allow greater flexibility to take advantage of opportunities that have or will emerge as a result of recent market volatility and associated dislocations

Portfolio Structure: Core Beliefs

- Gain *exposure to the broad opportunity* set across each asset class
  - Eliminate *un-intended* structural biases
  - Recognize risks associated with structural biases and be comfortable with such risks

- *Pay little for beta*
  - Use active management for alpha; not diversification

- *Eliminate style-box approach* to portfolio construction
  - Style boxes are a rigid and artificial construct

- Focus manager selection efforts on *skill and not style*
  - Hire active managers that can add value regardless of their style and capitalization orientation
  - Allow managers with identifiable skill broad latitude to add value

- *Utilize active risk budgeting* as a risk control and allocation tool

- *Seek to keep fees low* – higher fees do not translate to higher value-added

Investment Policy Risk Management Summary

- The below table highlights the hierarchy of investment risks and the tools and procedures in place to address these risks

Risk Management Tool	Risks Addressed	Observations
1. Asset Liability Study • Stochastic and Deterministic scenario analysis • Efficient Frontier Analysis • Stress Tests • Liquidity Analysis/Stress Test	• Ability to pay promised benefits • Assets (return + contributions) do not grow with liabilities • Liquidity	• Expected to reach full funding within 20 years • 78/22 appropriate risk posture given time horizon and return needs • Ability to invest in illiquid assets with no concerns regarding paying benefits
2. Asset Allocation Study • Mean Variance analysis • Historical scenario analysis • Forward looking (stochastic) scenario analysis • Deterministic Scenario Analysis • Factor Analysis	• Return shortfall • Diversification / Concentration Risk • Left tail risk	• Long-term return expected to exceed actuarial assumed return • Well-diversified portfolio with balanced risk exposures • Recognize explicit ‘protection’ role of risk-reducing allocation • Appropriate inflation hedge • Flexibility in implementation
3. Structure Review • Market coverage • Equity exposure • Active / Passive • Active Risk Contribution • Interest Rate Exposure • Credit Exposure • Active Manager Review	• Unintended biases • Concentration Risk (active risk, geographic, style, size, etc.) • Active management • Cost structure	• Broad, well-diversified exposure across markets • Deliberate active risk taking • Efficient use of low cost options • Appropriate monitoring and reporting policies • Focus on high conviction active managers

SDCERS: Portfolio Structure Review Conclusions

- SDCERS' portfolio structure has been well-crafted with a deliberate allocation of active risk
- Meaningful allocation to alternatives – where probability of enhanced alpha is greater
- Increased efficiency within public markets
  - Gained global market exposure across public equities
  - Increased low cost passive management in highly efficient markets
  - Focused active management in areas with greatest probability of success
  - Thorough due diligence and selection of high conviction active managers
- Constant exploration and consideration for attractive and new or opportunistic investments for potential fit within the Opportunity Fund
- Current portfolio structure appropriate given SDCERS' goals
  - Formally evaluated on an annual basis to ensure alignment with objectives
  - Managers monitored on an ongoing basis
- Recommendation:
  - Expand the active core fixed income managers' investment guidelines to allow greater flexibility to take advantage of opportunities that have or will emerge as a result of recent market volatility and associated dislocations

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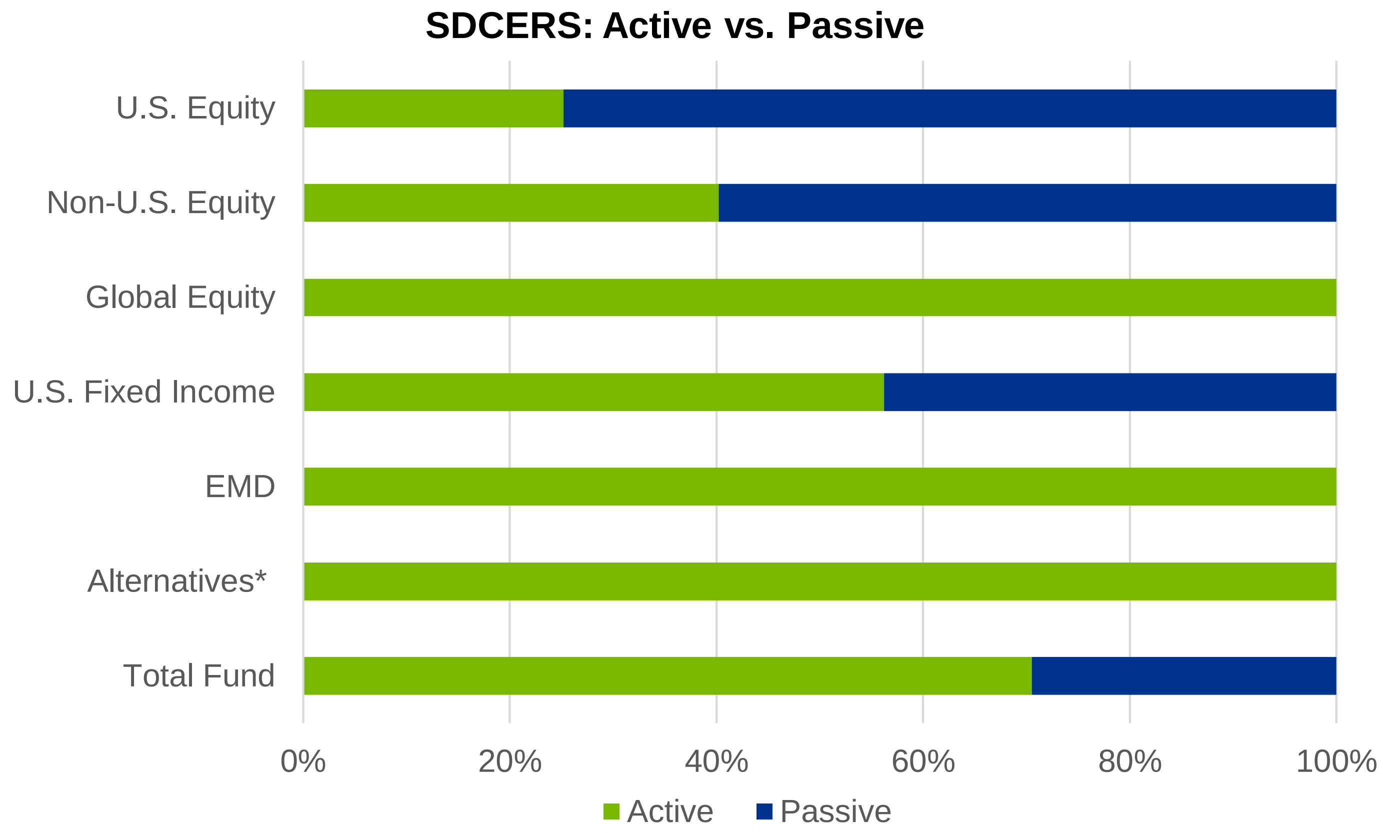
Active vs. Passive

- The appropriate active / passive mix is dependent on a number of factors, including:
  - Skill and patience in manager selection
  - Sensitivity to fees
  - Availability of passive options
  - Resources to identify and monitor active managers
  - Conviction in active management
  - Desire/need for alpha
  - Tolerance for periods of underperformance
- Theory says that the average investor must earn market (beta) returns net of costs, as half the asset returns are above and half are below those of the market
- According to Sharpe*:
  - Index funds and active managers, together, *are* the market
  - Together, they earn the return *of* the market, minus fee and costs
  - Index funds in aggregate underperform by a small fee and low costs
  - Active managers *in aggregate* underperform by a bigger fee and higher costs
  - Active management, on average, can't beat the market in the long run

*In a widely quoted 1991 article by Nobel Laureate William Sharpe, he uses simple mathematics to prove that market returns will be a cap-weighted average of the securities in the market, and that active manager performance *in aggregate* must be poorer than the performance of passively managed funds by an amount equal to aggregate research and trading costs

SDCERS: Active vs. Passive

- Currently, approx. 30% of the Total Fund and 46% of public markets are passively managed
- Active management has been focused in areas where the probability for value-add is greatest



* Includes private equity, real estate, infrastructure and the opportunity fund

SDCERS: Active vs. Passive Key Takeaways

- **Risk Controlled**: Deliberate and diversified active risk
- **Efficient**: Purposeful and managed deployment of investment management fees
- **Successful**: Value-add across asset classes, particularly within alternatives

Since Inception Ending 3/31/20	SDCERS' Return	Excess Return	Active Risk*	Information Ratio	Active / Passive Mix (%)	Fees**	Inception Date
U.S. Equity	9.7%	0.1%	1.4%	0.06	31 / 69	0.16%	1/1989
Non-U.S. Equity	6.2	1.6	1.2	0.21	40 / 60	0.33	4/1995
Global Equity	6.8	-0.5	1.7	-0.23	100 / 0	0.59	6/2012
U.S. Fixed Income	6.4	1.0	0.4	0.31	56 / 44	0.13	4/1989
EMD	1.1	-0.1	1.4	-0.05	100 / 0	0.61	7/2011
Real Estate***	9.0	0.8	n/a	n/a	100 / 0	*Flat: 0.3% - 1.5% Perf. Based: 0% and 30% to 2% and 20%*	*1/1989*
Private Equity***	14.1	2.6	n/a	n/a	100 / 0		10/2011
Infrastructure***	7.7	-1.2	n/a	n/a	100 / 0		1/2015
Opportunity Fund	5.8	3.0	n/a	n/a	100 / 0		6/2014

*Forward-looking annual active risk projection
Based on 3/31/20 market values and represent management fees only. Private market fees reflect typical industry fee ranges and **not fees specific to SDCERS' portfolio
***Reflects Performance as of 12/31/19. Prior to 3Q 2014, only the returns for the private portion of the real estate portfolio and its benchmark are reported on a quarter lagged basis.

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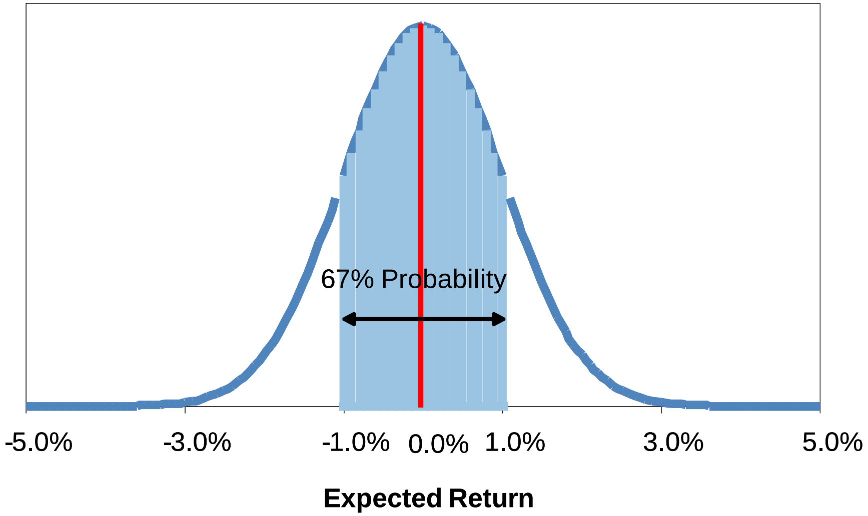
Active Risk Budgeting

- Active risk defines the range of expected returns relative to the return of its policy benchmark
  - Measured as the standard deviation of excess returns of a fund relative to the return of the policy benchmark (also referred to as tracking error)
  - A central focus of risk budgeting is understanding and measuring size of risk contribution / allocation, instead of dollar allocation
- SDCERS's Investment Policy Statement (IPS) specifies an active risk/tracking error budget of 1.75% relative to the Fund's Policy Benchmark

An Illustration: Total Fund Active Risk = 1.0%



What does an active risk of 1.0% mean?

- In two out of every three years, the Fund's return can be expected to lie within +/- 1.0 percentage points (one standard deviation) of its benchmark return
- In nine out of every ten years, the Fund's return can be expected to lie within +/-2.0 percentage points (two standard deviations) of its benchmark

SDCERS (Public Markets): Asset Class Active Risk Decomposition

Asset Class	Actual Allocation (%)	Policy Allocation (%)	Active Risk (%)	Contribution to Active Risk (%)
U.S. Equity*	28.3%	28.3%	1.4%	47.7%
Non-U.S. Equity	22.9	22.9	1.2	27.5
Global Equity	10.8	10.8	1.7	15.6
Fixed Income	31.2	31.2	0.4	2.3
Emerging Market Debt	6.8	6.8	1.4	6.9
Total Fund (Public Markets) Expected Active Risk →			**0.5%**	**100.0%**

- The public markets portfolio as currently constructed is expected to incur active risk of approximately 0.5% annually
- Relative to peers**, SDCERS has a similar active risk level for its public market assets and maintains greater exposure to alternative investments
- Actual realized active risk of SDCERS' Total Fund over the past 5-years has been 1.50%

Active Risk analysis based on policy allocations and trailing 5-years of historical monthly returns. Due to market volatility in Q1, asset allocation impact was eliminated from the analysis to focus on managers' active risk contribution.
*Allianz Structured Alpha assets were allocated to the BlackRock S&P 500 Index fund for this exercise.
**Peer group comprised of other Aon public fund clients and includes traditional public market asset classes.

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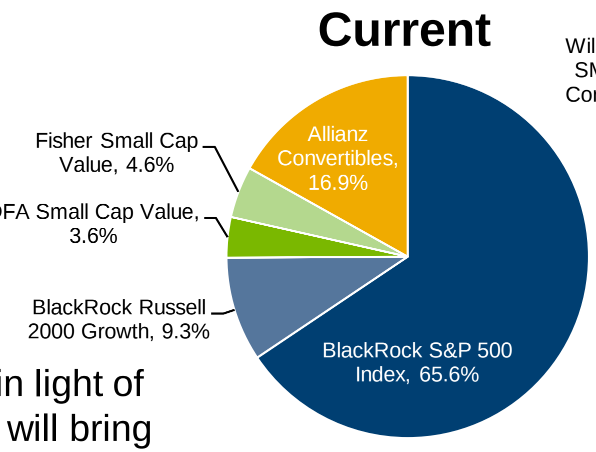
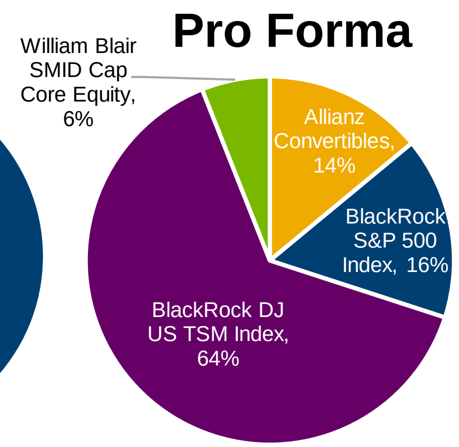
SDCERS: U.S. Equity Portfolio Snapshot

- **Role:** Growth
- **Long-Term Target**: 18%
- **Observations:**
  - Style neutral
  - Small cap bias (reduced in 2014 & will eliminate in 2020)
- **Recommendation**
  - In process of reviewing structure in light of Allianz termination; Aon and Staff will bring forth a recommendation later this year





Portfolio Snapshot (As of 3/31/2020)	
Asset class benchmark	DJ U.S. Total Stock Market Index
Current Interim Target and Allocation	18.6% / $1.2B
Structural biases	▪ Small cap bias - accounts for approx. 2/3 of the U.S. equity's projected tracking error
Active/Passive mix	Approx. 25/75
Number of active managers	3
Annual investment management fees	16 bps (approx. $1.9 million)*
Projected tracking error (active risk)	1.4% (approx. 1/3 of which explained by small cap bias)

* Based on investment management fee schedules and asset values as of 3/31/2020. Assumes Allianz Structured Alpha Assets were allocated to the BlackRock S&P 500 Index fund.

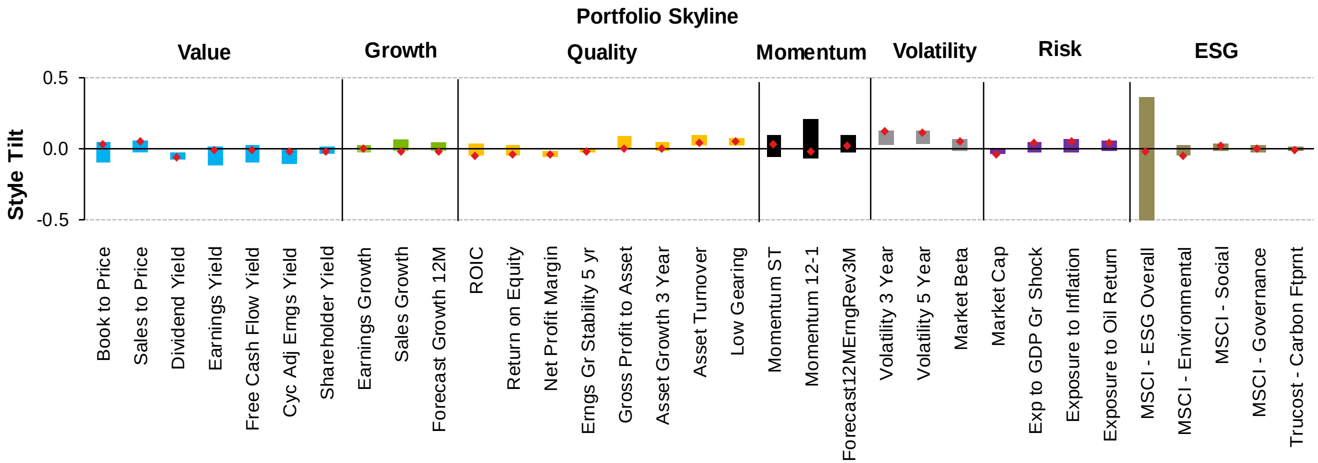
U.S. Equity: Active Risk Decomposition

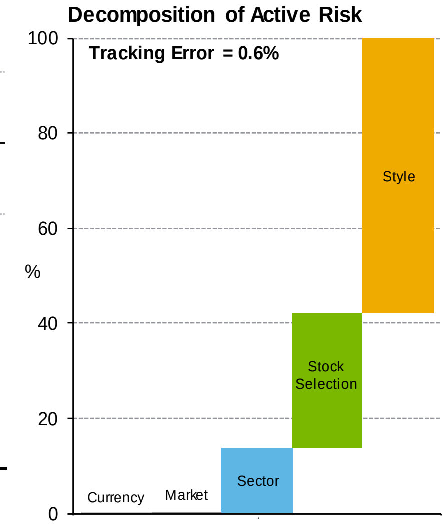
Manager*	Allocation (%)	Active Risk (%)	Contribution to Active Risk (%)
BR S&P 500 Index Fund	65.6%	-	-19.0%
BR Russell 2000 Growth Index Fund	9.3	-	21.0
DFA Small Cap Value	3.6	2.9%	3.0
Fisher Small Cap Value	4.6	6.3	5.7
Allianz Convertibles	16.9	3.9	89.2
Misfit Relative to Asset Class Benchmark (small cap bias) →			*64.4%*
Total U.S. Equity Active Risk →		**1.4%**	**100.0%**

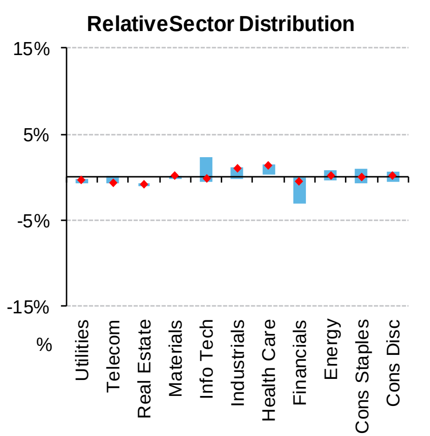
- Aon expects the U.S. equity portfolio as currently constructed to incur active risk of approximately 1.4%
- The small cap bias explains roughly 2/3 of the active risk within U.S. equity portfolio
  - Board approved elimination of small cap bias in 2019; implementation to remove bias is under way
- The convertibles allocation accounts for 1/3 of the misfit risk

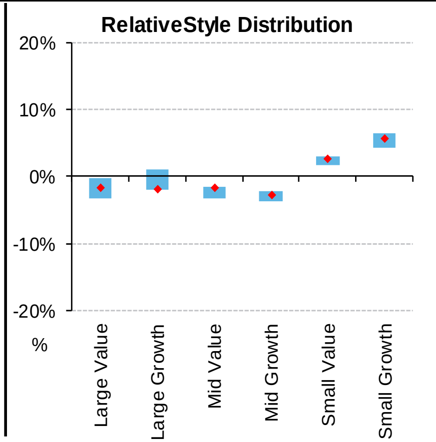
Active Risk analysis based on 3/31/2020 market values
*Allianz Structured Alpha assets were allocated to the BlackRock S&P 500 Index fund for this exercise.

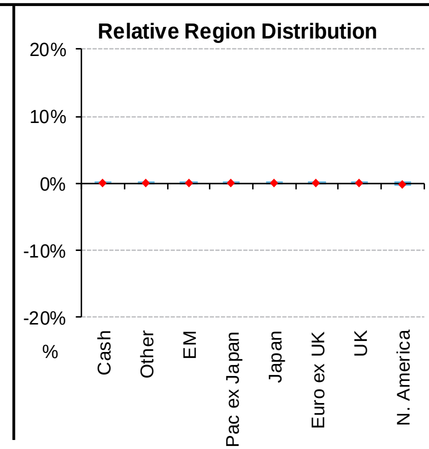
U.S. Equity Portfolio: Holdings Based Analysis









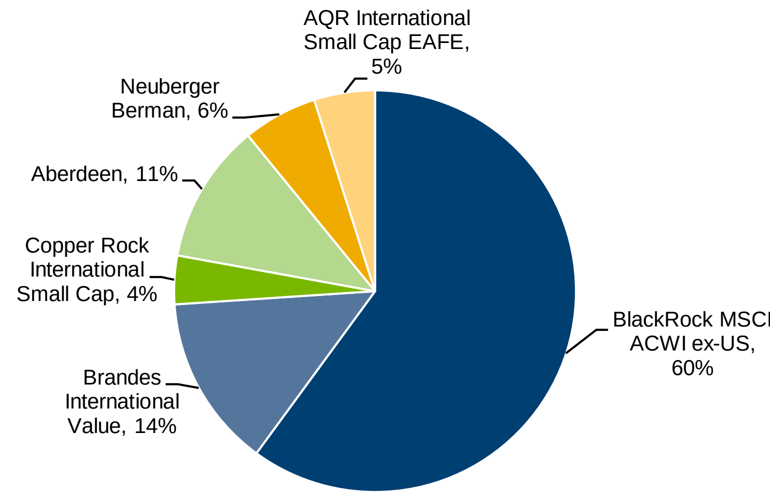


Tracking Error	0.6
Active Share	13.8
Number of Stocks	2295.0

Source: Aon Hewitt, Style Research. Portfolio Skyline & Distribution Data is from 31 March 2011 to 31 December 2019. Tracking Error Data is as at 31 December 2019. Benchmark: Dow Jones US Total Stock Market Index

SDCERS Non-U.S. Equity Portfolio Snapshot

- **Role:** Growth, Diversification
- **Long-Term Target**: 15%
- **Observations:**
  - Slight overweight to emerging markets
- **Recommendation**
  - Maintain current structure



Portfolio Snapshot (As of 3/31/2020)	
Asset class benchmark	MSCI ACW ex-U.S. IMI Index
Current interim policy and dollar allocation	15.6%, $1.0 billion
Active/Passive mix	Approx. 40/60
Number of active managers	5
Annual investment management fees	33 bps (approx. $3.4 million)*
Projected tracking error (active risk)	1.2%

* Based on investment manager fee schedules and asset values as of 3/31/2020

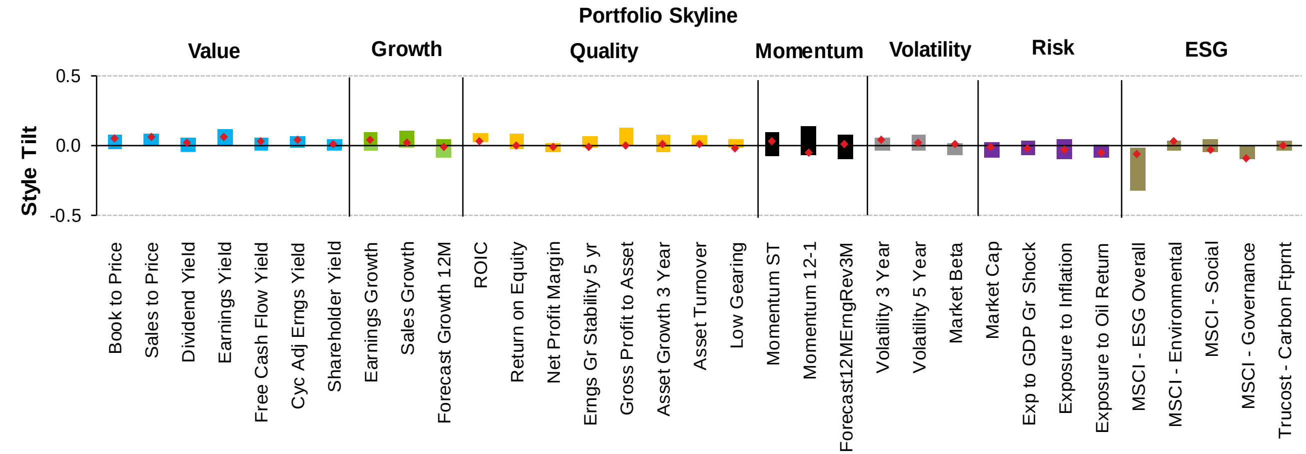
Non-U.S. Equity: Active Risk Decomposition

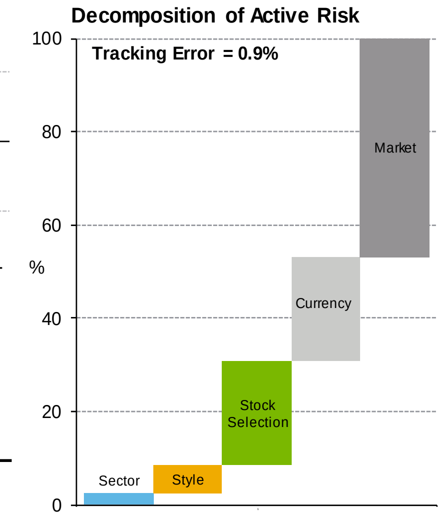
Manager	SDCERS Allocation (%)	Active Risk (%)	Contribution to Active Risk (%)
MSCI ACWI ex-U.S. IMI Index Fund	60.1%	-	-
Brandes International Value	13.9	4.5%	9.6
Copper Rock International Small Cap	3.9	5.8	8.4
Aberdeen Emerging Markets	11.3	5.0	45.4
Neuberger Berman Emerging Markets	6.0	8.2	29.3
AQR Int'l Small Cap	4.9	6.7	7.8
Misfit Relative to Asset Class Benchmark →			*23.0%*
Total Non-U.S. Equity Active Risk →		**1.2%**	**100.0%**

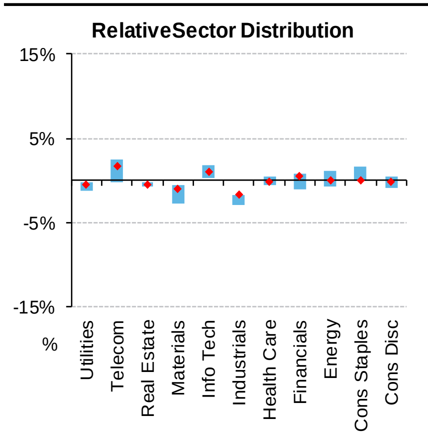
- Aon expects the Non-U.S. equity portfolio as currently constructed to incur active risk of approximately 1.2%

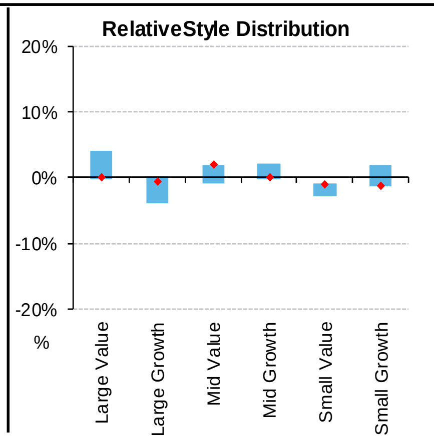
Active Risk analysis based on 3/31/2020 market values

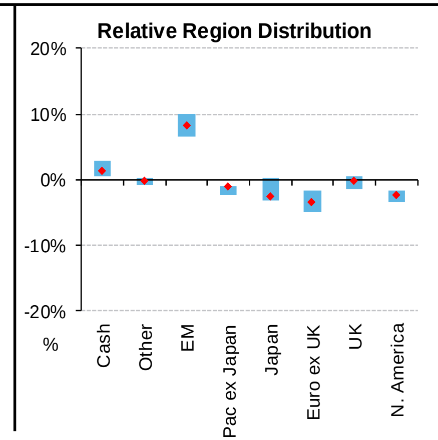
Non-US Equity: Holdings Based Analysis











Tracking Error	0.9
Active Share	35.3
Number of Stocks	3025.0

Source: Aon Hewitt, Style Research. Portfolio Skyline & Distribution Data is from 31 March 2011 to 31 December 2019. Tracking Error Data is as at 31 December 2019. Benchmark: MSCI ACW ex USA IMI

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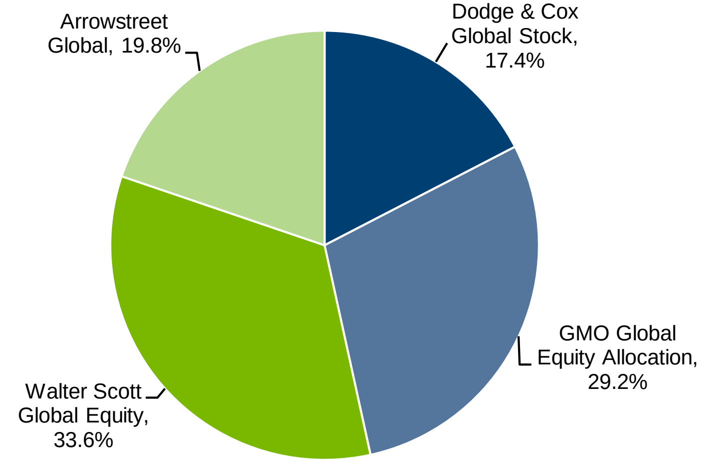
SDCERS Global Equity Portfolio Snapshot

- **Role:** Growth, Diversification, Alpha
- **Long-Term Target**: 8%
- **Observations:**
  - Current underweight to U.S. market
  - Style/size tilts may not persist given flexibility of active mandates to invest across styles
- **Recommendation:**
  - Maintain current structure



Portfolio Snapshot (As of 3/31/2020)	
Asset class benchmark	MSCI All Country World Index
Current policy and dollar allocation	8.0%, $568 million
Active/Passive mix	100% Active
Number of active managers	4
Annual investment management fees	59 bps (approx. $3.3 million)*
Projected tracking error (active risk)	1.7%

*Based on investment manager fee schedules and asset values as of 3/31/2020

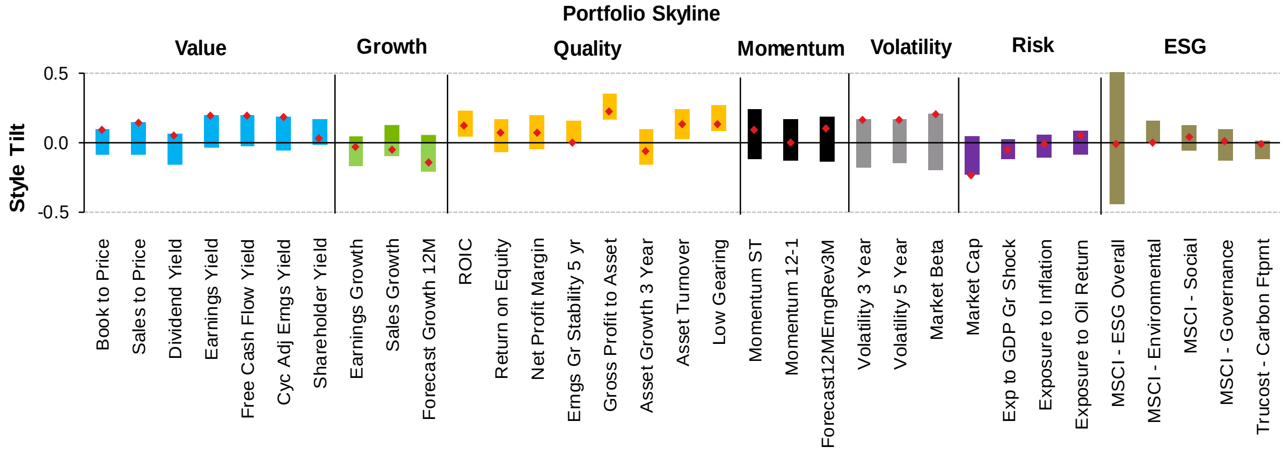
Global Equity: Active Risk Decomposition

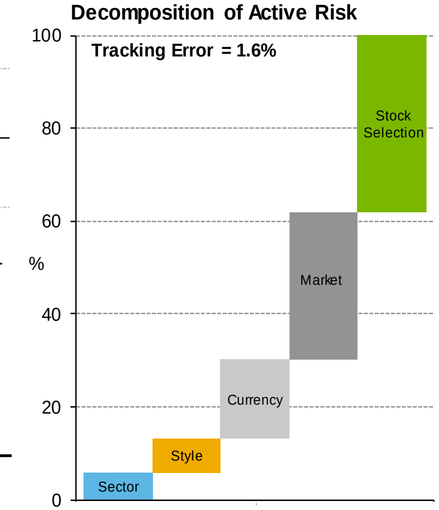
Manager	SDCERS Allocation (%)	Active Risk (%)	Contribution to Active Risk (%)
GMO Global Equity Allocation	29.2%	3.9%	36.8%
Walter Scott Global Equity	33.6	3.3	20.1
Dodge & Cox Global	17.4	7.3	37.6
Arrowstreet Global	19.8	2.6	5.5
Misfit Relative to Asset Class Benchmark →			*0.0%*
Total Global Equity Active Risk →		**1.7%**	**100.0%**

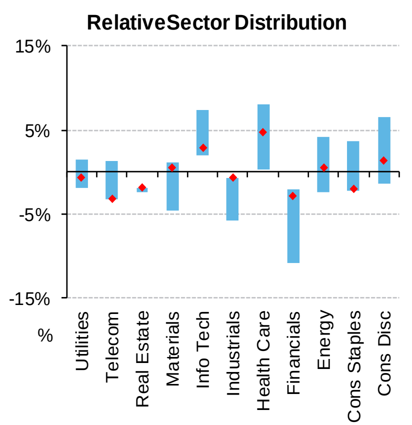
- Aon expects the global equity portfolio as currently constructed to incur active risk of approximately 1.7%
- Dodge & Cox Global was incepted in September 2018 and Arrowstreet Global was incepted in November 2018 as part of the asset allocation transition to a globally oriented equity portfolio
  - Composite returns will be used in the above analysis until there is sufficient SDCERS-specific data
- The contribution to active risk of the four active managers is similar

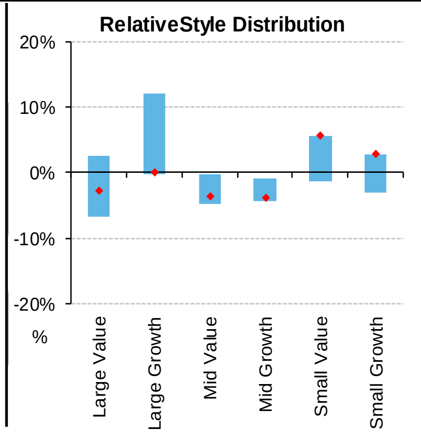
Active Risk analysis based on 3/31/2020 market values

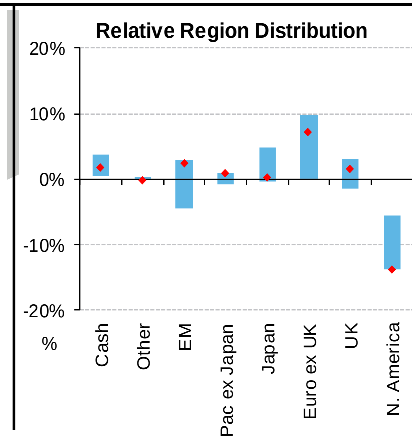
Total Global Equity: Holdings Based Analysis











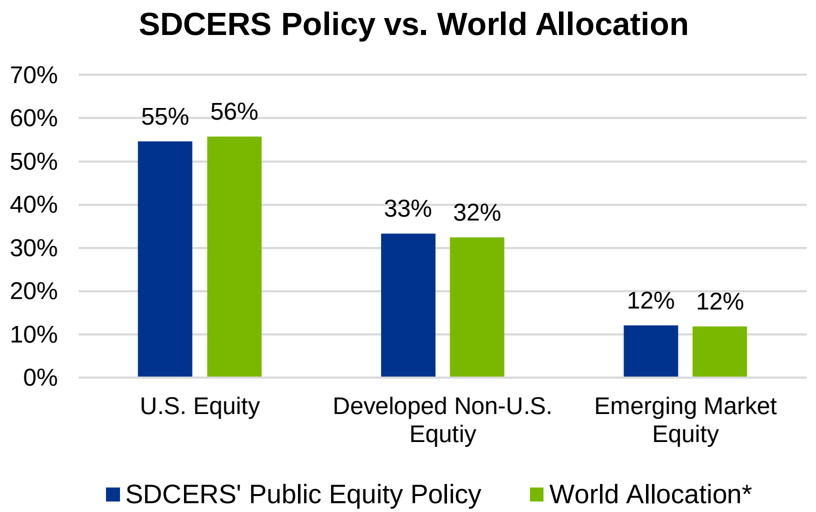
Tracking Error	1.6
Active Share	68.2
Number of Stocks	1746.0

Source: Aon Hewitt, Style Research. Portfolio Skyline & Distribution Data is from 31 March 2011 to 31 December 2019. Tracking Error Data is as at 31 December 2019. Benchmark: MSCI ACWI

SDCERS' Total Public Equity Portfolio

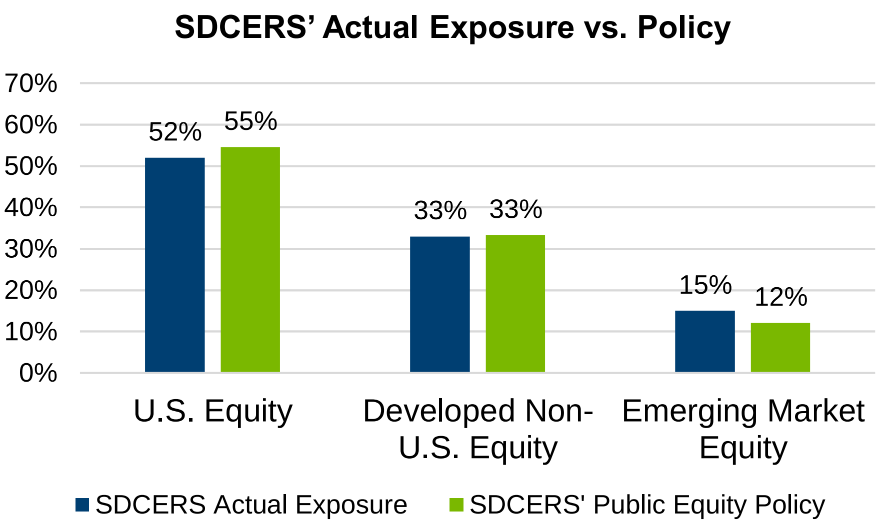
- SDCERS transitioned its total public equity *policy* portfolio to be in line with the global opportunity set
  - Comprised of U.S., non-U.S., and global equity asset classes
- Active management has the ability to take regional or country bets based on each strategy's philosophy and outlook

SDCERS' Policy is in line with the global opportunity set:

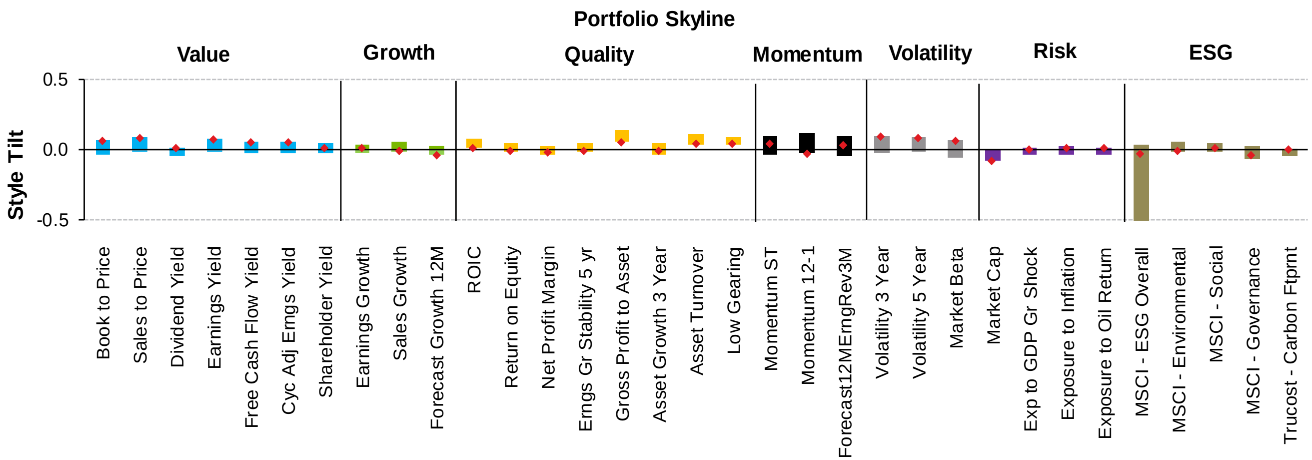


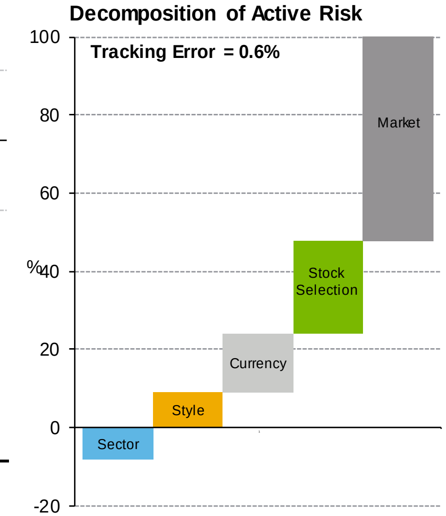
*Source: MSCI Inc.- MSCI ACWI IMI as of March 31, 2020

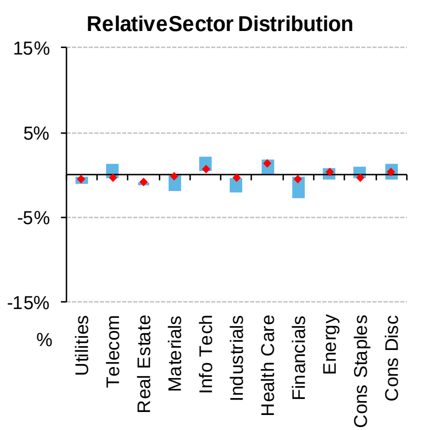
SDCERS' active managers (combined) exhibit a modest emerging market bias:

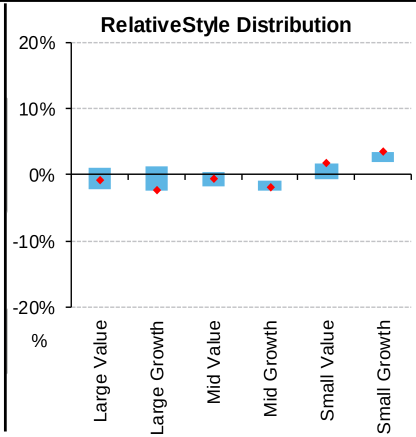


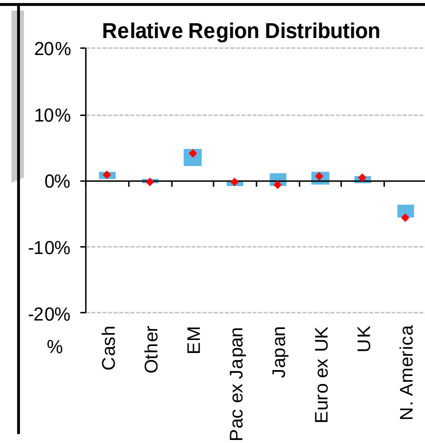
Total Public Equity: Holdings Based Analysis











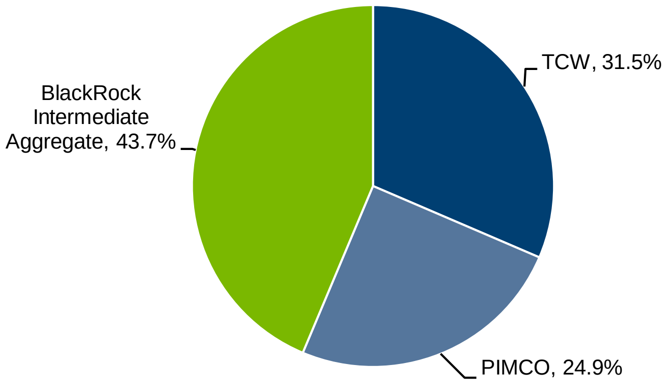
Tracking Error	0.6
Active Share	29.7
Number of Stocks	5986.0

Source: Aon Hewitt, Style Research. Portfolio Skyline & Distribution Data is from 31 March 2011 to 31 December 2019.

Tracking Error Data is as at 31 December 2019. Benchmark: 44% - DJ US TSMI,37% - MSCI ACW ex USA IMI, 19% MSCI ACWI

SDCERS U.S. Fixed Income Portfolio Snapshot

- **Role:** Downside Protection, Diversification
- **Long-Term Target**: 22%
- **Observations:**
  – Neutral credit quality and duration relative to benchmark
  – Modest out-of-benchmark exposures
- **Recommendation**
  – Expand investment guidelines to allow active managers greater flexibility
  – Increase active management exposure

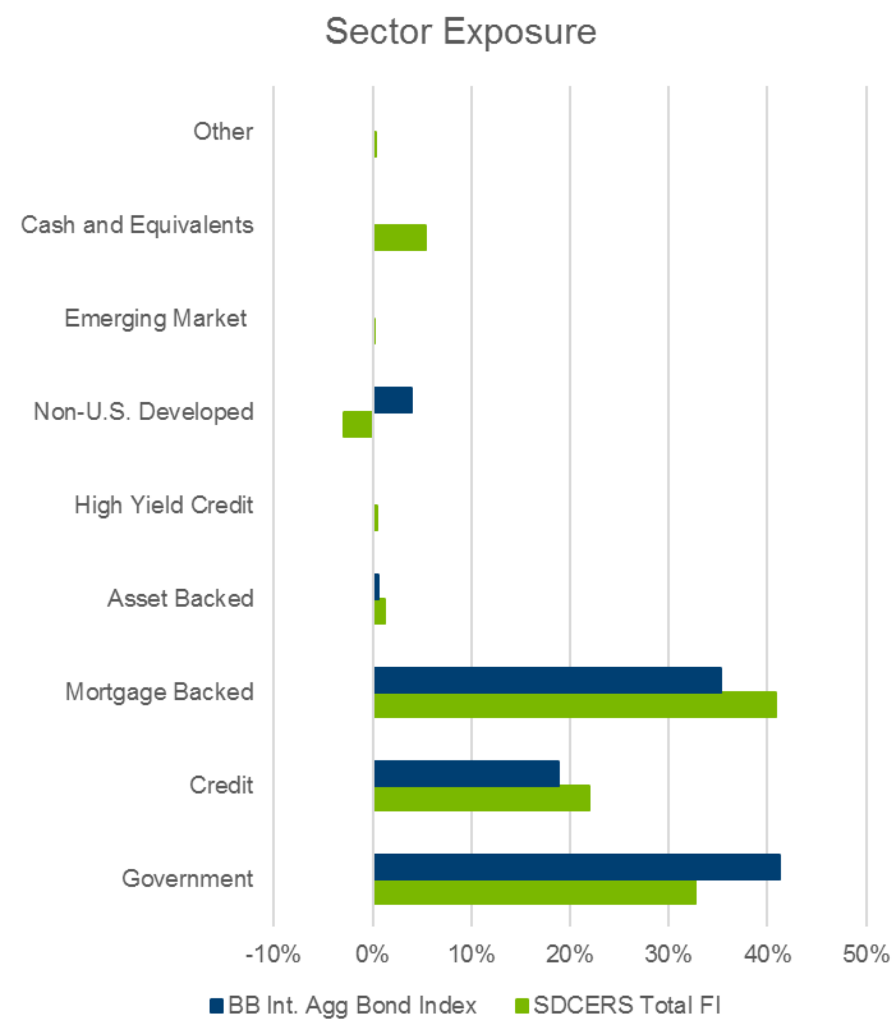


Portfolio Snapshot (As of 3/31/2020)	
Asset class benchmark	Barclays Intermediate Aggregate Bond Index
Current policy and dollar allocation	22.3%, $1.7 billion
Structural biases	▪ Focus on core, high quality orientation to diversify equity risk
Active/Passive mix	Approx. 56/44
Number of active managers	2
Annual investment management fees	13 bps (approx. $2.2 million)*
Projected tracking error (active risk)	0.4%

* Based on investment manager fee schedules and asset values as of 3/31/2020

U.S. Fixed Income: Positioning Relative to Benchmark

Credit Quality	SDCERS Total Fixed Income	BB Intermediate Aggregate Bond Index
Aaa/AAA	72.0%	79.3%
Aa/AA	5.3	2.3
A/A	7.8	8.9
Baa/BBB	12.3	9.5
Total Investment Grade	***97.4%***	***100.0%***
Ba/BB	2.6	0.0
Total Non-Investment Grade	***2.6%***	***0.0%***
Total	**100.0%**	**100.0%**
Effective Duration	**3.2 Years**	**3.1 Years**
Current Yield	**2.83%**	**2.75%**



Based on 3/31/2020 market values

U.S. Fixed Income: Active Risk Decomposition
Current Portfolio

Manager	SDCERS Allocation (%)	Active Risk (%)	Contribution to Active Risk (%)
Barclays Intermediate Aggregate Index Fund	43.7%	-	1.6%
TCW	31.5	0.4%	23.6
PIMCO	24.9	1.1	74.8
Misfit Relative to Asset Class Benchmark →			*0.0%*
Total Fixed Income Active Risk →		**0.4%**	**100.0%**

- Aon expects the U.S. fixed income portfolio as currently constructed to incur active risk of approximately 0.4%

Active Risk analysis based on 3/31/2020 market values

Role of SDCERS' Fixed Income Portfolio and Recommendation

- Desirable characteristics of a risk-reducing asset class:
  - Low correlation/diversifier to equities
  - Low volatility, though higher volatility may be warranted **IF** correlations with return-seeking assets are negative
  - Downside protection
- Recent market environment has created dislocations within fixed income that may persist for the foreseeable future
  - Opportunity for SDCERS to take advantage of these dislocations while not meaningfully increasing overall risk and while maintaining desired characteristics noted above
- Recommend modifying the fixed income portfolio for the foreseeable future to allow managers the ability to take advantage of this opportunity
  - Slightly modify TCW and PIMCO's manager guidelines to allow greater flexibility to invest in out-of-benchmark sectors in light of current and expected market environment
  - Recommend increasing active management to 70% and equally-weighting TCW and PIMCO
- Expect changes to generate a slightly higher active risk and expected return than current portfolio
- Aon and SDCERS will revisit these changes annually to evaluate maintaining or reverting back to previous guidelines

U.S. Fixed Income: Recommendation and Impact on Total Fixed Income

Total Fixed Income Portfolio	Current	Recommended
Barclays Intermediate Aggregate Index Fund	43.7%	30.0%
TCW	31.5	35.0%
PIMCO	24.9	35.0%

Impact on Key Characteristics	Current	Recommended
% Active Allocation	60.0%	70.0%
Active Risk	0.35%	0.47%
Max Allowable High Yield	3.5%	7.0%
Max Allowable EMD	1.0%	5.6%
Max Allowable Non-Agency MBS	2.5%	7.0%
Max Below Investment Grade	3.5%	7.0%
Fees	13bps	16bps

U.S. Fixed Income: Overview of Recommended Guidelines Changes

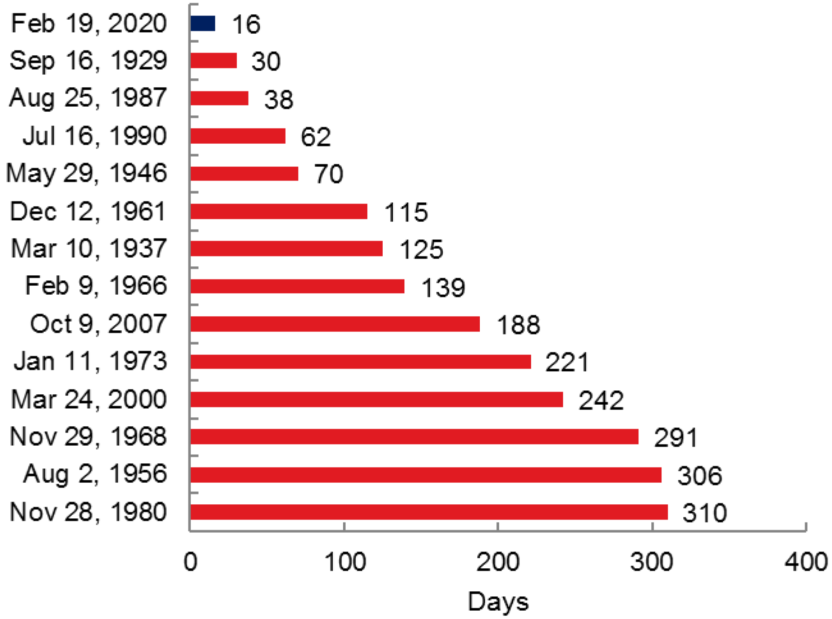
	Current PIMCO	Current TCW	Typical Core Plus	Recommended	Rationale
Min. Portfolio Avg. Credit Quality	A+	AA-	A	A+	An A+ rating represents a high quality asset, well above junk status.
Non-Agency MBS	Max: 10% IG only	Not Allowed	No Limit	Max: 10% Remove IG Limit	A 10% max allocation is reasonable. Removing the investment grade requirement will allow additional flexibility for the managers to invest in underrated assets which resulted from broad downgrades during the GFC.
Emerging Markets Debt	Max: 4%	Not Allowed	Max: 15%	Max: 8%	Setting a slightly higher max allocation will allow the managers to tactically invest in EMD and HY to add value. These are not intended to be strategic targets.
High Yield	Max: 4%	Max: 8%	Max: 20%	Max: 10%	
Below Investment Grade (Total FI)	Max: 4%	Max: 8%	Max: 20%+	Max: 10%	Increase below investment grade max to align with high yield max.
Alpha Expectations	75-100 bps	75 bps	100-200 bps	100-125 bps	Implementing the above changes to the guidelines will increase the alpha potential for these managers.
Tracking Error Targets	75-100 bps	187.5 bps	200 bps	125-150 bps	The managers will need to increase their tracking error targets as a result of the above guideline changes.

“The Baby Was Thrown Out With the Bath Water”

Many markets suffered dislocations as COVID-19 moved through economies and created ripple effects across markets

Fastest equity bear market ever

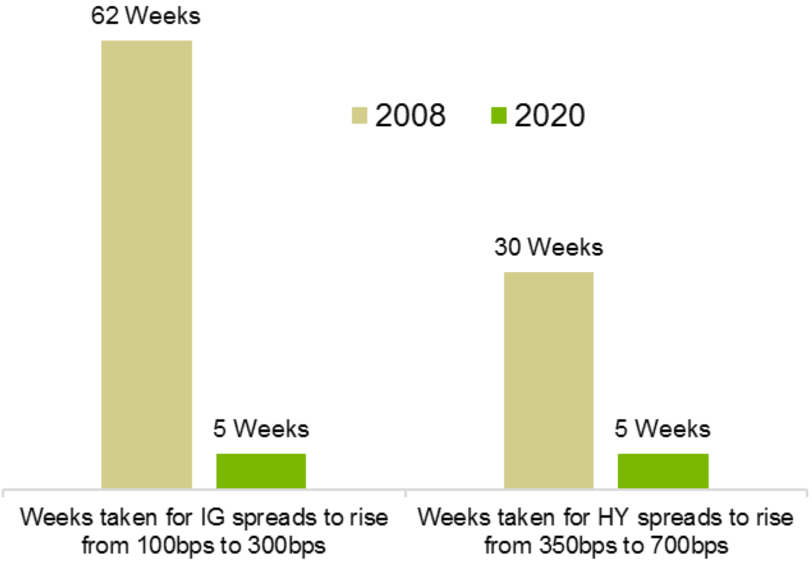
Days for S&P500 to fall 20%



Source: Aon, Bloomberg

Credit markets hit a wall too

Weeks for credit market to move from expensive to cheap



Source: Aon, Bloomberg

A Market of "Haves" and "Have-Less"…

Some markets have been propped up by the fiscal and monetary measures deployed, others not so much

US Monetary and Fiscal Support

- Money Market Mutual Fund Liquidity
- IG Bond Buying
- QE Infinity
- Paycheck Protection Program $4.8bn
- Primary Dealer Credit Facility
- -1.5% Fed Cut
- Fallen Angels Support
- TALF 2.0
- Commercial Paper Funding Facility
- CARES ACT $2.3tn

Who Benefits Most and Less?

"Haves"

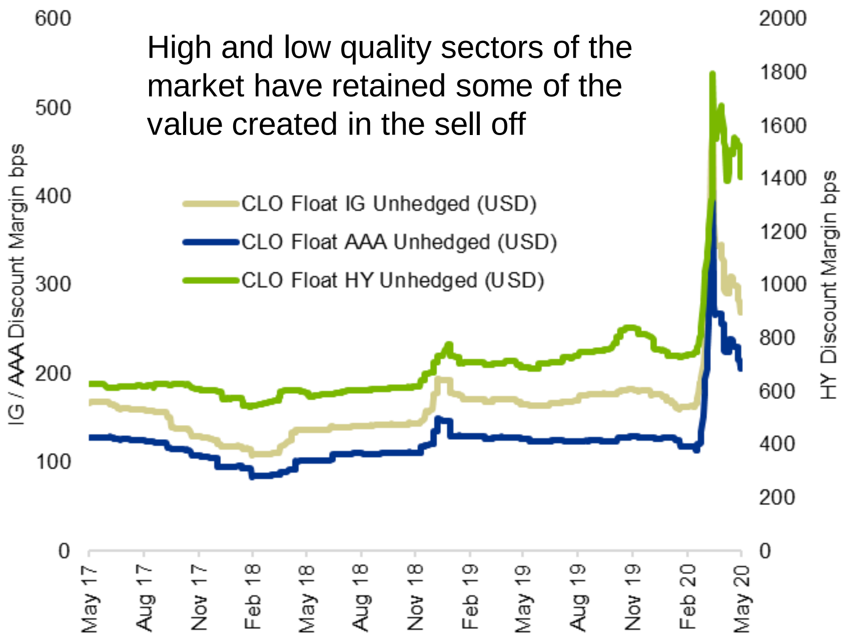
- US Treasuries
- Equities
- Investment Grade Bonds
- Fallen Angels
- High Yield
- Securitized Assets
- Commercial Real Estate
- Private Credit

"Have-Less"

Opportunities in Credit Markets

The valuation disconnect of credit has stuck more than equities creating opportunities e.g. CLOs	Stress in credit markets creates opportunities, and this is something that will occur through time

Collateralized Loan Obligation Spreads
3Y Discount Margin



Source: Aon, J.P. Morgan

Net Fallen Angels Downgrades
Last 12 Month Percent of HY Index

Source: Aon, BoA Merrill Lynch

Core vs. Core Plus Fixed Income

We recommend establishing investment guidelines that fall somewhere in-between a typical core and core plus strategy as shown below:

Core Strategies

- Lower returns and tracking error targets than core plus strategies
- Managers shoot for 50-100 bps outperformance versus the benchmark
- Manager tend to not go over 5-10% in risky non-benchmark securities

Both

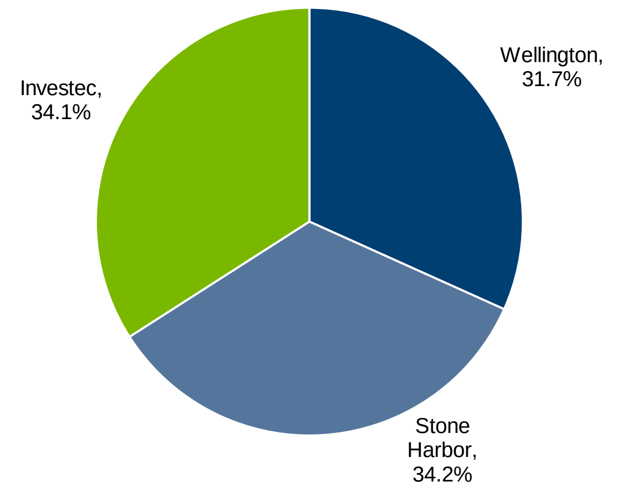
- Both strategies can invest in similar non-benchmark securities which could include:
  - High yield
  - Emerging Markets Debt
  - Convertibles
  - Other securitized/structured credit among possible other investments
- Both strategies tend to invest in the same securities but in different ranges

Core Plus Strategies

- Higher return and tracking error targets than core strategies
- Managers shoot for 100-150 bps outperformance versus the benchmark
- Manager often have higher allocations in risky-non benchmark securities
- Severe risk off markets on core plus
  - In a bad year for risk, 5-10% drawdowns could be expected

SDCERS Emerging Market Debt Portfolio Snapshot

- **Role:** Yield, Diversification
- **Long-Term Target**: 5%
- **Observations:**
  - Neutral in terms of country weightings, credit quality and duration
- **Recommendation**
  - Maintain existing structure
  - Ongoing evaluation of expanding allocation to multi-asset credit



Portfolio Snapshot (As of 3/31/2020)	
Asset class benchmark	40% JP Morgan EMBI Global Diversified and 60% JP Morgan GBI-EM Global Diversified
Current interim policy target and dollar allocation	5.0%, $376 million
Active/Passive mix	100% Active
Number of active managers	3
Annual investment management fees	61 bps (approx. $2.3 million)*
Projected tracking error (active risk)	1.4%

* Based on investment manager fee schedules and asset values as of 3/31/2020

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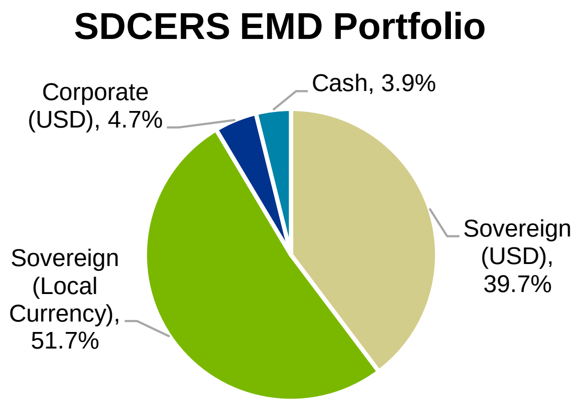
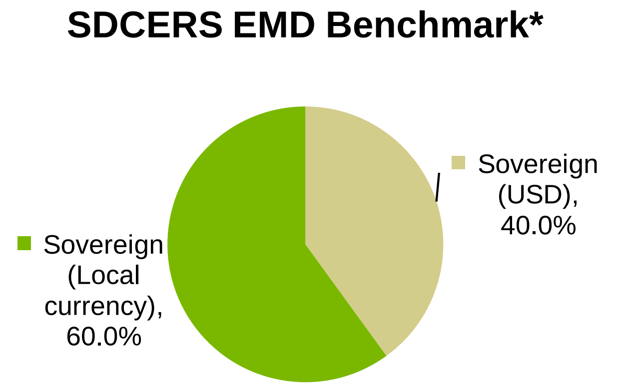
SDCERS Emerging Markets Portfolio Relative to Benchmark





	SDCERS' EMD	Custom Benchmark*
Modified Duration	6.2 years	6.1 years
Yield to Maturity	5.8%	6.0%
Credit Quality	Wellington: Baa2 Stone Harbor: BBB- Investec: BBB+	JPM EMBI: Baa3 JPM GBI-EM: BBB

- Portfolio is mostly in line with the custom benchmark, with an underweight to local currency EMD as of 3/31/2020
- Approximate 5% out-of-benchmark exposure to corporate emerging market debt

Based on 3/31/2020 market values
*40% JPM EMBI Global Diversified and 60% JPM GBI-EM Global Diversified

Emerging Market Debt: Active Risk Decomposition

Manager	Allocation (%)	Active Risk (%)	Contribution to Active Risk (%)
Wellington	31.7%	1.4%	27.5%
Stone Harbor	34.2	2.6	51.2
Investec	34.1	1.7	21.3
Misfit Relative to Asset Class Benchmark →			*-0.9%*
Total Emerging Market Debt Active Risk →		**1.4%**	**100.0%**

- Aon expects the emerging market debt portfolio as currently constructed to incur active risk of approximately 1.4%

* Active Risk analysis based on 3/31/2020 market values and trailing 5-years of historical monthly returns

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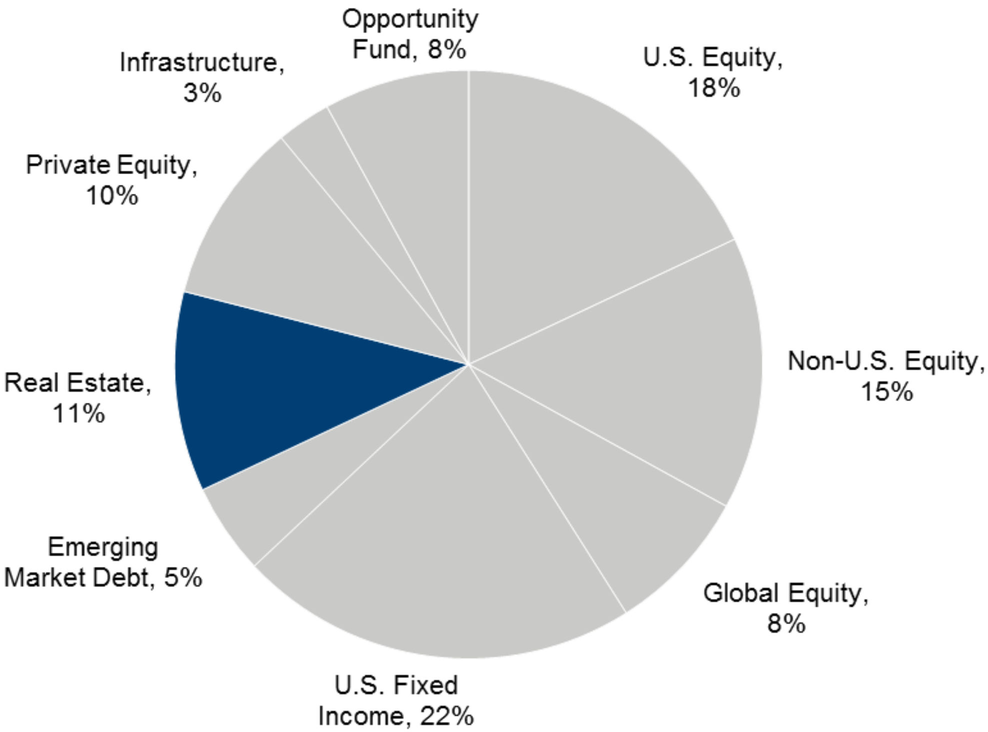
Agenda Tracker

SDCERS – Real Estate

Current
Long Term Policy Target Asset Allocation



Role of Asset Class

- Diversification, Yield, Potential to Hedge Inflation, and Competitive Returns relative to the benchmark

Key Observations

- Allocation is currently slightly above it's long-term target, but within its allowable range of 6% to 16%
- In compliance with its Strategic Plan with respect to Core and Non-Core allocations

Recommendation

- Consultant and Investment Team continue to identify and vet attractive opportunities for consideration

Real Estate: Portfolio Funding Status and Composition

PORTFOLIO OVERVIEW (As of September 30, 2019) $ in millions	
Number of Investments	31
Total Commitments	$1,234.4
Unfunded Commitments	$372.9
Total Paid-In Capital	$1,420.6
Total Distributions	$1,106.5
Market Value (Net Asset Value or NAV)	$860.5

[1]*Beta Neutral currently includes the DWS IMA separate account.*

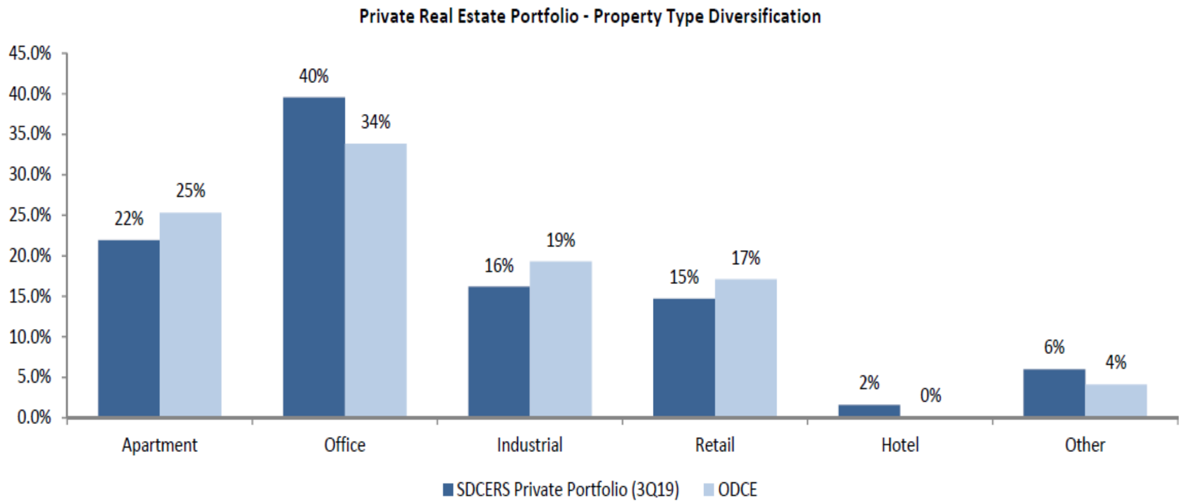
PORTFOLIO COMPOSITION TO TARGETS
(As of September 30, 2019)

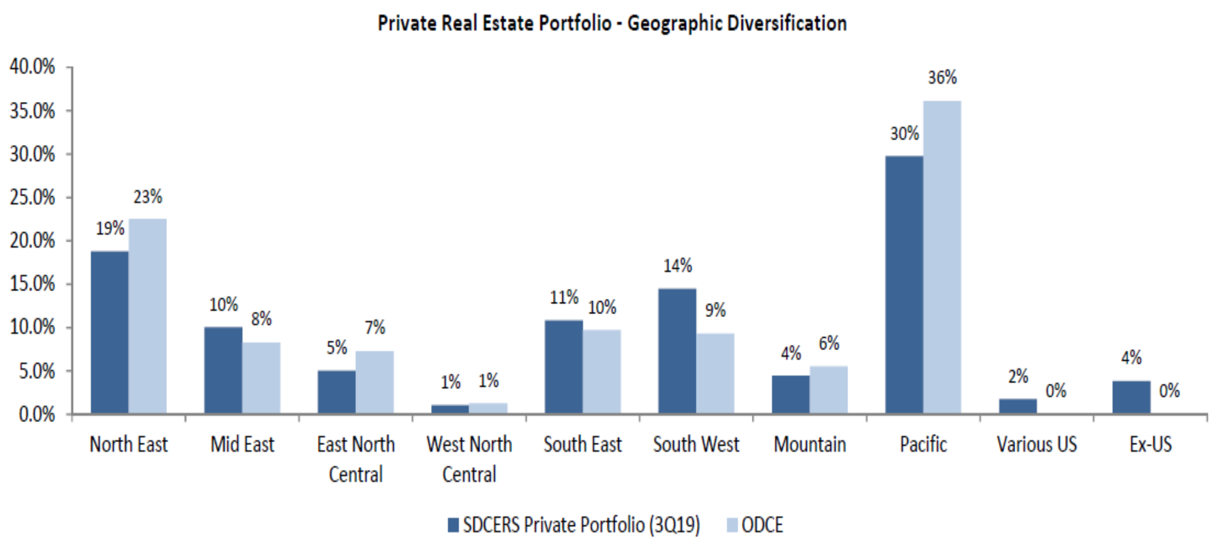
	Target	Tactical Range	Unfunded Commitments + Funded (NAV)	Funded (NAV)
Target R.E Allocation	13%*	N/A	14.3%	9.9%
Portfolio Style Composition				
Core	70%	60% - 80%	77.6%	85.3%
Beta Neutral[1]		*56-80%*	*56.0%*	*66.3%*
Tactical Core Equity		*0-24%*	*13.6%*	*10.2%*
Tactical Core Debt		*0-15%*	*8.1%*	*8.9%*
Non-Core	30%	20% - 40%	22.4%	14.7%
Value-Added	*20%*	*0% - 40%*	*5.1%*	*4.8%*
Opportunistic	20%	*0% - 20%*	*17.3%*	*9.9%*
Leverage	50%	N/A		29.8%

- The funded real estate allocation, currently at 12.0%, is slightly below the medium-term target allocation of 13%*
  - The Funded allocation will increase as capital from new commitments is drawn down over the coming quarters
- The portfolio is in compliance with its Strategic Plan with respect to Core and Non-Core allocations

*Real Estate Investment Policy outlines a long-term target of 11% with an additional 2% approved for a medium-term allocation to real estate Core debt

Real Estate: Portfolio Diversification



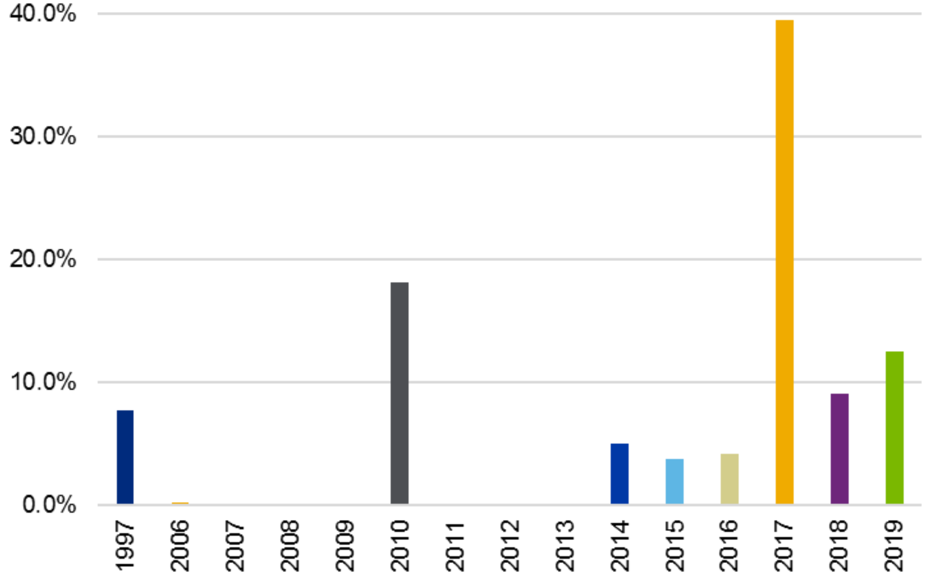


- SDCERS' portfolio is diversified by both geographic region and property type
  - Underweight to Industrial is a result of the early liquidation of several industrial assets in the DWS IMA portfolio
    - Funding of Lion Industrial Trust (100% of commitment has been called) and DWS Core Plus Industrial Fund (75% of commitment has been called) will increase Industrial exposure by about 60% by YE 2023
  - The portfolio gains non-U.S. exposure through LaSalle Asia Opportunity Fund IV and V, Europa Fund III, IV and V, and Colony VIII, and NREP Nordic Strategies Fund IV

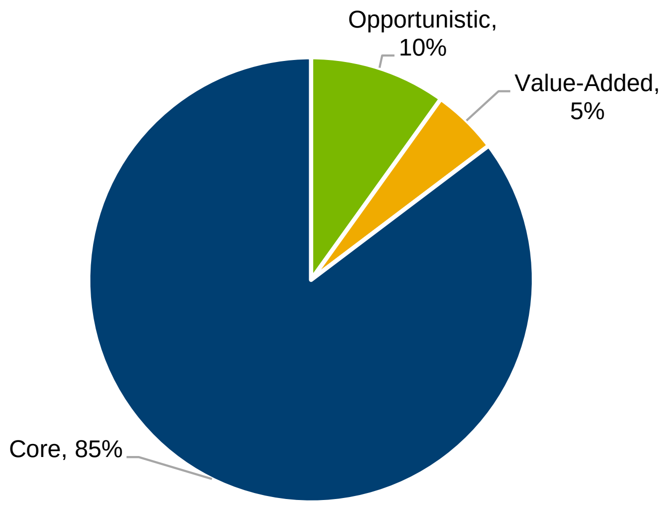
*Depending on the fund, the other sector could include Hotels, Resorts, Senior Living, Student Housing, Health Care, Mixed Use, Storage, Parking, and Land

Real Estate: Portfolio Diversification (cont'd)

Vintage Year Diversification
(As of September 30, 2019)

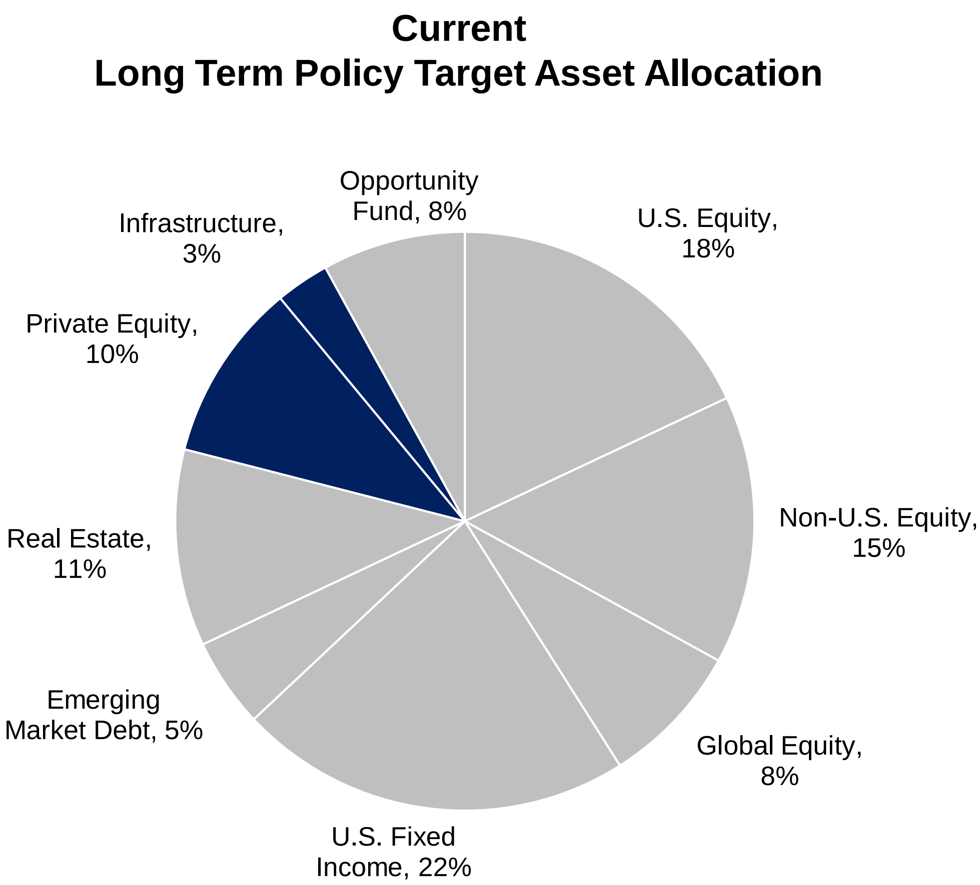


Strategy Allocation
(As of September 30, 2019)



- SDCERS has diversification across vintage year and real estate style categories
  - The significant Core allocation is primarily due to Core Open End ODCE Funds; Non-Core exposure is expected to increase slightly in the near-term as the DWS IMA winds-down and unfunded commitments to Non-Core funds are funded
  - SDCERS approved a commitment to 5 new funds in 2019, as of December 31, 2019

SDCERS – Private Equity and Infrastructure



Role of Asset Classes

- Diversification, Attractive Return, Income-Orientation, Lower Volatility, Inflation Hedging

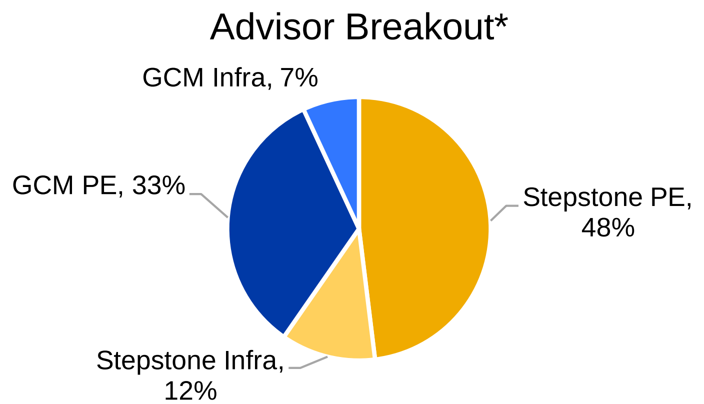
Key Observations

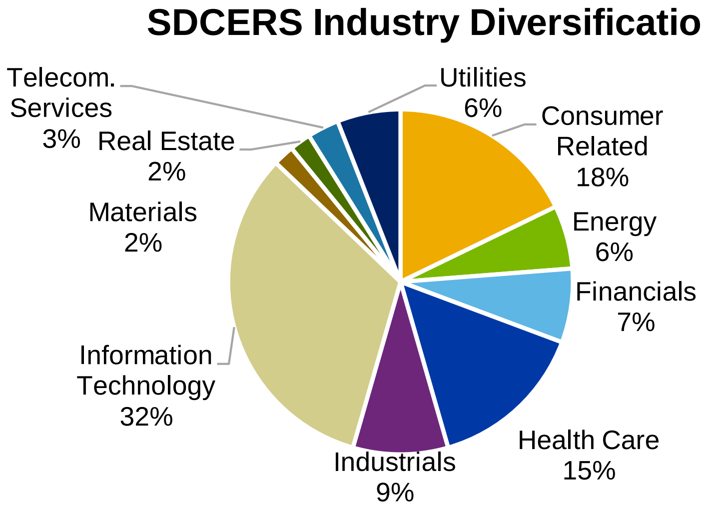
- Decoupled PE and Infra asset classes to better isolate roles and evaluate performance
- PE is above (12.9%) its long-term target of 10%
- Infrastructure is at its long-term target of 3%

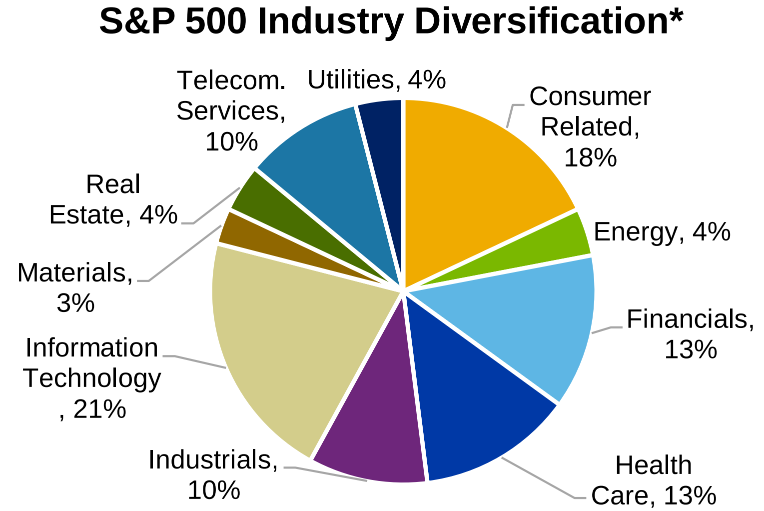
Recommendation

- Consultant and Investment Team continue to identify and vet attractive opportunities for consideration
- During 2019, secondary sales totaling $71.8 million were completed to bring the PE allocation closer in line with the policy target
  - GCM sold $47.3m on 6/30/19
  - StepStone sold $24.5m on 9/30/19

SDCERS – Private Markets Composition Data





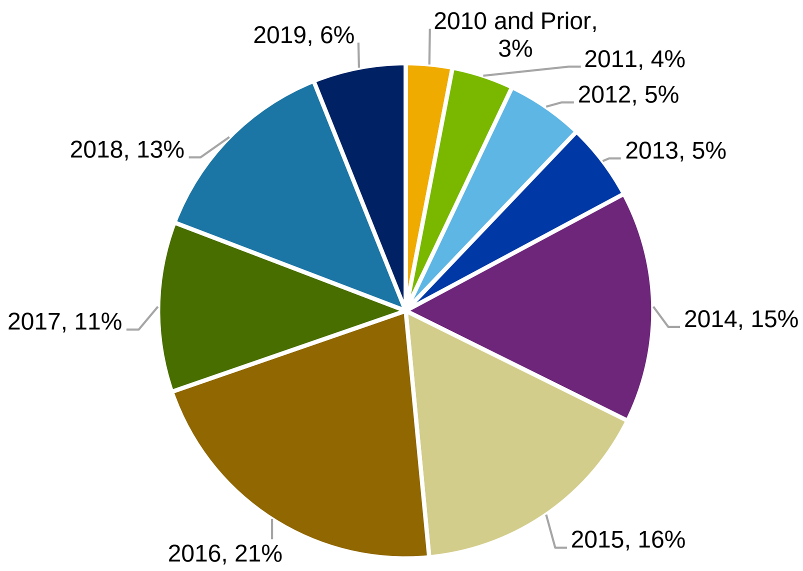


- SDCERS' portfolio is diversified by industry and broadly in line with the U.S. public equity market as represented by the S&P 500 Index

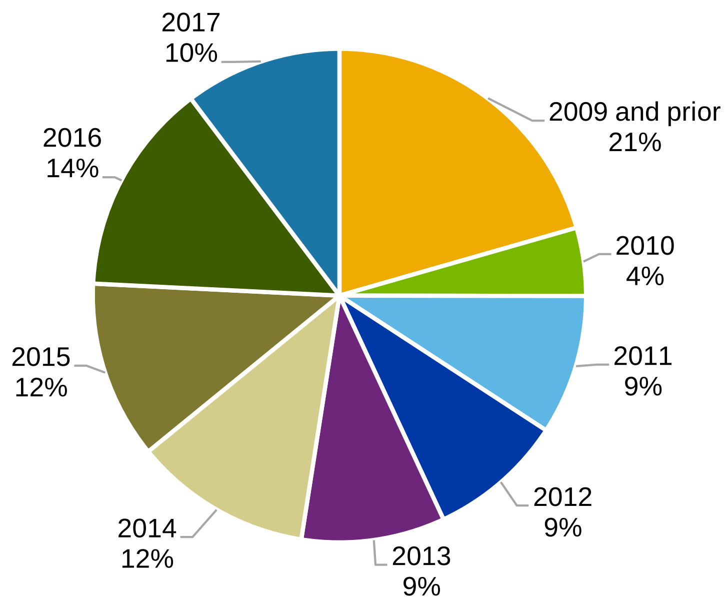
*As of 9/30/2019

SDCERS – Private Markets Composition Data (cont'd)

SDCERS Private Markets Vintage Year*



Preqin Private Equity Vintage Year**

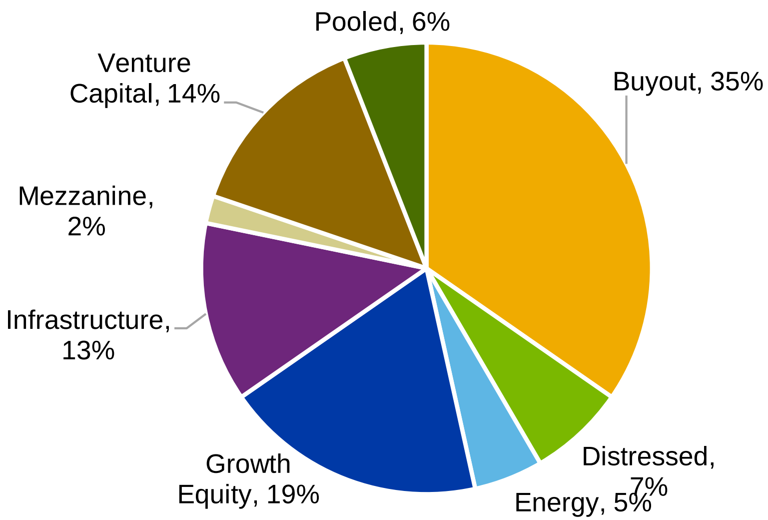


- SDCERS has diversification across vintage year

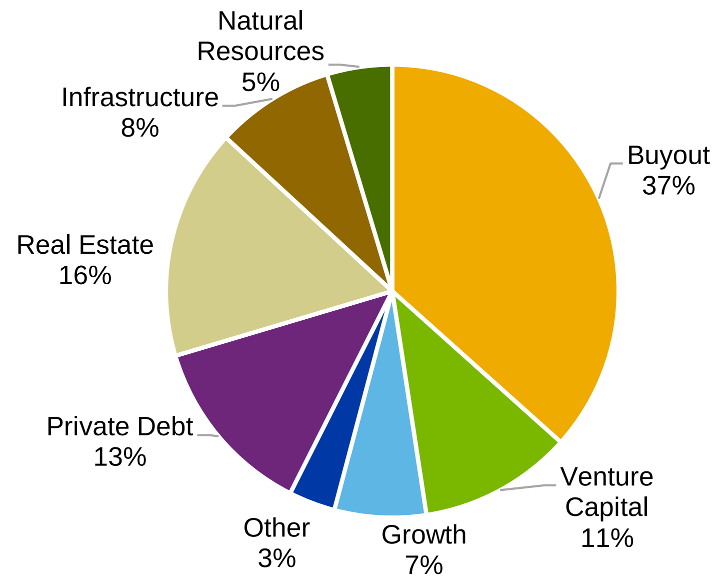
*Based on asset values as of 9/30/2019
**Source: 2018 Preqin Global Private Equity & Venture Capital Report. Represents data as of June 2017

SDCERS – Private Markets Composition Data (cont'd)

SDCERS Private Markets Fund Strategy*



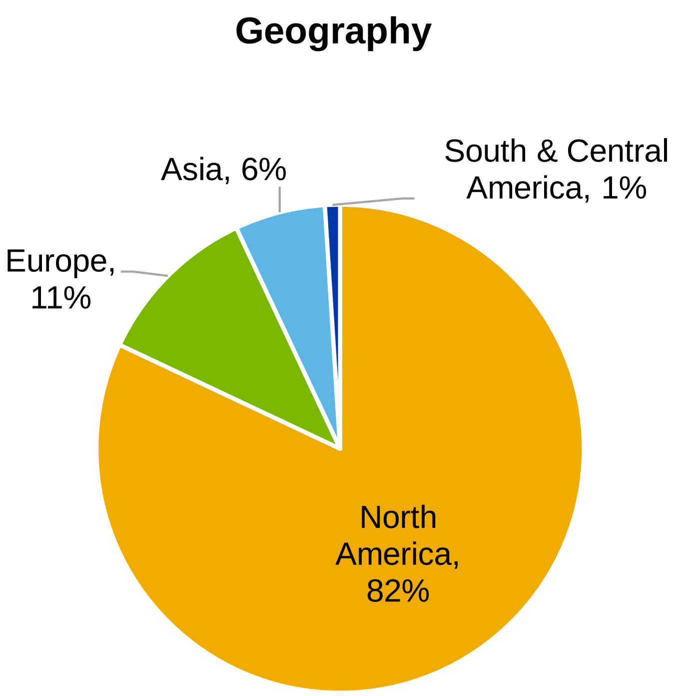
Preqin Private Equity Fund Strategy**

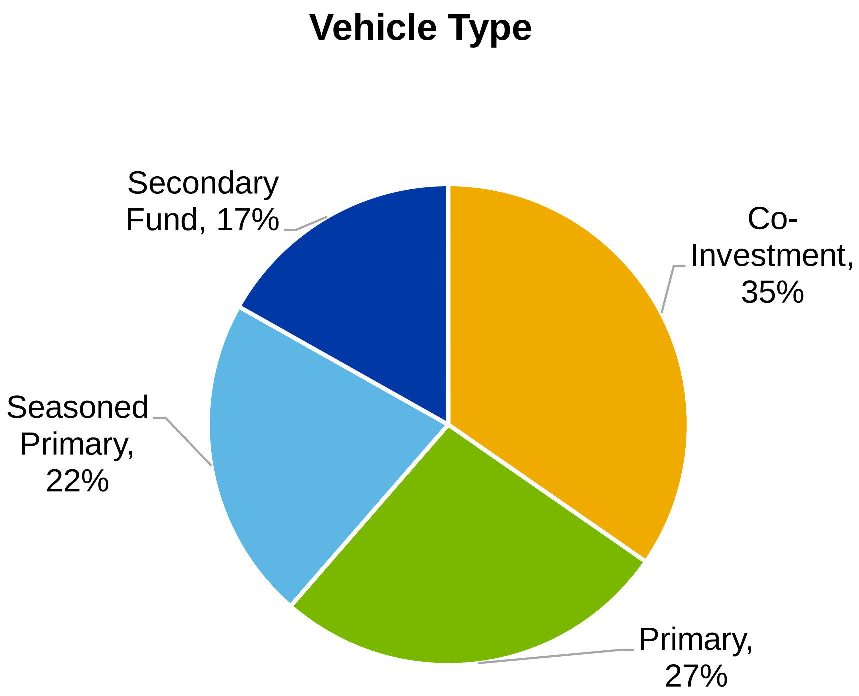


- SDCERS' portfolio is diversified by strategy type and broadly in line with the opportunity set as reported by Preqin

*Based on asset values as of 9/30/2019
**Source: 2018 Preqin Global Private Equity & Venture Capital Report. Represents data as of June 2017

SDCERS – Private Markets Composition Data





- SDCERS' portfolio is diversified by both geographic region and vehicle type

* Based on asset values as of 9/30/2019

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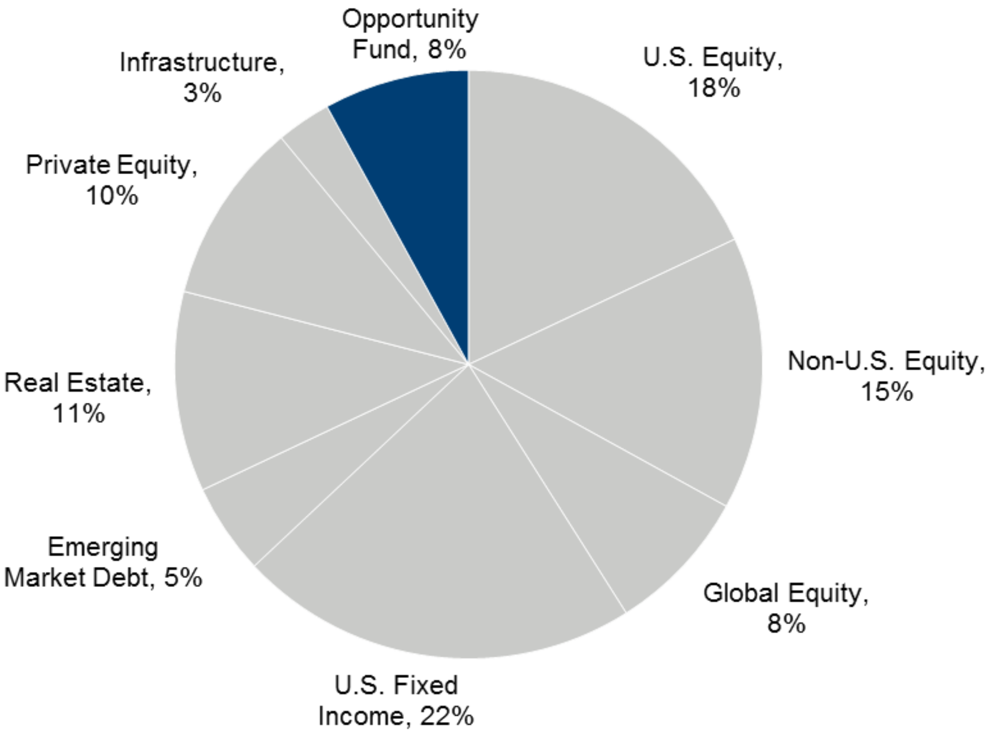
SDCERS – Opportunity Fund

Current
Long Term Policy Target Asset Allocation



Role of Asset Class

- Growth, Diversification, Opportunistic, Investment Dislocation, Flexibility

Key Observations

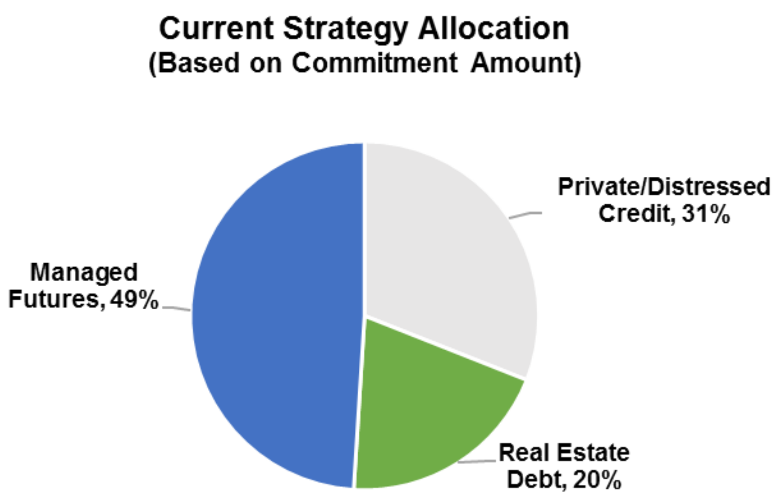
- Allowable allocation is 0% to 8%
- Current portfolio split between distressed credit, real estate debt, and managed futures
- Invested allocation represents approx. 7% of Total Fund as of 3/31/2020

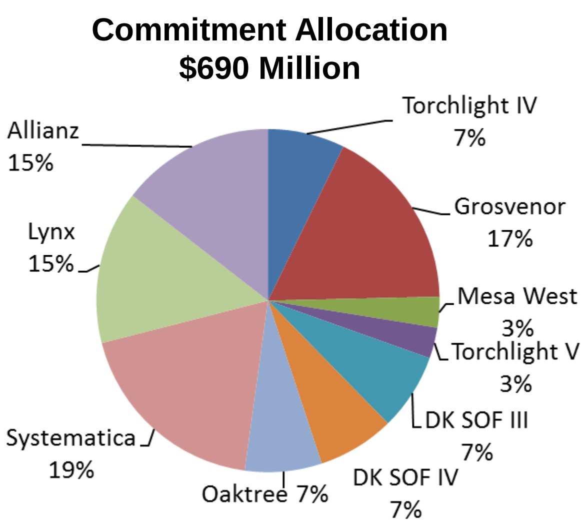
Recommendation

- Recommend increasing maximum allocation to 10%, as noted in the Asset Allocation Review
- Aon and SDCERS continue to identify and vet attractive opportunities

*See specific recommendation in SDCERS 2019 Asset Allocation Review

SDCERS Opportunity Fund Overview*





Fund Name	Total Commitment ($M)	% Funded
Torchlight IV	$50	100%
Grosvenor	$120	100%
Mesa West	$20	80%
Torchlight V	$20	80%
Davidson Kempner III	$50	100%
Davidson Kempner IV	$50	53%
Oaktree II	$50	63%
Systematica	$130	100%
Lynx	$100	100%
Allianz	$100	100%
Total Commitment	**$690**	**93%**

* In May 2020, a $50M commitment was made to TCW's TALF Fund, representing approx. 7% of the commitment allocation

Opportunity Fund Framework

Investment Objective	*What risks are we trying to address or what opportunities are we trying to take advantage of?* ▪ Identify market risk/opportunity being targeted for more “opportunistic-type investments”, and/or ▪ Identify portfolio benefits that investment provides that long-term strategic asset allocation does not
New Investment Risks	*What risks (new or increased) do such investments bring?* ▪ Identify new sources of risk or increases in types of risk that would result from pursuing such a strategy ▪ Identify environments when strategy will not be successful ▪ Identify risk mitigating factors
Implementation Strategy	*What should be the focus of implementation?* ▪ Identify the precepts that will drive manager/strategy selection
Other Factors:	▪ Fees ▪ Liquidity/Lock-up provisions ▪ Transparency ▪ Leverage ▪ Benchmarking

Agenda Tracker

Conclusions

- We believe SDCERS' portfolio structure is appropriate given SDCERS' goals
  - Portfolio structure well-crafted with a deliberate allocation of active risk
  - Meaningful allocation to alternatives – where probability of enhanced alpha is greater
  - Increased efficiency within public markets
    - Gained global market exposure across public equities
    - Increased low cost passive management in highly efficient markets
    - Focused active management in areas with greatest probability of success
    - Thorough due diligence and selection of high conviction active managers
  - Constant exploration and consideration for attractive and new or opportunistic investments for potential fit within the Opportunity Fund
- Recommendations:
  - Expand active core fixed income managers' investment guidelines to allow greater flexibility to take advantage of opportunities that have or will emerge as a result of recent market volatility and associated dislocations

Next Steps

- SDCERS Investment Team, in collaboration with Aon, will revise the investment guidelines for TCW and PIMCO to allow for additional flexibility going forward
- SDCERS Investment Team will rebalance the fixed income portfolio to the following target weights:
  - BlackRock passive: 40%
  - TCW: 35%
  - PIMCO: 35%
- Aon and SDCERS will re-evaluate the manager guidelines annually in light of the current and expected market environment to assess whether changes are needed

Agenda Tracker

SDCERS' Portfolio Structure: Look Back at Equity

Asset Class	Modifications Since 2010	Associated Theme
U.S. Equity	• Meaningfully increased passive management • Decreased number of active managers from 11 to 3 and are in process to streamline further • Trimmed small cap overweight relative to broad market by half and are in process of eliminating small cap bias this year • Tracking error decreased to 1.0%, from 2.5% in 2010	• U.S. markets extremely efficient; low probability of active manager success • Focus active management in high conviction strategies; pay little for beta • Previously, small cap bias explained half of active risk, reduced to explaining roughly a third, as outlook did not support level of bias • Target diversified sources of alpha
Non-U.S. Equity	• Introduced meaningful level of passive management • Decreased active risk to 1.2%, from 3.3% • Added dedicated Emerging Markets (EM) managers to increase EM exposure to in line with opportunity set	• Non-U.S. markets efficient • Focus active management in high conviction strategies; pay little for beta • Gain broad exposure in line with full opportunity set • Utilize active management where probability of success higher, i.e. emerging markets
Global Equity	• Added 5% Global Equity allocation • Hired 2 active managers • Subsequently added an additional 3% and hired 2 additional active managers	• Most advantageous utilization of active risk budget • Represents an integrated and efficient means for investing in stocks across the world • Focuses on capturing managers' skill by giving discretion to invest in stocks regardless of style, capitalization or securities' country of origin

SDCERS' Portfolio Structure: Look Back at Fixed Income

Asset Class	Modifications Since 2010	Associated Theme
Emerging Market Debt (EMD)	• Added EMD allocation; hired 3 active managers • Modified mandate to 60/40 local/dollar denominated (hard) currency split	• EMD provides compelling diversification given the low-to-moderate correlation to major asset classes • More favorable outlook for local EMD
Fixed Income	• Modified mandate to a 'core,' higher quality orientation • Lowered duration to intermediate orientation • Increase passive management	• Align with goal to effectively diversify equity risk and provide downside protection • Serves as additional liquidity source for benefit payments and other plan expenses

SDCERS' Portfolio Structure: Look Back at Alternatives

Asset Class	Modifications Since 2010	Associated Theme
Real Estate[1]	• Consolidated IMA program and started liquidation and transition to Core commingled funds • Elimination of REIT allocation • Recommended 4 Structural Core and 3 Tactical Core strategies for redeployment of IMA capital • Expanded allocation to include Core Debt • Committed to 17 new non-core managers from 2010-2019	• Continue liquidation of IMA holdings and focus on higher quality assets; cull portfolio laggards • Reduce volatility of Core returns/risk by diversifying core holdings and reducing idiosyncratic risk • Invest in significant market dislocations • Capture increased downside risk protection through Core Debt • Focus on enhanced returns at reasonable risk levels
Private Equity	• Increased Private Equity target from 5 to 10% • Decoupled from Infrastructure and changed to a primary peer benchmark and secondary opportunity cost benchmark	• Focus active risk in areas expected to provide greatest value-add • Focus on secondaries and co-investments as opportunities arise • Better evaluate success and role
Infrastructure	• Added 3% Infrastructure target • Decoupled from Private Equity • Changed benchmark to better evaluate role and expectations	• Focus active risk in areas expected to provide greatest value-add • Better evaluate success and asset class role
Opportunity Fund	• Incepted in 2011 • Commitments comprise 8.8% of Total Fund (as of 03/20) • Diversified portfolio of distressed credit, real estate debt, and managed futures	• Enhance return and/or reduce risk • Provide flexibility to efficiently invest in attractive opportunities

[1]See complete set of changes and associated themes in the Fiscal Year End 2018 Real Estate Program Review.

Active Management is No Easy Endeavor!

- Standard & Poor's (S&P) Indices Versus Active Funds (SPIVA) scorecard shows the percentage of active funds outperformed by their benchmarks
  - Database adjusts for survivorship bias and provides an apples-to-apples comparison of similar funds

Percentage of Active Funds Outperformed by their Benchmarks (net-of-fees)

Fund Category	Comparison Index	One Year	Three Years	Five Years	Ten Years	Fifteen Years
U.S. Large Cap (All)	**S&P 500**	71%	71%	81%	89%	90%
U.S. Small Cap (All)	**S&P Small Cap 600**	39%	61%	77%	89%	89%
Global	**S&P Global 1200**	57%	65%	75%	83%	83%
International	**S&P 700**	57%	68%	78%	78%	90%
Emerging Markets	**S&P/IFCI Composite**	36%	70%	79%	77%	91%
Investment-Grade Intermediate Funds	**Barclays Intermediate Government/Credit**	33%	43%	49%	53%	69%
Emerging Market Debt Funds	**Barclays Emerging Markets**	49%	76%	86%	100%	93%

Source: S&P Dow Jones Indices. SPIVA U.S. Scorecard – Year End 2019

SDCERS' Active Risk: Background and Assumptions

- Active risk analysis is forward-looking
  - Based on current asset allocation and manager line-up
- Focuses on publicly-traded security asset classes; excludes illiquid private market asset classes
- Analyze sources that contribute to active risk
  - Asset class level, including impact of biases (for instance, small cap overweight)
  - Manager level (risk due to manager active bets)
- Utilize 60 months of historical return data
- Similar to other statistical / quantitative tools, the active risk budgeting tool has limitations
  - Does not incorporate illiquid, private market assets
  - Historical tracking error may not be a good estimate of future tracking error if there are changes to the portfolio manager / team or structural changes in the marketplace
  - As a result, it is important to overlay quantitative results with sound qualitative judgment for the active risk modeling tool to be useful and meaningful

Utilizing Active Risk Budgeting to Guide Implementation

- Overall, we believe that the active risk budgeting is a useful framework to guide implementation of an investment program
  - Are we comfortable with the level of active risk?
  - Are we taking active risk in asset classes / segments of the market that we believe would be rewarded?
  - Are active risk allocations to managers consistent with our expectations for the managers' value-add?

- Active risk target guides
  - Level of active / passive exposure across asset classes, based on expectations for value-add
  - Number and types of managers to be utilized
  - Extent of biases relative to the market opportunity set
  - Help assess how changes to investment structure (active/passive, etc.) / managers alter the level of / contribution to active risk

Style Research Output Manual

Portfolio Skyline:

- The skylines are designed to answer the question "How significantly different is the portfolio from the benchmark?" in respect to Style factors which are important in equity markets.
- The first six bars from the left are value factors (shown as blue bars) while the next four bars are growth factors (green bars). The next six bars are quality factors (amber) whilst the dark and light grey bars represent momentum and risk factors, respectively.
- A bar above the axis indicates that the portfolio has a positive tilt towards that factor e.g. in the case of value factors, if the bar is above axis then the portfolio has a tilt towards cheaper companies.
- As a general rule of thumb, for any individual Style tilt:
  - Style tilts less than -0.5 or more than +0.5 indicate a tilt is observable
  - Style tilts less than -1 or more than +1 are significant

Value measures:

- Book to Price - The ratio of the company’s Book Value (the sum of Shareholders’ Equity plus accumulated Retained Earnings from the P & L Account) to its Share Price.
- Sales to Price - Net Sales per Share divided by the Share Price.
- Dividend Yield - The annual Dividend Paid per Share divided by the Share Price.
- Earnings Yield - Annual Earnings (adjusted for Amortizations of Intangibles, Extraordinary charges and credits) per Share divided by the Share Price.
- Free cash flow Yield - Annual Cash Flow per share minus Capital Expenditure per share divided by the share price. Free cash flow is the amount of money available to the company after paying out for the maintenance and renewal of fixed assets
- Cyclically Adjusted Earnings Yield – 10 year average of cyclically adjusted annual earnings (adjusted for Amortizations of Intangibles, Extraordinary charges and credits) per Share divided by the Share Price.
- Total Shareholder Yield – The sum of Net Buyback Yield and Net Debt Paydown yield. This factor measures the proportion of a company’s value distributed to shareholders through dividend payments, share repurchases and debt reduction.

Style Research Output Manual – cont.

Growth measures:

- Earnings Growth - The average annual growth rate of Earnings (adjusted for Amortizations of Intangibles, Extraordinary charges and credits) over a trailing three years.
- Sales Growth - The average annual growth rate of Net Sales per Share over a trailing three years.
- IBES 12M Growth - IBES consensus forecast growth of Earnings over the next twelve months.

Quality measures:

- Return on Invested Capital - (Net Income + ((Interest Expense on Debt - Interest Capitalized) * (1-Tax Rate))) / Average of Last Year's and Current Year's (Total Capital + Short Term Debt & Current Portion of Long Term Debt). The Return on Invested Capital (also known as Return on Capital) measures the profitability of a company as measured by its operating income in relation to the total capital invested in the company.
- Return on Equity - Net Income before Preferred Dividends divided by the Book Value of Shareholders' Common Equity.
- Income to Sales - The "net margin", annual Net Income before Preferred Dividends (plus Policyholders' Surplus for insurance companies), divided by annual Net Sales.
- Earnings Growth Stability - This 'Quality' factor is calculated as the negative of the standard deviation of Earnings Growth over the most recent 5 years of growth data.
- Gross Profit to Assets – Gross Profits divided by Total Assets. Gross profit is a company's total revenue minus the cost of goods sold. Gross profit may be preferred as an alternative over earnings or free cash flow to consider a company's true economic profitability without subtracting expenses that may in fact be increasing a company's production advantage or competitive advantage e.g. advertising , R&D, or capital expenditure. Gross profits are divided by assets, not shareholder's equity, because gross profits exclude interest payments, and are therefore independent of leverage.
- 3 Year Asset Growth – The average annual growth rate of total assets over a trailing three years.
- Asset Turnover - Net Sales /Total Assets. The asset turnover ratio is an indicator of how efficient a company is in deploying its assets to generate revenue.
- Low Gearing - The negative of Debt to Equity. Low geared companies can regarded as being of higher "Quality" as they are less burdened by debt repayment costs.

Style Research Output Manual – cont.

Momentum measures:

- ST Momentum - Calculated using a 6 month "memory" of monthly total returns. The past period returns are weighted using a "decay ratio" of 2/3, per month.
- Momentum 12-1 – The total return of the stock over the last 12 months, excluding the total return over the most recent month since reversal effects are often associated with one-month returns.
- IBES 12M Earnings Revisions - IBES balance of Earnings forecast revisions for the next annual reporting period.

Low Volatility measures:

- 3 Year Volatility – The standard deviation of the last 36 months of total returns, expressed as an annualized percentage.
- 5 Year Volatility – The standard deviation of the last 60 months of total returns, expressed as an annualized percentage.
- Market Beta - The "slope coefficient" from the simple regression.

Style Research Output Manual – cont.

Risk measures:

▪Market Capitalisation - The average Size statistic of a portfolio is the weighted (by holding value) average size of the securities held. The average Size statistic of a benchmark (or total market) is the weighted (by holding value) average size of the securities within the benchmark (or total market). If the bar is above the line, there is a large cap bias whilst a bar below the line indicates a mid/small cap bias.

▪Market Beta – The "slope coefficient", (β), from the simple regression: Security Monthly Return = α + β * Market Monthly Return + Random Error. The regression is carried out over 36 month periods; where sufficient information is not available, β=1 is assumed.

▪Exposure to GDP Shock Beta – Based on the equation: Quarterly Share Price Return of Security *n* = α*n* + β*n*GDP Shock. Where GDP Shock is the difference between the most recent GDP quarterly growth rate and the average of the previous 4 quarters. A number of, say, 2.5 would mean that a GDP growth rate of 1% (quoted at an actual quarter to quarter rate) above the average of GDP growth rates recorded over the previous 4 quarters would result in the value of the stock/sector/portfolio being 2.5% (= 2.5 x 1%) higher in the current quarter than would otherwise have been.

▪Exposure to Inflation Beta – Based on the equation: Monthly Share Price Return of Security *n* = α*n* + β*n* Monthly Inflation Rate. Where Monthly Inflation is quoted at an annual rate. A number of, say, 0.8 would mean that a rise in the annual rate of inflation by 1% (quoted at an annual rate) would result in the performance of the stock/sector/portfolio being 0.8% (= 0.8 x 1%) stronger in the current month than would otherwise have been.

▪Exposure to Oil Beta - Based on the equation: Monthly Share Price Return of Security *n* = α*n* + β*n* Oil Price Return. Where the Oil Price Return is the monthly per cent change in the Oil Price, in US dollars. A number of, say, 0.7 would mean that an increase of 1% in the US dollar price of oil would result in the value of the stock/sector/portfolio being 0.7% (= 0.7 x 1%) higher in the current month than would otherwise have been.

Style Research Output Manual – cont.

Decomposition of Active Risk:

- Risk attribution breaks down the Tracking Error into the main sources of risk i.e., from currency allocation, market (country) allocation, sector allocation, Style allocation and stock selection (or equity risk). These are displayed as percentages and provide further insights into the sources of risk in a portfolio.

Risk Measures:

- Tracking Error - Estimate of the expected relative volatility of the portfolio versus the benchmark and is expressed as an annualised percentage.
- Benchmark Overlap– Measure of the percentage of stock holdings in a manager's portfolio that differ from the benchmark index. A high Active share indicates large differences between the portfolio and benchmark in terms of holdings while a portfolio with a low active share will conclude that there is a reasonable overlap between the portfolio and the benchmark.
- Number of Stocks - The number of stocks contained in the portfolio.

Relative Style Distribution:

- The distribution shows the relative style distribution analysis according to Market Cap and Book to Price based on the Benchmark.
- Large, Mid, Small = Market Cap (70%, 20%, 10%); Value, Growth = Book to Price (50%, 50%).