



# TEACHERS' RETIREMENT SYSTEM

## of the State of Kentucky

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Executive Secretary

### Special Workshop Meeting of the TRS Board of Trustees

### AGENDA

Monday, November 23, 2020

8:30	Introduction	Gary Harbin
9	Actuarial Issues	Ed Koebel Alisa Bennett Cavanaugh Macdonald
10	Break	
10:15	Kentucky Ethics Overview	Beau Barnes
10:45	Federal Tax and Washington Update	Audra Ferguson-Allen Robert Gauss Ice Miller
11:45	Pension Basics Funding Discussion	Flick Fornia Pension Trustee Advisors
12:15	Lunch and discussion of retirement issues	
1	Aon's Insights on Investment Climate	P. J. Kelly Aon Investment Consulting
1:50	Update on Medical Insurance	Jane Gilbert
	Personalized Medicine	Dr. Jeffrey Shaman Coriell Life Sciences
2:45	Break	
3	Economic Outlook	Curt Scott Todd Asset Management
4	Open discussion concerning administrative operations	Gary Harbin

The meeting will be conducted by live video teleconference.  
Information on accessing the meeting will be provided on TRS's  
website at: <https://trs.ky.gov/administration>



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## **Board Workshop 2020**

# **Teachers' Retirement System of the State of Kentucky**

Ed Koebel, CEO

Alisa Bennett, President

November 23, 2020



# Summary of Pension Valuation

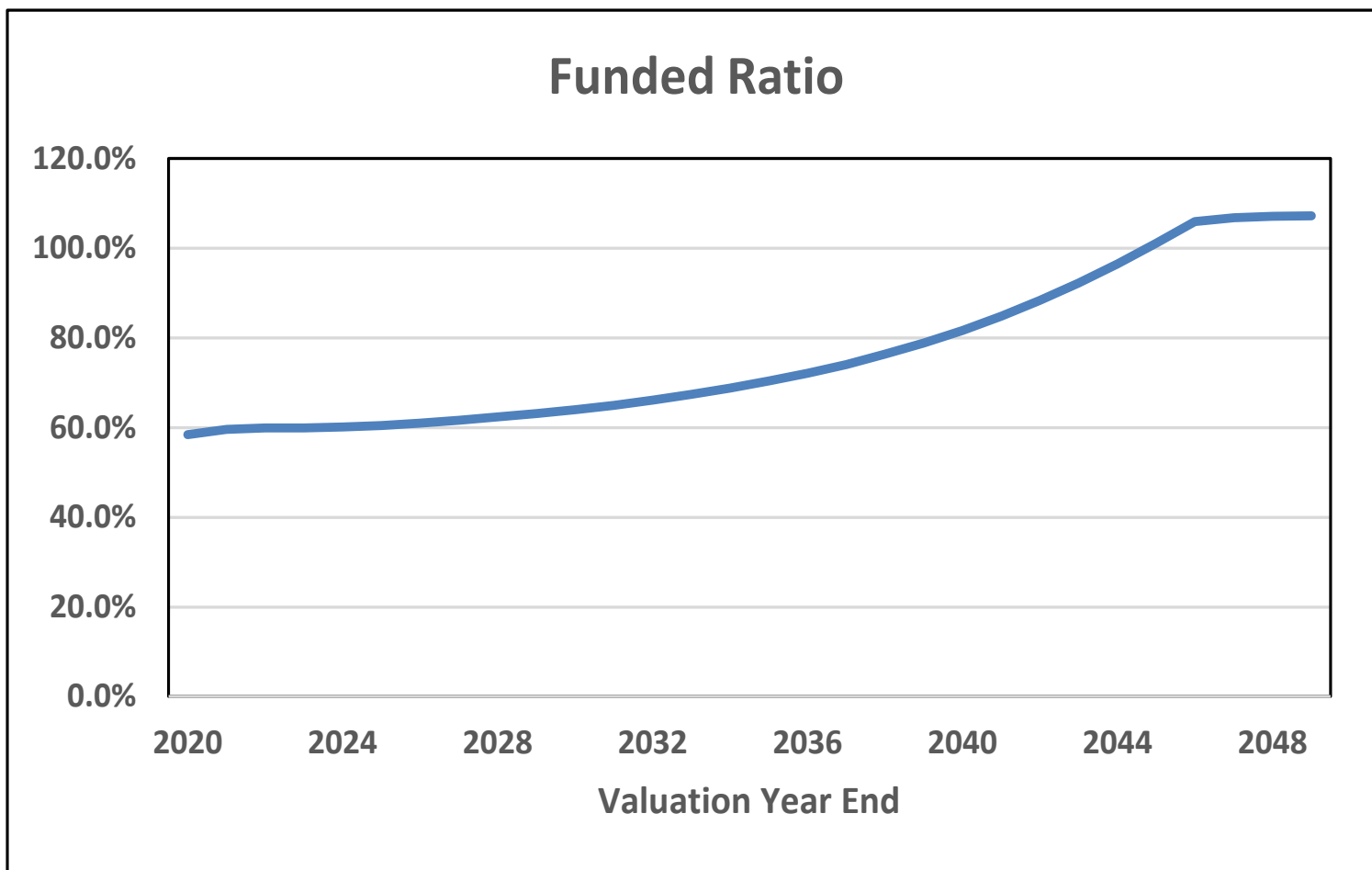
- TRS received 100% of the Actuarially Determined Employer Contribution for the fiscal year ending June 30, 2020 (100% in 2019 fiscal year)
  - Actuarially recommended amount of \$538.3M was received this year
  - Actuarially recommended amount of \$551.1M is expected for 2021 Fiscal Year
- Net Investment Return on Market Value of 5.47%
  - Trust Fund increased \$345 Million due to investment returns in excess of negative cash flow
  - Negative cash flow for 2020 as a percentage of market value of assets is (3.68)%
    - Last year's percentage was (3.48)%

# Summary of Pension Valuation

- Actuarial Value of Asset Return of 7.03%
  - Compare to 7.50% investment return assumption
  - Smoothing of investment gains and losses over 5-year period
- Increase of 0.51% in State Pension Contribution Requirement from last year
  - Last year was an increase of 0.70%
- Unfunded Accrued Liability (UAL) increased slightly from \$14.5B to \$14.8B
- Funding Ratio increased from 58.1% to 58.4%



# Pension Plan - Baseline Projection of Funded Percentage



Assumes 7.50% returns each year and ADC is fully contributed.

# Summary of Health Insurance Trust Valuation



- Funded status has improved for the Health Insurance Trust.
  - From 46.0% to 61.7%.
- If all assets were used to fund benefits for members over age 65, the funded status for that group alone would be over 100%
- Total actuarially determined contribution rate has decreased for the health trust
  - From 4.89% to 3.54%.
  - Mainly due to Medicare Advantage rates less than expected.
- Target Rate of Return for the health trust is 8.00%.
  - Market Value Return of 2.30%.
  - Actuarial Value of Asset Return of 5.78%.
    - Reflects smoothing of investment gains and losses over 5-year period.

# Summary of Life Insurance Trust Valuation

- Funded status has decreased for the Life Insurance Trust.
  - From 78.7% to 75.5%.
- Total contribution rate for the life trust has increased.
  - From 0.07% to 0.08%.
- Target Rate of Return for the life trust is 7.50%.
  - Market Value Return of 6.32%.
  - Actuarial Value of Asset Return of 3.61%.
    - Reflects smoothing of investment gains and losses over 5-year period.

# Experience Study

- We will be conducting an Experience Investigation for the Five-Year Period Ending June 30, 2020
- Demographic Assumptions to Review
  - Rates of Withdrawal
  - Rates of Pre-Retirement Mortality
  - Rates of Disability Retirement
  - Rates of Service Retirement
  - Rates of Post-Retirement Mortality
  - Rates of Salary Increase
- Economic Assumptions to Review
  - Price inflation
  - Investment return
  - Wage inflation

# Pension – Risk Assessment

(\$1,000's)

## Discount Rate Sensitivity Analysis

	Decrease Discount Rate	Valuation Results	Increase Discount Rate
Actuarial Accrued Liability	\$39,646,802	\$35,582,250	\$32,170,538
Actuarial Value of Assets	<u>20,796,494</u>	<u>20,796,494</u>	<u>20,796,494</u>
Unfunded Actuarial Accrued Liability	\$18,850,308	\$14,785,756	\$11,374,044
Funded Ratio	52.5%	58.4%	64.6%
Employer ADEC – University*	38.815%	30.185%	22.675%
Employer ADEC – Non-University*	40.295%	31.665%	24.155%
Discount Rate	6.50%	7.50%	8.50%
Wage Inflation Rate	3.50%	3.50%	3.50%
Price Inflation Rate	3.00%	3.00%	3.00%

\*Less 1% for members hired before July 1, 2008

# Pension – Risk Assessment

(\$1,000's)

## Price Inflation Assumption Sensitivity Analysis

	Valuation Results	Decrease Inflation Rate 0.25%	Decrease Inflation Rate 0.50%
Actuarial Accrued Liability	\$35,582,250	\$36,409,033	\$37,270,778
Actuarial Value of Assets	<u>20,796,494</u>	<u>20,796,494</u>	<u>20,796,494</u>
Unfunded Actuarial Accrued Liability	\$14,785,756	\$15,612,539	\$16,474,284
Funded Ratio	58.4%	57.1%	55.8%
Employer ADEC – University*	30.185%	32.255%	34.425%
Employer ADEC – Non-University*	31.665%	33.735%	35.905%
Discount Rate	7.50%	7.25%	7.00%
Wage Inflation Rate	3.50%	3.25%	3.00%
Price Inflation Rate	3.00%	2.75%	2.50%

\*Less 1% for members hired before July 1, 2008

# Pension – Risk Assessment

(\$1,000's)

## Wage Inflation Assumption Sensitivity Analysis

	Valuation Results	Decrease Wage Inflation to 2%	No Wage Inflation
Actuarial Accrued Liability	\$35,582,250	\$35,582,250	\$35,582,250
Actuarial Value of Assets	<u>20,796,494</u>	<u>20,796,494</u>	<u>20,796,494</u>
Unfunded Actuarial Accrued Liability	\$14,785,756	\$14,785,756	\$14,785,756
Funded Ratio	58.4%	58.4%	58.4%
Employer ADEC – University*	30.185%	34.395%	40.685%
Employer ADEC – Non-University*	31.665%	35.875%	42.165%
Discount Rate	7.50%	7.50%	7.50%
Wage Inflation Rate	3.50%	2.00%	0.00%
Price Inflation Rate	3.00%	3.00%	3.00%

\*Less 1% for members hired before July 1, 2008

# Health Insurance Trust – Risk Assessment

(\$1,000's)

## Discount Rate Sensitivity Analysis

	Decrease Discount Rate	Valuation Results	Increase Discount Rate
Actuarial Accrued Liability	\$3,119,944	\$2,757,653	\$2,456,805
Actuarial Value of Assets	<u>1,700,968</u>	<u>1,700,968</u>	<u>1,700,968</u>
Unfunded Actuarial Accrued Liability	\$1,418,976	\$1,056,685	\$755,837
Funded Ratio	54.5%	61.7%	69.2%
Discount Rate	7.00%	8.00%	9.00%
Wage Inflation Rate	3.50%	3.50%	3.50%
Price Inflation Rate	3.00%	3.00%	3.00%



# Health Insurance Trust – Risk Assessment

(\$1,000's)

## Price Inflation Assumption Sensitivity Analysis

	Valuation Results	Decrease Inflation Rate 0.25%	Decrease Inflation Rate 0.50%
Actuarial Accrued Liability	\$2,757,653	\$2,853,851	\$2,955,697
Actuarial Value of Assets	<u>1,700,968</u>	<u>1,700,968</u>	<u>1,700,968</u>
Unfunded Actuarial Accrued Liability	\$1,056,685	\$1,152,883	\$1,254,729
Funded Ratio	61.7%	59.6%	57.6%
Discount Rate	8.00%	7.75%	7.50%
Wage Inflation Rate	3.50%	3.25%	3.00%
Price Inflation Rate	3.00%	2.75%	2.50%

# Health Insurance Trust – Risk Assessment

(\$1,000's)

## Health Care Trend Assumption Sensitivity Analysis

	Decrease Trend Rates 1.00%	Valuation Results	Increase Trend Rates 1.00%
Actuarial Accrued Liability	\$2,424,293	\$2,757,653	\$3,168,458
Actuarial Value of Assets	<u>1,700,968</u>	<u>1,700,968</u>	<u>1,700,968</u>
Unfunded Actuarial Accrued Liability	\$723,325	\$1,056,685	\$1,467,490
Funded Ratio	70.2%	61.7%	53.7%
Discount Rate	8.00%	8.00%	8.00%
Wage Inflation Rate	3.50%	3.50%	3.50%
Price Inflation Rate	3.00%	3.00%	3.00%

# Life Insurance Trust – Risk Assessment

(\$1,000's)

## Discount Rate Sensitivity Analysis

	Decrease Discount Rate	Valuation Results	Increase Discount Rate
Actuarial Accrued Liability	\$137,911	\$122,194	\$109,259
Actuarial Value of Assets	<u>92,229</u>	<u>92,229</u>	<u>92,229</u>
Unfunded Actuarial Accrued Liability	\$45,682	\$29,965	\$17,030
Funded Ratio	66.9%	75.5%	84.4%
Employer ADEC	0.11%	0.08%	0.06%
Discount Rate	6.50%	7.50%	8.50%
Wage Inflation Rate	3.50%	3.50%	3.50%
Price Inflation Rate	3.00%	3.00%	3.00%

# Life Insurance Trust – Risk Assessment

(\$1,000's)

## Price Inflation Assumption Sensitivity Analysis

	Valuation Results	Decrease Inflation Rate 0.25%	Decrease Inflation Rate 0.50%
Actuarial Accrued Liability	\$122,194	\$126,014	\$130,044
Actuarial Value of Assets	<u>92,229</u>	<u>92,229</u>	<u>92,229</u>
Unfunded Actuarial Accrued Liability	\$29,965	\$33,785	\$37,815
Funded Ratio	75.5%	73.2%	70.9%
Employer ADEC	0.08%	0.09%	0.10%
Discount Rate	7.50%	7.25%	7.00%
Wage Inflation Rate	3.50%	3.25%	3.00%
Price Inflation Rate	3.00%	2.75%	2.50%

# Impact of COVID-19

## ➤ Investments

Fiscal Year Ending	Estimated Range of Investment Returns
December 31, 2019	15% to 20%
March 31, 2020	-5% to -10%
June 30, 2020	2% to 6%

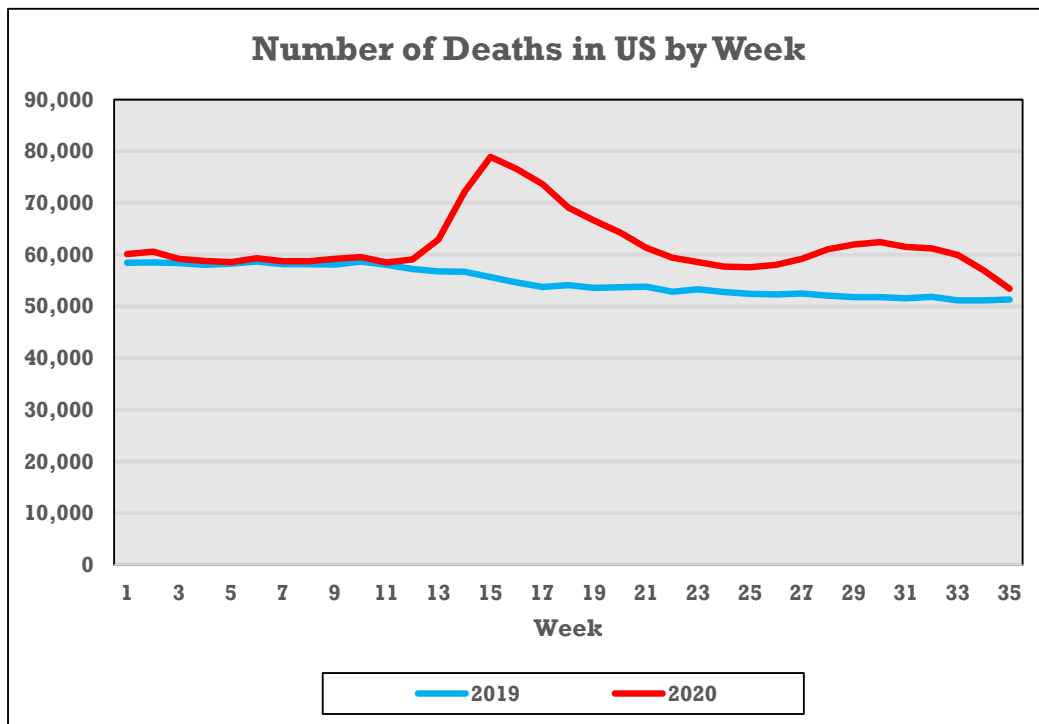
Although 2020 has been a volatile year in the markets, most plans use a smoothing of asset return methodology when calculating Funded Ratio, UAL and Contribution Requirement so impact due to any Investment losses will be phased in over the next five years.

# Impact of COVID-19

## ➤ Tax Revenues

- COVID-19 recession closed businesses and put many Americans out of work, suppressing spending and use of services that pump tax revenue into state and local government funds.
- Governments may experience budgetary shortfalls for pensions, health care, schools, roads, parks, etc.
- Similar issue during Tech Bubble of 2001 and Recession of 2008 and 2009
  - Several sponsors took contribution holidays or did not make their full actuarial required contributions
  - Some plans went to Fixed Contribution Rates
  - Unfortunately, these reductions come at the worse time and add to pension plan funding woes.

# Impact of COVID-19



COVID-19 is now responsible for over 250,000 deaths in the US

Approximately 2.0% of the public sector retiree population.

- Plans will experience some gains due to more deaths in 2020-2021 but we don't think it will be significant enough to warrant any changes in mortality tables or projection scales going forward
- Of course, unless there are systemic issues from contracting the disease

# Impact of COVID-19

## ➤ Retirement

- Whatever the reason for early or delayed retirement, this decision could have an impact to the benefit payout stream for pension plans and could impact contribution requirements and funding of plans
  - Delaying retirement is a positive to a pension plan because it keeps member active and paying into the system longer
  - Taking earlier retirement than expected is a negative to pension plan as not enough contributions to the trust during active service was made to ensure payout for a longer period of time



# Impact of COVID-19

## ➤ Healthcare

- No explicit changes were incorporated at this time for COVID-19 due to the level of uncertainty regarding the impact on both plan costs and contribution levels going forward
- Potential Impacts:
  - Routine and elective care being deferred
    - Deferrals have offset COVID costs for 2020 but could increase costs in 2021 due to pent up demand.
  - Direct COVID-19 treatment and prevention costs
  - Cost of vaccine when available
  - Changes in contribution and budget projections
  - Potential for long term effects on both health costs and disabilities



# Teachers' Retirement System of the State of Kentucky

## Fiduciary and Ethics Overview

**Nov. 23, 2020**

**Gary L. Harbin, CPA**  
Executive Secretary

# Fiduciary Overview

Fiduciary training helps fiduciaries understand:

- What is a fiduciary?
- Sources and standards of fiduciary duties



# What is a Fiduciary?

- Highest duty in law
- Undivided loyalty — Trustees must discharge duties solely in interest of plan participants and beneficiaries and for exclusive purpose of providing benefits to them.
- Trustees should avoid any conflict of interest in which the trustee's interests conflict with interests of plan participants and beneficiaries.



## Definitions

**Fiduciary:** “The term is derived from the Roman law, and means a person holding the character of a trustee, or a character analogous to that of a trustee, in respect to the trust and confidence involved in it and the scrupulous good faith and candor which it requires. A person having a duty, created by his or her undertaking, to act primarily for another’s benefit in matters connected with such an undertaking ... A person who manages money or property for another and who must exercise a standard of care in such management activity imposed by law or contract. A trustee, for example, possesses a fiduciary responsibility to the beneficiaries of the trust to follow the terms of the trust and the requirements applicable to state law.”

**Trustee:** “Person holding property in trust. The person appointed, or required by law, to execute a trust: one in whom an estate, interest, or power is vested, under an express or implied agreement to administer or exercise it for the benefit or the use of another.”

Black’s Law Dictionary, Fifth Edition (1979)

## Common and Case Law Guidelines

“The first duty of a trustee is the duty of loyalty.” Bryan, et al. v. Security Trust Co., Ky., 176 S.w.2d 104 (1943).

“He [a trustee] owes the duty of utmost fidelity and loyalty to the beneficiary...” Hutchings, et al. v. Louisville Trust Company, Ky., 276 S.W.2d 461 (1954).

# Sources of Fiduciary Duty

Federal  
Law

Common  
Law

State  
Law

Plan and Plan-  
Related Documents

Fiduciaries have a duty to administer a plan in good faith in accordance with law and its written plan documents and procedures.



## **Federal Law**

Internal Revenue Code

## **State Law**

Kentucky Revised Statutes

Kentucky Administrative Regulations

Kentucky Executive Branch Code of Ethics

## **Common Law**

Restatement (Third) of Trusts (Compilation of common law)

Uniform Management of Public Employee Retirement Systems Act

(UMPERSA) (Not adopted in Kentucky)

## **Plan and Plan-Related Documents**

Trust Documents

Board policies

# Fiduciary Duty in Brief

## General Conduct

1. **Honesty and Duty of Full Disclosure** — Trustees must disclose any material fact that could influence in any way the trustee's decisions, actions or willingness to make decisions or to take action. Abstain from votes where trustee has a conflict.
2. **Avoiding Appearance of Impropriety** — “Front Page Test”
3. **Due Care** — The standard is: “What would a prudent public pension plan trustee do?”



# Fiduciary Duty in Brief

## Specific Duties Owed to Plan Participants and Beneficiaries

1. Providing due process.
2. Informing about the plan.
  - Summary plan description, newsletters, website and social media.
3. Protecting the fund.
  - Preventing incursions into fund for political objectives.
  - Requesting actuarially sound contributions to fund.
  - Requiring and collecting contributions when due.
4. Investing solely to provide legal benefits to plan participants and beneficiaries.

Trustees do not have to be investment experts. They do need to feel assured that they have employed competent investment staff and managers with adequate checks and safeguards.



# Ethics Standards

Ethics training helps trustees understand:

- Duties under Code of Conduct for Members of a Pension Scheme Governing Body
- Kentucky Executive Branch Code of Ethics
- Teachers' Retirement System of the State of Kentucky (TRS) statutes and policies





# Ethics Duties

Duties Under Code of Conduct for Members of a Pension Scheme Governing Body

CODE OF CONDUCT  
FOR MEMBERS OF A  
PENSION SCHEME  
GOVERNING BODY



# Ethics Duties

## Duties Under Code of Conduct for Members of a Pension Scheme Governing Body

### Code of Conduct Pension trustees

1. Act in good faith and in the best interest of the scheme participants and beneficiaries.
2. Act with prudence and reasonable care.
3. Act with skill, competence, and diligence.
4. Maintain independence and objectivity by, among other actions, avoiding conflicts of interest, refraining from self-dealing, and refusing any gift that could reasonably be expected to affect their loyalty.
5. Abide by all applicable laws, rules, and regulations, including the terms of the scheme documents.
6. Deal fairly, objectively, and impartially with all participants and beneficiaries.
7. Take actions that are consistent with the established mission of the scheme and the policies that support that mission.
8. Review on a regular basis the efficiency and effectiveness of the scheme's success in meeting its goals, including assessing the performance and actions of scheme service providers, such as investment managers, consultants, and actuaries.
9. Maintain confidentiality of scheme, participant, and beneficiary information.
10. Communicate with participants, beneficiaries, and supervisory authorities in a timely, accurate, and transparent manner.



# Executive Branch Code of Ethics

Statement of Public Policy  
Prohibited Conflicts of Interest  
When to Abstain  
Prohibited Acts  
Acceptance of Gifts  
Statements of Financial Disclosure



# Executive Branch Code of Ethics

## Statement of Public Policy

The public policy of the commonwealth requires that:

- A public servant must be independent and impartial;
- Decisions and policies must be made through the established processes of government;
- A public servant should not use public office to obtain private benefits; and
- The public has confidence in the integrity of its government and public servants.

(KRS 11A.050)



# Executive Branch Code of Ethics

## Prohibited Conflicts of Interest

**No public servant, by himself or through others, shall knowingly use or attempt to use his influence:**

- In any matter that involves a substantial conflict between a personal/private interest and duties in public interest;
- To obtain financial gain
- To secure or create privileges, exemptions, advantages or treatment for himself or others in derogation of the public interest at large.

(KRS 11A.020)



**No public servant, by himself or through others, shall knowingly:**

- Use or attempt to use his or her influence in any matter which involves a substantial conflict between his or her personal or private interest and his or her duties in the public interest;
- Use or attempt to use any means to influence a public agency in derogation of the state at large;
- Use his or her official position or office to obtain financial gain for him or herself or any members of the public servant's family; or
- Use or attempt to use his or her official position to secure or create privileges, exemptions, advantages, or treatment for him or herself or others in derogation of the public interest at large.

If a public servant appears before a state agency, he or she shall avoid all conduct which might in any way lead members of the general public to conclude that the public servant is using his or her official position to further his or her professional or private interest.

When a public servant abstains from action on an official decision in which the public servant may have a personal or private interest, he or she shall disclose that fact in writing to his superior, who shall cause the decision on these matters to be made by an impartial third party.

*Source: KRS 11A.020*

# Executive Branch Code of Ethics

## When to Abstain

Some guidelines for determining whether to abstain:

- Does a personal interest creates a substantial threat to independence of judgment;
- Is participation likely to have any significant effect on the disposition;
- Will the decision affect the public servant differently from the public or differently from others in similar positions (i.e., jobs)
- A public servant may request an advisory opinion from the Executive Branch Ethics Commission in accordance with the Commission's rules of procedure.



(KRS 11A.030)

## When to Abstain from Acting on an Official Decision

In determining whether to abstain from action on an official decision because of a possible conflict of interest, a public servant should consider the following guidelines:

- Whether a substantial threat to his or her independence of judgment has been created by the public servant's personal or private interest;
- The effect of his or her participation on public confidence in the integrity of the executive branch;
- Whether his or her participation is likely to have any significant effect on the disposition of the matter;
- The need for his or her particular contribution, such as special knowledge of the subject matter, to the effective functioning of the executive branch; or
- Whether the official decision will affect the public servant in a manner differently from the public or will affect the public servant as a member of a business, profession, occupation, or group to no greater extent generally than other members of such business, profession, occupation, or group. A public servant may request an advisory opinion from the Executive Branch Ethics Commission in accordance with the Commission's rules of procedure.

*Source: KRS 11A.030*

# Executive Branch Code of Ethics

## Prohibited Acts

### Examples:

- Knowingly disclosing or using confidential information gained in duties.
- Knowingly undertaking, bidding on, negotiating, or enjoying any agreement or purchase made or awarded by the agency where the public servant is employed or supervises for himself or a business where he owns at least 5%.
- Knowingly accepting compensation, other than that provided by law, for performance of official duties without the prior commission approval.
- Violating employment restrictions.
- Lobbying and representation restrictions for one year.

(KRS 11A.040)



#### A public servant is prohibited from the acts as follow:

- A public servant, in order to further his or her own economic interests, or those of any other person, shall not knowingly disclose or use confidential information acquired in the course of his or her official duties.
- A public servant shall not knowingly receive, directly or indirectly, any interest or profit arising from the use or loan of public funds in his or her hands or to be raised through any state agency.
- A public servant shall not act knowingly as representative or agent for the state or any agency in any business or regulatory action with him or herself, or with any business that the public servant or family member has any interest greater than 5 percent.
- A public servant shall not knowingly him or herself or through any business in which he or she owns or controls an interest of more than five percent (5%), or by any other person for the public servant's use or benefit or on the public servant's account, undertake, execute, hold, bid on, negotiate, or enjoy, in whole or in part, any contract, agreement, lease, sale, or purchase made, entered into, awarded, or granted by the agency by which the public servant is employed or which the public servant supervises, subject to the provisions of KRS 45A.340.
- A public servant shall not knowingly accept compensation, other than that provided by law for public servants, for performance of his or her official duties without the prior approval of the Commission.
- A former officer or public servant listed in KRS 11A.010(9)(a) to (g) shall not, within six months of termination of his or her employment, knowingly by himself or through any business in which the public servant owns or controls an interest of at least 5 percent, or by any other person for his use or benefit or on the public servant's account, undertake, execute, hold, bid on, negotiate or enjoy, in whole or in part, any contract, agreement, lease, sale or purchase made, entered into, awarded or granted by the agency by which the public servant was employed. This provision shall not apply to a contract, purchase or good faith negotiation made under KRS 416 relating to eminent domain or to agreements that may directly or indirectly involve public funds disbursed through entitlement programs. This provision shall not apply to purchases from a state agency that are available on the same terms to the general public or made at public auction. This provision shall not apply to former Department of Public Advocacy officers whose continued representation of clients is necessary.
- A present or former officer or public servant listed in KRS 11A.010(9)(a) to (g) shall not, within six months after termination of office or employment, accept employment, compensation or other economic benefit from any person or business that contracts or does business with or is regulated by the state in matters in which the public servant was directly involved during the last 36 months of his or her tenure. This provision shall not prohibit an individual from returning to the same business, firm, occupation or profession in which he or she was involved prior to taking office or beginning his or her term of employment, or for which the public servant received, prior to state employment, a professional degree or license, provided that, for 6 months, he or she refrains from working on any matter in which the public servant was directly involved during the last 36 months in state government. This subsection shall not prohibit the ministerial functions, including but not limited to filing tax returns, filing permit or license applications or filing incorporation papers, nor shall it prohibit the former officer or public servant from receiving public funds disbursed through entitlement programs.
- A former public servant shall not act as a lobbyist or lobbyist's principal in matters in which he or she was directly involved during the last 36 months of his or her tenure for a period of one year after the latter of:
  - (a) The date of leaving office or termination of employment; or
  - (b) The date the term of office expires to which the public servant was elected.
- A former public servant shall not represent a person or business before a state agency in a matter in which the former public servant was directly involved during the last 36 months of his or her tenure, for a period of one year after the latter of:
  - (a) The date of leaving office or termination of employment; or
  - (b) The date the term of office expires to which the public servant was elected.
- Without the approval of his or her appointing authority, a public servant shall not accept outside employment from any person or business that does business with or is regulated by the state agency for which the public servant works or which he or she supervises, unless the outside employer's relationship with the state agency is limited to the receipt of entitlement funds.
  - (a) The appointing authority shall review administrative regulations established under KRS Chapter 11A when deciding whether to approve outside employment for a public servant.
  - (b) The appointing authority shall not approve outside employment for a public servant if the public servant is involved in decision-making or recommendations concerning the person or business from which the public servant seeks outside employment or compensation.
  - (c) The appointing authority, if applicable, shall file quarterly with the Executive Branch Ethics Commission a list of all employees who have been approved for outside employment along with the name of the outside employer of each.

Source: KRS 11A.040

# Executive Branch Code of Ethics

## Acceptance of Gifts

**Generally, Board Governance Manual says gifts should be avoided.**

The Executive Branch Code provides:

“No public servant ... shall accept any gifts ... totaling more than \$25 in a calendar year from any person or business that does business with ... the agency in which the public servant is employed or which he or she supervises ... .”

Not included: Gifts from family, campaign donations or prizes available to public.  
(KRS 11A.010(5))

**BUT: Even if otherwise allowed, gifts are a problem if made quid pro quo.**

(KRS 11A.045)



**As a general rule, gifts should be avoided per the TRS Governance Manual.**

The Executive Branch Code of Ethics provides that:

- No public servant, spouse, or dependent child knowingly shall accept any gifts or gratuities, including travel expenses, meals, alcoholic beverages and honoraria, totaling more than \$25 in a calendar year from any person or business that does business with, is regulated by, is seeking grants from, is involved in litigation against or is lobbying or attempting to influence actions of the agency in which the public servant is employed or which he or she supervises, or from any group or association that has as its primary purpose the representation of those persons or businesses. Nothing in this subsection prohibits the commission from authorizing exceptions where such exemption would not create an appearance of impropriety.
- Nothing in KRS 11A shall prohibit or restrict the allocation of or acceptance by a public servant of a ticket for admission to a sporting event if the ticket or admission is paid for by the public servant at face value or is paid for at face value by the individual to whom the ticket is allocated.

*“Gift” is defined, in part, as “anything of value”, unless consideration of equal or greater value is received; “gift” does not include gifts from family members, campaign contributions, or door prizes available to the public.” KRS 11A.010(5) Note: Gift exceptions are still a problem if made on a quid pro quo basis. Source: KRS 11A.045*



# Executive Branch Code of Ethics

## Statements of Financial Disclosure

Each officer, each public servant listed in KRS 11A.010(9)(a) to (g), and each candidate shall file a statement of financial disclosure with the commission.

(KRS 11A.050)



Looking at TRS investment performance as of June 30, 2018 we can see on the top line the Gross returns exceed the 7.5 percent assumed rate of return for all but the 20-year period that included the Tech.com bubble bursting and the Great Recession.

The gross return for 2018 fiscal year is 10.81 percent. Another great year for investment returns. We announced a preliminary number return number just recently for the annuity of x.xx percent. It's a great return in a year of tremendous market volatility. Compared to the market performance of TRS's benchmarks, the pension outperformed the benchmark in every timeframe shown.

On the yellow line, which shows the ranking your investment team earned from TRS's investment consultant among the other pensions in its database, the performance is top 10 percent or better for anything that's one year or more, and top 4 percent for the one-year and 2% for the 10-year numbers.

Comparing the Gross to the net returns, you can see how the investment team is keeping expenses to a minimum.

Most importantly, TRS is a long-term investor and the 30-year return is at 8.39 percent – higher than the assumed rate of return of 7.5 percent. Good for you and good for your pension.

# TRS Conflict of Interest Statute

## **No trustee or employee of the board shall:**

1. Have any interest, direct or indirect, in the gain or profits of any investment or transaction made by the board;
2. Use any TRS assets except to make payments authorized by the board;
3. Become an endorser, surety, or obligor for moneys loaned to or borrowed from the board;
4. Have a contract with TRS individually or through a business;
5. Use his or her official position with TRS to obtain a financial benefit;
6. Use confidential TRS information to further personal economic interests; or
7. Generally, hold outside employment with any person or business that he or she has involvement as part of TRS position.

(KRS 161.460)



Trustees, staff and managers sign statements of adherence to the law and policies.

## **No trustee or employee of the board shall:**

1. Have any interest, direct or indirect, in the gain or profits of any investment or transaction made by the board;
2. Directly or indirectly for himself or as an agent for another, use any of the assets of the retirement system in any manner except to make current and necessary payments authorized by the board;
3. Become an endorser, surety, or obligor for moneys loaned to or borrowed from the board;
4. Have a contract or agreement with the retirement system, individually or through a business owned by the trustee or the employee;
5. Use his or her official position with the retirement system to obtain a financial gain or benefit or advantage for himself or herself or a family member;
6. Use confidential information acquired during his or her tenure with the retirement system to further his or her own economic interests or that of another person; or
7. Hold outside employment with, or accept compensation from, any person or business with which he or she has involvement as part of his or her official position with the retirement system. The provisions of this subsection shall not prohibit a trustee from serving as an employee of an agency participating in the Teachers' Retirement System.

*Source: KRS 161.460*

# Policy & Form

## BOARD GOVERNANCE MANUAL

### APPENDIX 7 CONFLICT OF INTEREST AND CONFIDENTIALITY POLICY

#### INTRODUCTION

##### 1. Adoption of Conflict of Interest and Confidentiality Policy

Pursuant to the provisions of KRS 161.250, the Board of Trustees (board) of the Teachers' Retirement System of the State of Kentucky (TRS) is vested with the responsibility for the general administration and management of the retirement system. The Board may adopt procedures necessary to conduct the business of the retirement system as needed. The law shall control if any inconsistency exists between the law and this policy.

##### 2. Statement of Conflict of Interest and Confidentiality Policy

TRS recognizes the need to maintain the public's confidence and trust in the integrity of TRS and the Commonwealth of Kentucky. Individuals associated with TRS must not engage in activities that have the potential to become a conflict of interest in their association with TRS. Likewise, individuals associated with TRS must not release information about TRS or any of its members that would breach any duty to protect such information. TRS recognizes the need to establish procedures to prevent such conflicts or breaches.

##### 3. Purpose

The purpose of this Conflict of Interest and Confidentiality Policy is to: establish which individuals are subject to TRS's conflict of interest provisions; establish the specific standards of conduct with regard to conflict of interest; establish standards with regard to the confidentiality of information; and establish procedures for obtaining written conflict of interest statements and confidentiality agreements from certain individuals.

##### 4. Procedures Regarding Conflicts of Interest and Confidentiality

###### A. Application of Policy

- 1) This policy shall apply to all individuals who have a statutory, contractual or working relationship with TRS.
- 2) Individuals affected by this policy shall include, but are not limited to:
  - a) Employees of TRS;
  - b) The board;
  - c) Independent contractors of TRS;

Page 1 of 3

- d) Vendors of TRS;
- e) Employees or Officers of the Commonwealth of Kentucky providing legal or expert advice at the request of TRS; and
- f) Any person acting in a fiduciary capacity for TRS.

###### B. Standards of Conduct Regarding Conflicts of Interest

- 1) Individuals have an obligation to diligently identify, disclose, avoid and manage conflicts of interest.

- 2) Potential conflicts of interest exist when an individual, as an individual or a family member, is directly or indirectly financially impacted, or a decision made by TRS in which the individual

- 3) Individuals and their family members should not engage in any agency doing business with TRS for financial

- 4) Individuals should not be involved in the decision-making process of TRS in which the individual or family member

- 5) Individuals should not conduct business or pursue any agency in which the individual or family member

- 6) Individuals should not accept campaign contributions, services or other compensation made reasonably be inferred that a major purpose of

- 7) Individuals must avoid all conduct that in any way that the individual is using his or her position or political or private interest.

- 8) Individuals not covered by the conflict of interest provisions of this policy shall file a written conflict of interest statement on the form(s) provided by TRS and adopted by the Board of Trustees.

- 9) Individuals not covered by the conflict of interest provisions of this policy shall file a written conflict of interest statement on the form(s) provided by TRS and adopted by the Board of Trustees.

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- 82) Individuals not covered by the conflict of interest provisions of this policy shall file a written conflict of interest statement on the form(s) provided by TRS and adopted by the Board of Trustees.

- 1) Individuals associated with TRS may be granted access to confidential information in the course of being a TRS employee, board member or contractor.

- 2) This information may include, but is not limited to, investment trade data; individual member information, including but not limited to, Social Security numbers, names, addresses, phone numbers, birth dates, beneficiaries, health insurance information, member numbers, documents, records, programs, files, scientific or technical information, and other information made available to individuals for purposes of completing their obligations to TRS.

- 3) These individuals have a duty to keep confidential the information to which they are granted access as a result of their association with TRS.

- 4) TRS and these individuals also recognize that confidential member information is protected under KRS 161.385.

- 5) Written Statements of Conflict of Interest and Confidentiality

- A. On an annual basis, the Executive Secretary, Deputy Executive Secretaries, Chief Investment Officer, Director of Investment Strategies, Chief Financial Officer, the members of the board, independent contractors, vendors of TRS and other persons identified in Section 2 (2) shall file a written conflict of interest statement on the form(s) provided by TRS and adopted by the Board of Trustees.

- B. Upon proposal for contract and continuing on an annual basis, any independent contractors and vendors of TRS shall file a written confidentiality agreement on the form provided by TRS and adopted by the Board of Trustees. This form may be amended to conform to specific needs of the individual vendor or contractor as deemed necessary by general counsel or designee.

- C. Other employees of TRS who may be requested to file a written conflict of interest statement as needed or requested by the board.

- D. An individual who abstains from involvement in an official decision because of a personal or private interest must disclose that fact in writing to the executive secretary.

6. Ethics and Confidentiality

- Individuals as set forth above shall conform to the Executive Branch Code of Ethics with regard to conflicts of interest as set forth in KRS Chapter 11A and this policy. Individuals as set forth above shall conform to the confidentiality requirements of KRS 161.385.

Adopted March 16, 2009; amended September 19, 2016

Page 3 of 3



# Conflict of Interest Statement

## External Service Provider

TEACHERS' RETIREMENT SYSTEM  
OF THE STATE OF KENTUCKY  
EXTERNAL SERVICE PROVIDER  
CONFLICT OF INTEREST STATEMENT

I, \_\_\_\_\_, in my role as \_\_\_\_\_  
for the Teachers' Retirement System of the State of Kentucky  
(TRS), recognize the need to maintain the public's confidence and trust in the integrity of TRS  
and the Commonwealth of Kentucky.

I understand that I have the obligation to diligently identify, disclose, avoid and manage conflicts  
of interest that may arise through my relationship with TRS.

I will conduct my activities with TRS so that I do not advance or protect my own interests or the  
private interests of others with whom I have a relationship, in a way that is detrimental to the  
interests of TRS.

In every instance in which I am acting on behalf of TRS, I will conduct my activities in a manner  
to best promote the interests of TRS.

I agree not to attempt to influence TRS in disregard of the public interest at large.

In all matters where an official decision must be made that may favorably or detrimentally  
impact my own financial interests or the financial interests of other individuals or organizations  
with whom I have a relationship, I will reveal that relationship and abstain from involvement in  
the official decision.

When a conflict of interest arises, or when a potential conflict of interest arises, I will disclose  
that conflict or potential conflict to my contact person at TRS and seek resolution of that issue.

I agree not to violate any conflict of interest statute or principle by the performance of my duties  
with TRS. I will not engage directly or indirectly in any financial or other transaction with a  
trustee or employee of TRS that would violate the standards of the Executive Branch Ethics  
provisions, as set forth in KRS Chapter 11A.

I Agreed this the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_.

Signature \_\_\_\_\_

Name \_\_\_\_\_

Title \_\_\_\_\_

Company \_\_\_\_\_

*Read, sign & return to TRS*



# Conflict of Interest Statement

## Board of Trustees and Employees

*Read, sign & return to TRS*

TEACHERS' RETIREMENT SYSTEM  
OF THE STATE OF KENTUCKY  
BOARD OF TRUSTEES AND EMPLOYEES  
CONFLICT OF INTEREST STATEMENT

I, \_\_\_\_\_, in my role as \_\_\_\_\_  
for the Teachers' Retirement System of the State of Kentucky  
(TRS), recognize the need to maintain the public's confidence and trust in the integrity of TRS  
and the Commonwealth of Kentucky.

I understand that I have the obligation to diligently identify, disclose, avoid and manage conflicts  
of interest that may arise through my relationship with TRS.

I will conduct my activities with TRS so that I do not advance or protect my own interests or the  
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interests of TRS.

In every instance in which I am acting on behalf of TRS, I will conduct my activities in a manner  
to best promote the interests of TRS.

I agree not to attempt to influence TRS in disregard of the public interest at large.

In all matters where an official decision must be made that may favorably or detrimentally  
impact my own financial interests or the financial interests of other individuals or organizations  
with whom I have a relationship, I will reveal that relationship and abstain from involvement in  
the official decision.

When a conflict of interest arises, or when a potential conflict of interest arises, I will disclose  
that conflict or potential conflict to the TRS Executive Secretary, or his or her designee, and seek  
resolution of that issue.

I agree not to violate any conflict of interest statute or principle by the performance of my duties  
with TRS. I will not engage directly or indirectly in any financial or other transaction with a  
trustee, employee of TRS or any other person or organization that would violate the standards of  
the Executive Branch Ethics provisions, as set forth in KRS Chapter 11A.

Agreed this the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_.

Signature \_\_\_\_\_  
Name \_\_\_\_\_  
Title \_\_\_\_\_



# Summary

The provisions of the Executive Branch Code of Ethics and the TRS Conflict of Interest statute provide base guidelines for conduct. As always, it is important to be mindful that TRS needs to avoid not only any actual impropriety, but also even the appearance of impropriety. Just because the code or statute may not prohibit something does not mean that it is OK.



Looking at TRS investment performance as of June 30, 2018 we can see on the top line the Gross returns exceed the 7.5 percent assumed rate of return for all but the 20-year period that included the Tech.com bubble bursting and the Great Recession.

The gross return for 2018 fiscal year is 10.81 percent. Another great year for investment returns. We announced a preliminary number return number just recently for the annuity of x.xx percent. It's a great return in a year of tremendous market volatility. Compared to the market performance of TRS's benchmarks, the pension outperformed the benchmark in every timeframe shown.

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Comparing the Gross to the net returns, you can see how the investment team is keeping expenses to a minimum.

Most importantly, TRS is a long-term investor and the 30-year return is at 8.39 percent – higher than the assumed rate of return of 7.5 percent. Good for you and good for your pension.



## ***Our Members Come First!***

**800-618-1687**

**8 a.m. – 5 p.m. ET  
Monday – Friday**

**[info@trs.ky.gov](mailto:info@trs.ky.gov)**  
**<https://trs.ky.gov>**

***Protecting & Preserving Teachers' Retirement Benefits***

Thank you for your time and if time permits, I'll answer a few questions or, if I don't have the answer, take them back to the office and get back with you.

# Kentucky Teachers' Retirement System

## Overview of Governmental Plans

Audra Ferguson-Allen  
Robert L. Gauss

**November 23, 2020**



# Overview

- Qualified Retirement Plans
- Governmental Plan Status
- Washington Update

# QUALIFIED RETIREMENT PLANS

# What is a Pension Plan?

- Established and maintained by an employer(s)
- To provide definitely determinable benefits
- Payments made to employees over a period of years (primarily after retirement)
- Assets held in trust
- Trustees and others subject to fiduciary duties

# Qualified Retirement Plans



Code § 401(a)

Provides qualification requirements for tax-favored treatment



Code § 414(d)

Defines "governmental plan"

# Additional Sources of Qualification Requirements



# Importance of Qualification: Tax Advantage

## Trust

- Earnings are not taxable
- Tax recapture is available in tax treaty countries

## Employer

- No employment taxes on contributions

## Member

- Employee/employer contributions are not currently taxable (as income) until distribution
- Favorable tax treatment upon distribution
- No employment taxes when contributions are made or benefits are paid

# Is a Plan Qualified? How to Know

IRS issues determination letters to confirm the qualified status of a retirement plan

Rev. Proc. 2016-37 curtails determination letter program for individually designed retirement plans

- Trying to encourage plans to use volume submitter (master-prototype plans)
- Determination letters for individually designed plans (currently) only available if: (1) first application or (2) at plan termination
- Expiration dates in current determination letters are no longer operative
- KTRS' current determination letter is dated September 12, 2014

# Types of Qualified Plans



Defined Contribution

- Does not include 457(b) plans

Defined Benefit

Hybrid Defined Benefit



# GOVERNMENTAL PLAN STATUS

# Governmental Plans: Definition

- Code § 414(d) defines “governmental plan” as
  - a plan established and maintained for its employees by the Government of the United States, by the government of any State or political subdivision thereof, or by any agency or instrumentality of any of the foregoing . . . .

# Membership in a Qualified Governmental Plan



# Governmental Plans: Exemptions

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ERISA

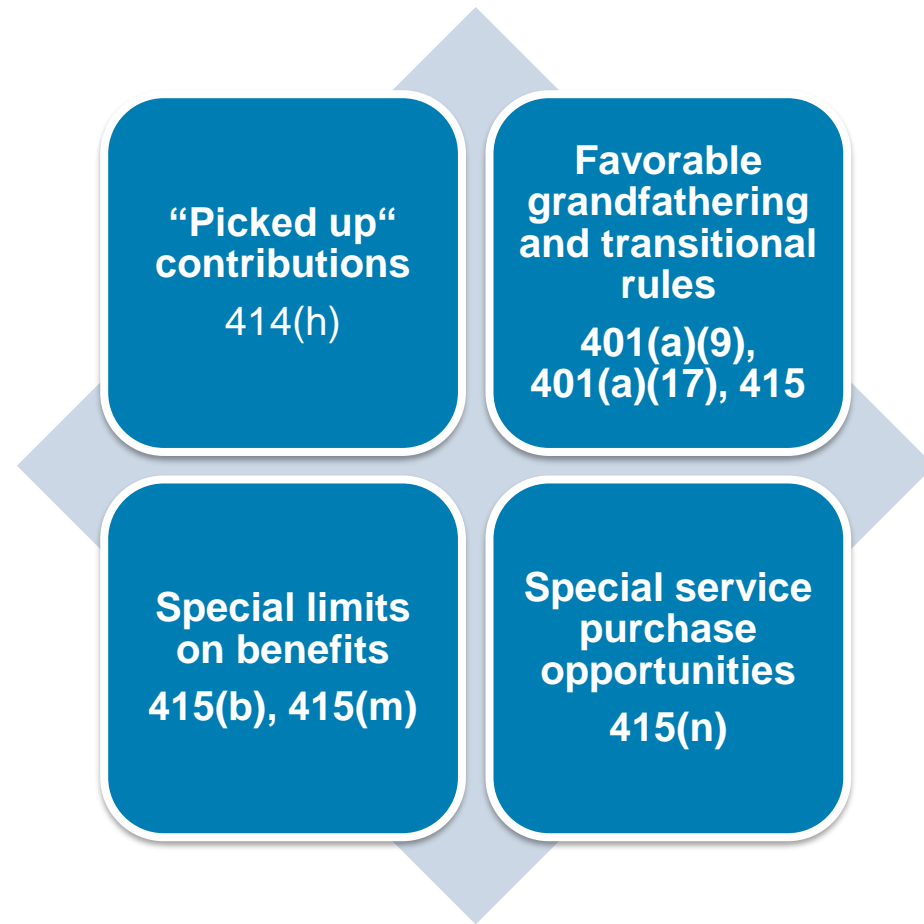
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Pension Benefit Guaranty Corporation  
Premium Payments

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ERISA Related Code Requirements

# Governmental Plans: Favorable Code Provisions



# Governmental Plans: IRS Guidance

ANPRM (REG-157714-06)

**Nov. 2011**

**Feb. 2015**

Notice 2015-7 – Charter School Guidance

# Governmental Plans: ANPRM

- ANPRM contains draft proposed regulations defining “governmental plan”
  - Federal government
  - Federal instrumentality or agency
  - State governments
  - Political Subdivisions of a State
  - Instrumentality or agency of a State or Political Subdivision

# Governmental Plans: ANPRM (Cont'd)

## Political subdivisions

- Governing body must be publicly elected or appointed by state officials AND
- Must exercise sovereign powers (taxation, eminent domain, police power)



# Governmental Plans: ANPRM (Cont'd)

## Instrumentality or agency

- 5 main factors
- 8 other factors

## Critical issues

- Control of Operations
- Funding (direct through tax revenues or other)
- Statutory Authorization
- Treatment of Employees
- Tax Status
- Any Judicial decision by State or Federal Court
- Serves a Government Purpose

# Governmental Plans Status

## What are the big issues?

Privatizations

Charter  
schools

For  
profit/non-  
profit entities

Economic  
Development  
Entities

Municipal  
Utilities

Associations

Volunteer  
Fire  
Departments

# Where are we on the definition of a Governmental Plan?



# Exclusive Benefit Rule: Code § 401(a)(2)

Plan must be established and operated for the Exclusive Benefit of employees and their beneficiaries

Plan must make it impossible ...for any of the corpus or income to be...used for, or diverted to, purposes other than for the exclusive benefit of employees or their beneficiaries

# Prohibited Transactions: Code § 503(b)

## Plans may not engage in Prohibited Transactions

- Self-dealing in investments
- Loans
- Exchange of non-liquid assets for employer contributions
- Excess payment for services mandated by the plan sponsor
- Substantial diversion of income to a plan sponsor

# WASHINGTON UPDATE

# Impact of the Election on Retirement Policy

- A Republican majority in the Senate makes wholesale change to the tax structure of retirement savings (i.e. “rothification”) less likely
- Biden administration may pursue policies through the regulatory process or take steps to revise or undo rules published by the Trump administration (but unlikely)
  - environmental, social and governance investments, proxy voting, use of private equity in 401(k) plans and the fiduciary definition

# Impact of the Election on Retirement Policy

- Biden may be more willing to work with Republicans.
- Likelihood of Retirement Legislation?
- Potential for Medicare age reduction?
- Financial Transaction Tax?



# Upcoming Retirement Legislation

- Securing a Strong Retirement Act of 2020
  - Increase RMD age to 75 for years 2021 and later
  - Allow 403(b) plans to use collective investment trusts (CITs)
  - Remove first-day-of-the-month rule for 457(b) plans
  - Create an exemption to RMD rules for individuals with less than \$100,000 (total) in DC plans
  - Exclusion of disability benefits from income for first responders

# Questions?



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# Teachers' Retirement System of the State of Kentucky

Briefing to Trustee Workshop

November 23, 2020

# Briefing Agenda

- Background on national perspectives
- Initial PTA perspective on 2021 Plan
- Review of process of 2015 TRS Work Group
- Key findings from TRS Work Group
  - Presentation to Public Pension Oversight Board

# National Perspectives

- Expected Rate of Return
  - NIRS presentation 16 November 2020
  - <https://www.youtube.com/watch?v=li3deqOfdJQ&feature=youtu.be>
- Risk Sharing Plans

# Actuaries Report Pension Costs and Liabilities Based on Expected Return

- **Before ERISA (1970s):** Public Pensions tended to invest mostly in fixed income securities
  - Actuaries used bond yields as the assumed rate of return
  - Created well-matches cost and liability determination
- **1980s:** Most funds continued to shift to more equity investments
  - Assumed rates of return crept up to recognize equity risk premium in costs and liabilities
  - High inflation meant that assumed rates of return were still conservative
- **1990s:** Sustained bull market made 8% return assumptions look overly conservative
  - 401(k)'s looked more attractive than “stodgy” DB plans built around only an 8% return

# Implications of using a single assumed rate of return

- Decision makers get incomplete picture of costs and liabilities
- No recognition of risk of not earning assumed rate
- The single number approach gives undue credence to the costs and liabilities
- Financial economists argued that single rate must be market-based
  - This meant risk-free rate
  - This rate is often appropriate for determining settlement values
- Many economists and actuaries support market-value liability (MVL) approach as single rate
  - Consistent with insurance pricing
  - Consistent with pricing assets which trade

# Public plans / actuaries have challenged appropriateness & usefulness of MVL

- Unlike private sector pensions which can be bought and sold, public pensions do not trade as a marketable security
- Tremendous opportunity for mis-information
- MVL accrued benefit basis inconsistent with public plan benefit promise
- Distorts comparisons between DB (if based on risk-free rates) and DC (when thought of by participants as opportunity to earn based on balanced portfolio)
- Not a useful risk measure, unlike other approaches





# Actuarial Standards Of Practice

- US Credentialed Actuaries are bound by Actuarial Standards of Practice (ASOPs)
  - Member, American Academy of Actuaries
  - Fellow or Associate, Society of Actuaries
  - Fellow, Conference of Consulting Actuaries
- ASOPs developed by leading actuaries
- We are also subject to Code of Professional Conduct
  - Integrity
  - Only do work if qualified
  - Must follow ASOPs
  - Self-policing
  - Ten other precepts to the code of conduct

# ASOP 4 (Measuring Pension Costs) Changes

## – Overview

- **Liabilities must additionally be measured based on a “Low-Default-Risk Obligation Measure” (LDROM)**
  - This is consistent with risk-free rate
  - Strong push-back from plans and practicing actuaries
  - Loosened to permit liability measurement to be consistent with ongoing liability measurement – permits meaningful calculation of value of investing in riskier assets
- **Requires “Reasonable Actuarially Determined Contribution”**
  - Generally viewed as positive requirement
  - Some necessary technical changes may lead to delay in final standard

# ASOP 51 on Measuring Pension Risk



**"All models are wrong but some are useful."**

**George E.P. Box**

# Risk-Sharing plan designs are becoming more popular, due to:

- Employer financial challenge of increasing required contributions under traditional Defined Benefit (DB) model where employer takes on entire risk of underfunding, including
  - Decrease in prevailing interest rates, which increase costs and liabilities
  - Longer lifespans, which increase costs and liabilities
- Failure of pure Defined Contribution (DC) plans in providing adequate retirement
- Success of risk sharing plans in other states

# Risk-Sharing plan examples



Wisconsin Retirement System



Ohio Retirement Systems



South Dakota Retirement Systems



Colorado Fire and Police Pension Association



Texas Municipal Retirement System



Tennessee Consolidated Retirement System



Maine Local Consolidated Retirement Plan



Alaska proposed public safety plan



New Brunswick Shared Risk Plans

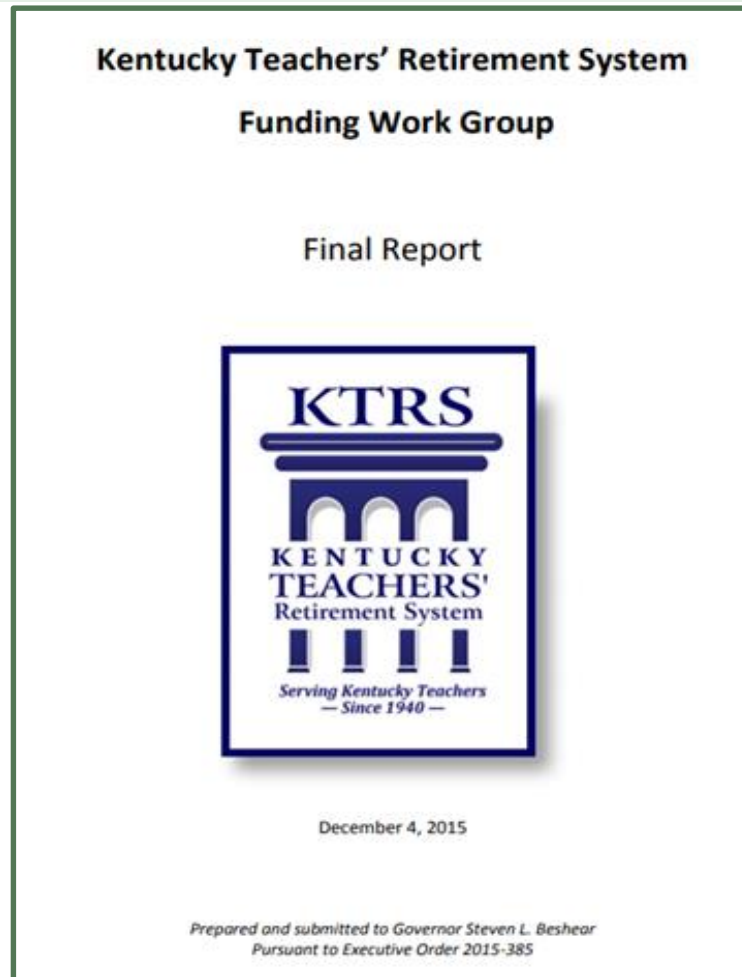


Defined Ambition Plans in Netherlands

# Initial thoughts on proposed 2021 plan

- Consistent with best designs of other states' risk-sharing plans
- Protects employer costs from increase in liabilities
- Provides members with increased security through
  - Pooled, professionally managed investments
  - Pooled longevity risk prevents outliving assets

# 2015 TRS Funding Work Group



<https://trs.ky.gov/administration/ktrs-funding-work-group/>

# 2015 TRS funding work group members

David Karem	Work Group Chair KY Board of Education	Gary Harbin	KY Teachers' Retirement System
Dave Adkisson	KY Chamber of Commerce	Rep. Jeff Hoover	House Minority Floor Leader
Mike Armstrong	KY School Boards Association	Mary Lassiter	Governor Beshear's Executive Cabinet
Jason Bailey	Kentucky Center for Economic Policy	Timothy Longmeyer	KY Personnel Cabinet
Mary Ann Blankenship	KY Education Association	Roger Marcum	KY Board of Education
Sen. Joe Bowen	Chair, State and Local Government Committee; Co-Chair, Public Pension Oversight Board	Sen. Morgan McGarvey	KY Senate
Jane Driskell	KY Office of State Budget Director	Brent McKim	Jefferson County Teachers' Association
Adam Edelen	KY Auditor of Public Accounts	Brigitte Blom Ramsey	Prichard Committee for Academic Excellence
Amanda Ellis	KY Department of Education	Tom Shelton	KY Association of School Superintendents
Lori Flanery	Secretary KY Finance Cabinet	Rep. Greg Stumbo	Speaker of the House
Rep. Derrick Graham	Chair, House Education Committee	Sen. Damon Thayer	Senate Majority Floor Leader
Todd Hollenbach	KY State Treasurer	Bob Wagoner	KY Retired Teachers Association
		Wayne Young	KY Association of School Administrators



# 2015 TRS work group recommendations

- The special appropriation and debt service savings, commonly known as green box and yellow box dollars, should stay with TRS to help address the unfunded liability in the pension fund as the associated obligations go offline and the funds become available for this purpose.
- TRS prepare very thorough projections and adjustment impacts
- Encourages the Governor, General Assembly and all stakeholders to continue meaningful dialogue that has taken place over the last six months. While it was not possible to reach consensus around a single specific solution, common ground was found, and it is reasonable to expect that a solution can be identified

# 2015 TRS work group guiding principles

The following fundamental beliefs influenced the discussions of the Work Group and formed the parameters within which various scenarios and components of a comprehensive solution were considered:

1. The status quo is unsustainable. While the projected date of insolvency may vary based upon the assumptions made and accounting models used, doing nothing leaves the Kentucky Teachers' Retirement System on a pathway to insolvency.
2. Full funding of TRS should be achieved within 30 years – by 2046.
3. This Work Group recommends preservation of all components of the inviolable contract between the Commonwealth of Kentucky and current educators.
4. Approaches to improving the solvency of TRS must be multi-faceted. A combination approach of increased contributions and benefit adjustments will put TRS on the path to financial health and stability.

# 2015 TRS work group guiding principles (continued)

5. Actions taken as a result of this Work Group report should be long-term. Actions that involve phasing-in additional contributions must be balanced against the need to share responsibility equitably between current and future Kentuckians/taxpayers who ultimately fund the employer contribution to the Teachers' Retirement System.
6. The current underfunding of the Teachers' Retirement System is negatively affecting the Commonwealth's credit and bond ratings. Lack of action to fund the system during the 2016 legislative session will do further harm to the Commonwealth's credit and bond ratings.
7. Benefits for current TRS retirees and their beneficiaries should be exempt from any reductions in accordance with current Kentucky law.
8. Following the spirit used to address the retiree health insurance costs by the 2010 General Assembly in House Bill 540, a multi-faceted and comprehensive solution to address pension system underfunding may include shared responsibilities among the Commonwealth, school districts, and members of the TRS.

# 2015 TRS work group guiding principles (continued)

9. The Work Group urges that TRS funding be treated as among the highest level budget priorities. The Governor and General Assembly should, in as fiscally responsible manner as possible, move toward fully funding the actuarially required contribution for future budget periods. Any plan to return TRS to financial health and stability should contain meaningful reforms, sound actuarial assumptions and additional appropriations to satisfy the bond rating agencies that will ultimately judge Kentucky's level of fiscal discipline or lack thereof.
10. The need for additional funding of TRS has been solidly demonstrated and all options for making the required actuarial contributions now and in the future should be considered by the General Assembly. This is also necessary to minimize the untimely sale of assets to pay benefits, which over time may hurt investment performance.
11. A high-quality education workforce is necessary to achieve our education and economic goals for Kentucky. Decisions made about the Kentucky Teachers' Retirement System should recognize and consider the impact on the total compensation package for teachers, ensuring continued attractiveness of the profession to high quality candidates and retention of effective professionals. This report is intentionally silent on the causative factors which may have contributed to the current financial circumstances of TRS.

# 2015 TRS work group: Components of a Comprehensive Solution

- Increased Contributions
- Benefit Adjustments
  - Current Teachers
  - Future Teachers
  - Increased Member Contributions
- Defined Contribution Plan
  - Increased costs were enumerated

# Kentucky Teacher Retirement System Funding Work Group

Briefing to Public Pension Oversight Board  
November 23, 2015

***Goal:** Make recommendations to strengthen the solvency of the TRS*

# PPOB Briefing

- Thank you for inviting us to summarize our process and findings
- We will be showing excerpts of key slides from our seven meetings
- Robust discussions
- Materials available online and KET
- Have utilized interactive projection workbook

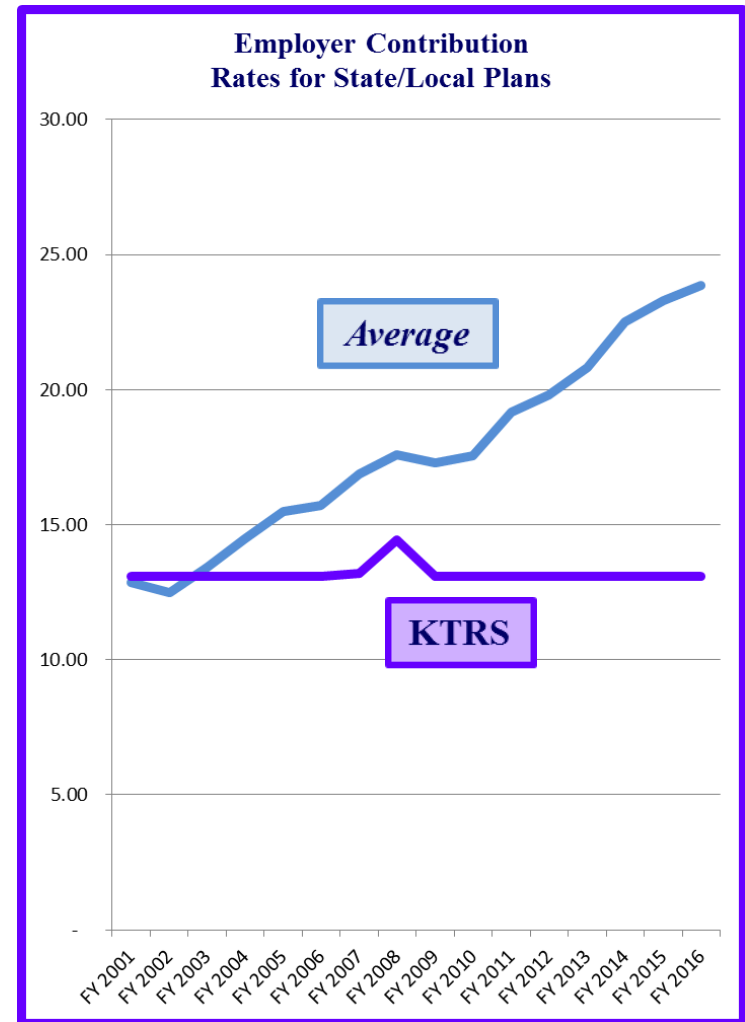
# Key Points from July 17 – TRS Presentation

- TRS benefits are important to Kentucky
- Future teacher benefit normal cost is 15.68% of pay
  - Members pay 9.11%
  - Leaving 6.58% for State, only 0.28% above 6.20% Social Security would require
- TRS investment capabilities are not the problem
- TRS administrative costs are not the problem
- Many problems have been essentially “solved”
  - Air time
  - Return to work
- Have begun to prefund retiree health
  - And adopted cost control measures



# Key Points from July 17, continued

- TRS Statutory Contribution is significantly below the Actuarially Required Contribution
- Other States are too, but TRS is trailing, according to Boston College study
- Currently about \$500 million below ARC
  - \$551 million contribution budgeted FY 2016
  - \$487 million short of ARC
- Pension Obligation Bond helps, but primarily because it softens phase-in to ARC funding



# Key Points from July 31

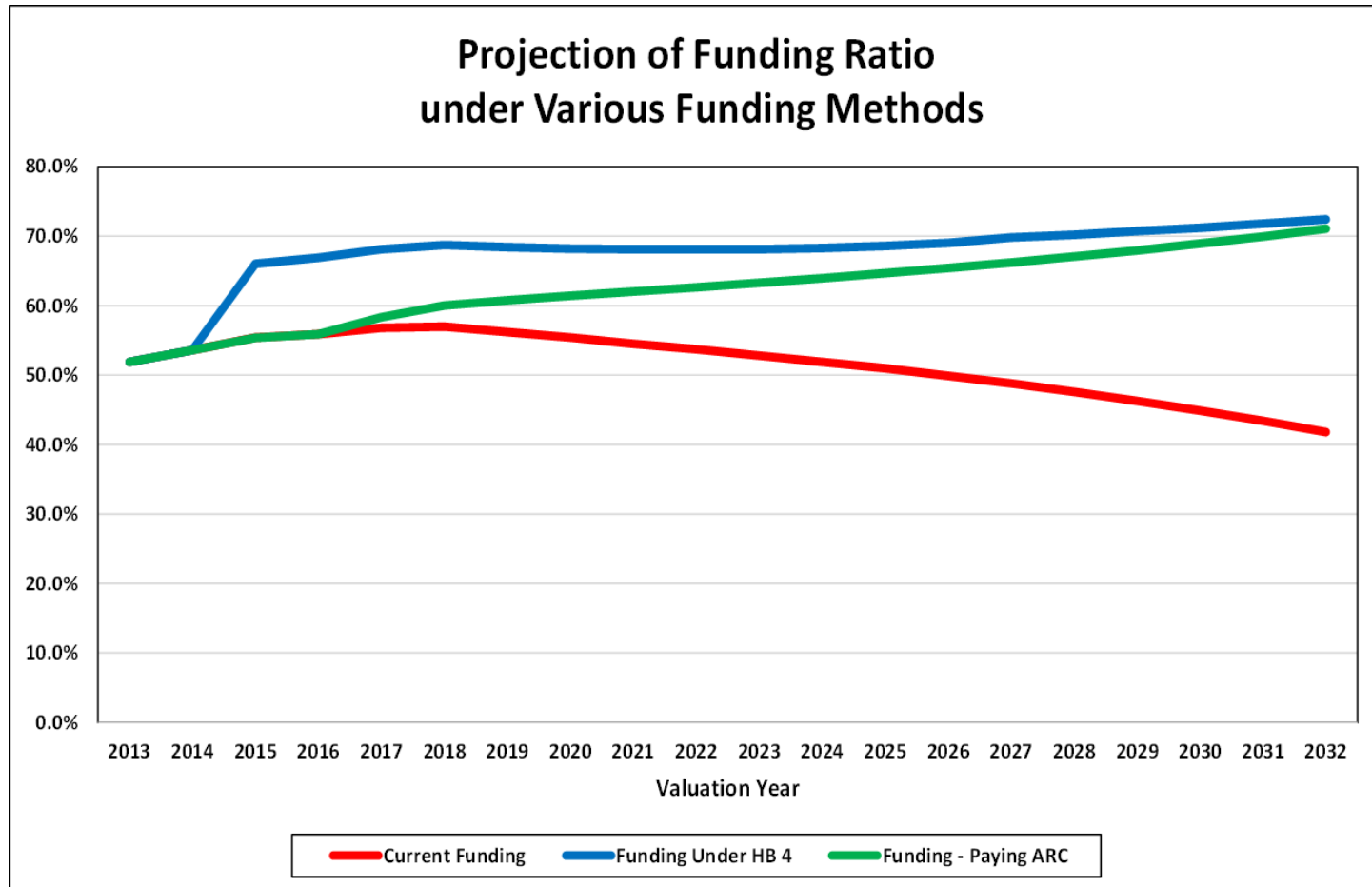
- If we don't increase contributions, fund won't be sufficient to pay current level of benefits
  - If not now, likely within 20 years
- Broad options are:
  - Increase Contributions
  - Reduce Benefits
  - Some combination of both
- Key point
  - What benefit changes meet our commitments, pass legal muster and minimize impact on educational outcomes

# Key Points from July 31, continued

- Most elements of TRS are inviolable, exceptions are:
  - Increase to benefit based on 3 year salaries if at least 55 & 27
  - Post-retirement re-employment provisions
  - Part-time and substitute provisions
  - Sick leave payments used for retirement calculation provisions
- TRS will quantify the costs for each of these
  - Not expected to be substantial, and
  - may have offsetting savings to districts and/or health care

# Key Points from July 31, continued

Paying ARC is necessary to prevent insolvency



# Key Points from July 31, continued

- Pension Obligation Bonds are not a complete solution
  - Phase into ARC is the key driver
  - Increased pension fund investments mean more risk
  - Pension fund return is expected to exceed POB interest cost
  - Additional assets improve fund liquidity
  - Additional assets improve long term solvency
  - POB can hurt debt capacity and credit rating
  - Transaction can improve credit rating if part of structural reform

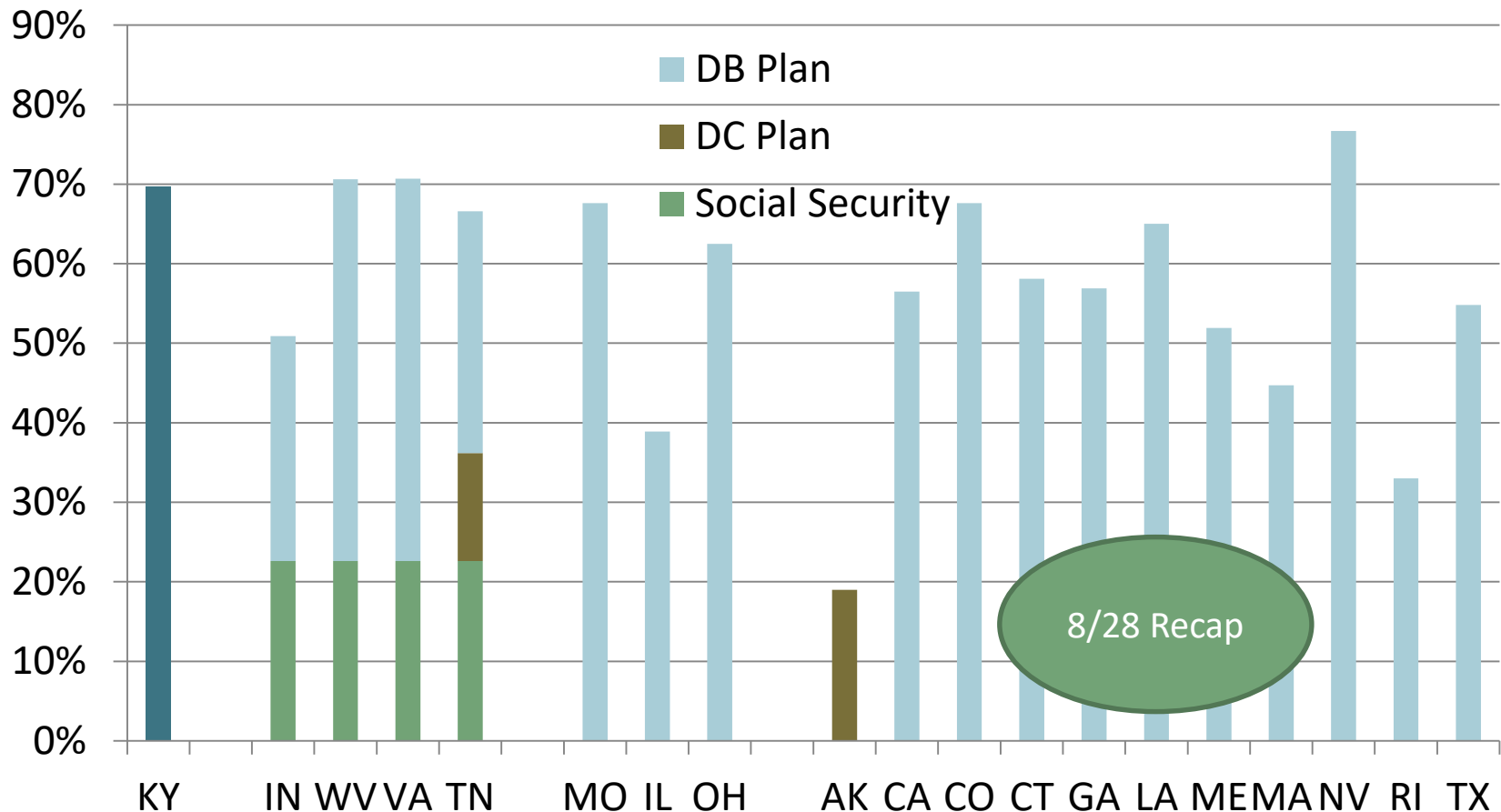
# Key Points from August 28

- Recall from earlier meetings:
  - If contributions are not increased or benefits decreased, TRS will be depleted and fund will not be sufficient to pay promised benefits (20+ years)
- Findings from benefit comparisons for future hires:
  - Future Kentucky Teachers have higher benefits (as % of compensation) than peers if hired young and work 30 years
  - Benefits for older hires are slightly below average
  - Benefits for average hires (age 33) are slightly above average

# Key Points from August 28 -Continued

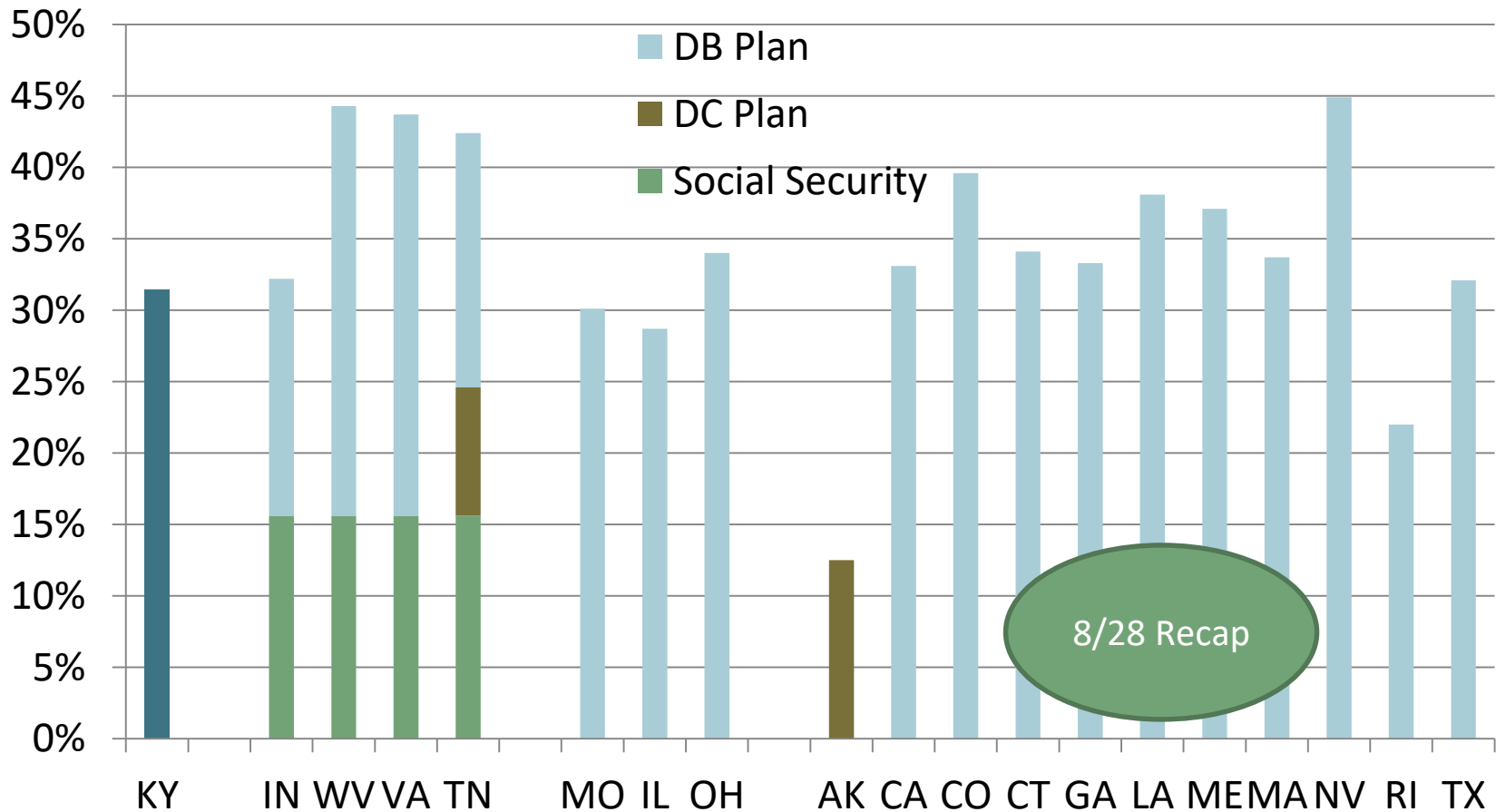
- Kentucky teacher compensation is somewhat lower than many states
  - Update: When adjusted for cost of living, closer to average, but still below
- Several states have made significant reductions in teacher pensions for future teachers
- TRS changes reduced “Normal Cost” for teachers hired after 2008 from 16.93% to 15.68%
  - This is equivalent to a decrease in benefit value of 1.25% of pay versus pre-2008 peers

# Benefits as % of Pay – Age 33 hire, retiring at 62



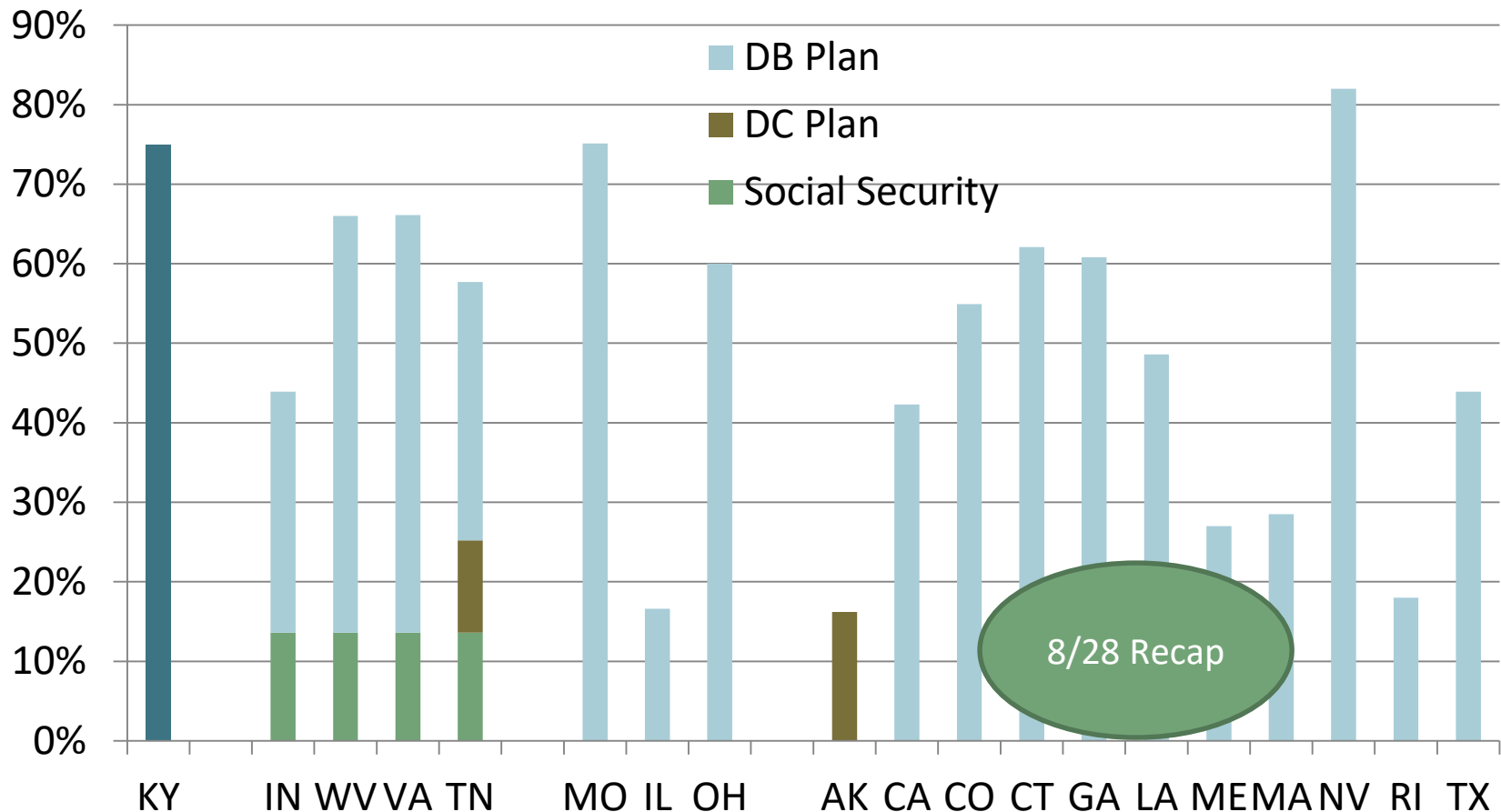


# Benefits as % of Pay – Age 48 hire, retiring at 65

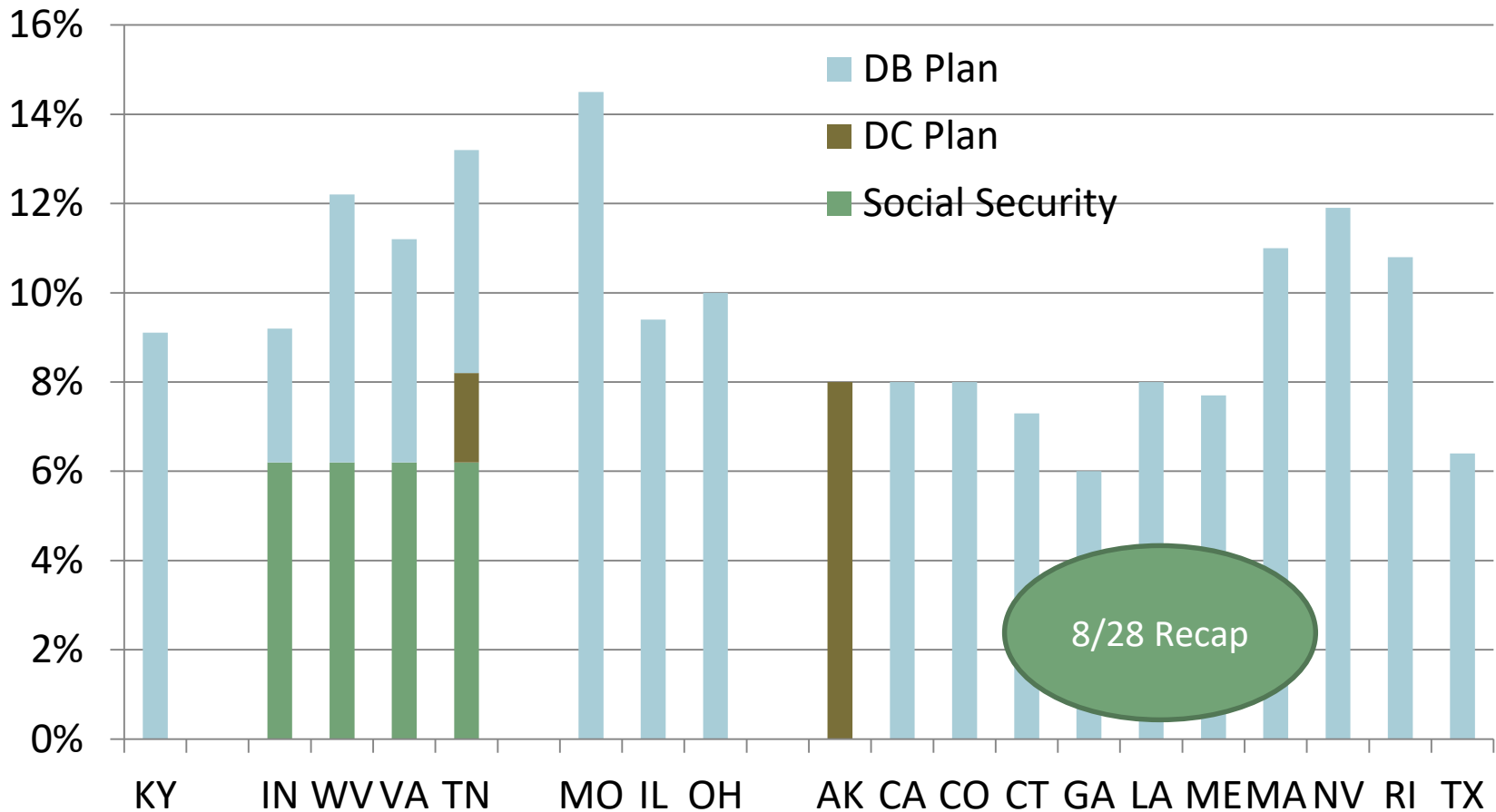


Note that teacher hired at 48 would likely have other covered Social Security

# Benefits as % of Pay – Age 24 hire, retiring at 55

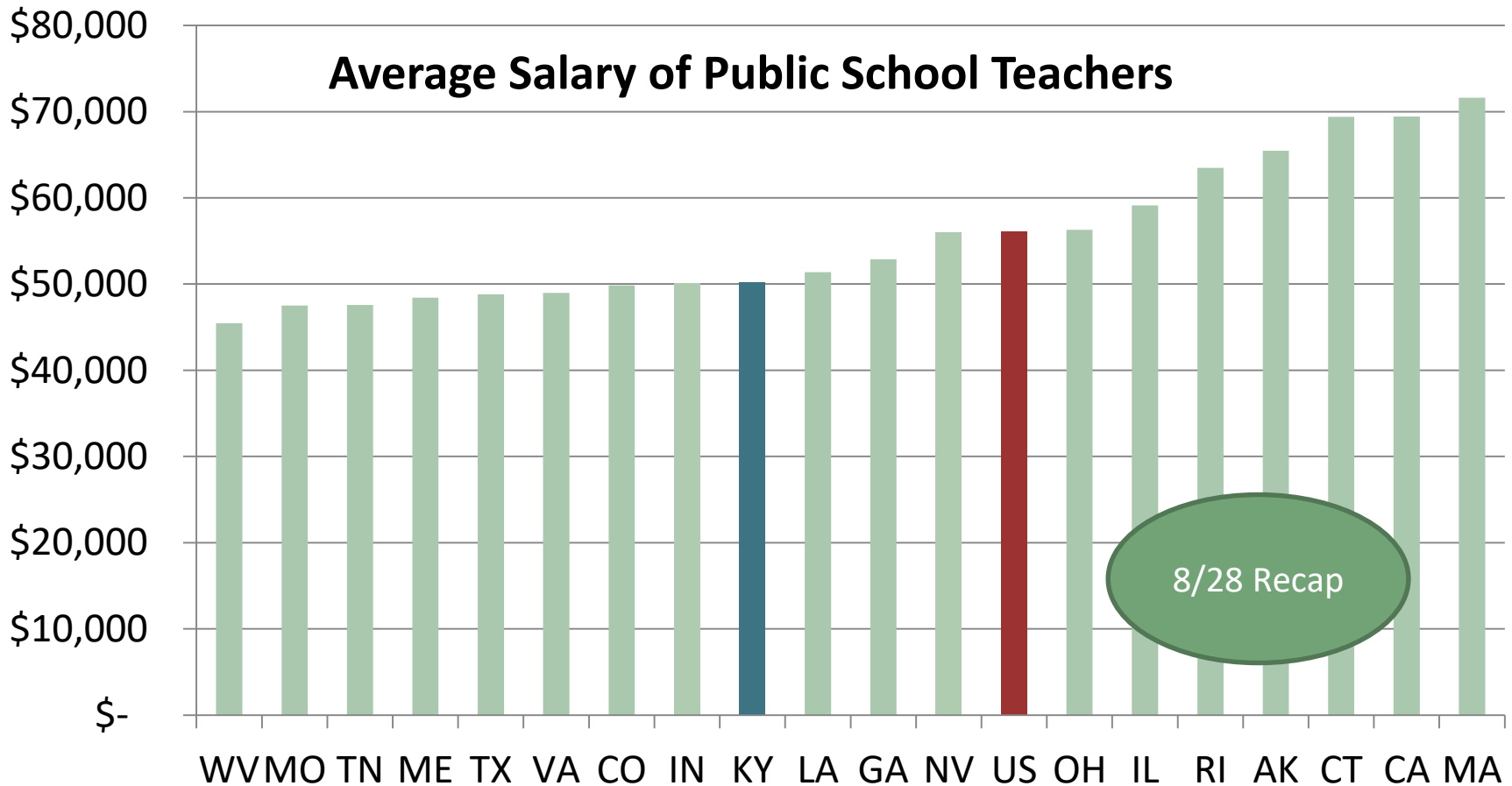


# Teacher Contribution Rate



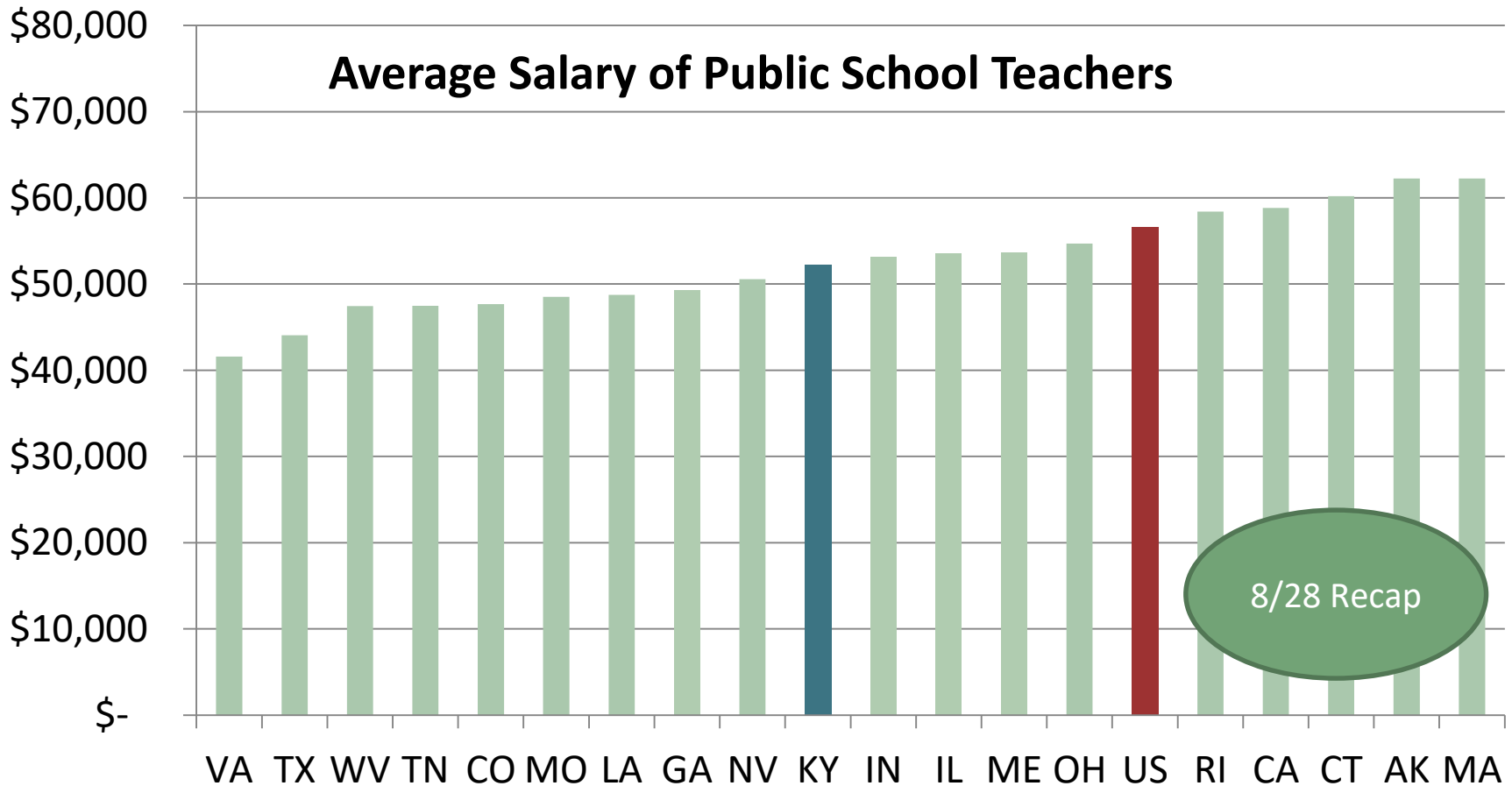
Source: NCTQ Report – Not limited to future teachers only

# Kentucky Teacher Wage Comparison



SOURCE: NEA 2014 Ranking of the States: analysis of average salaries of public school teachers 2012-2013

# Kentucky Teacher Wage Comparison – Adjusted by Comparable Wage Index



SOURCE: NEA 2014 Ranking of the States: analysis of average salaries of public school teachers 2013-2014  
CWI: Texas A&M University. Data provided by KASS and RSEC

# Examples of Teacher Pension Reform

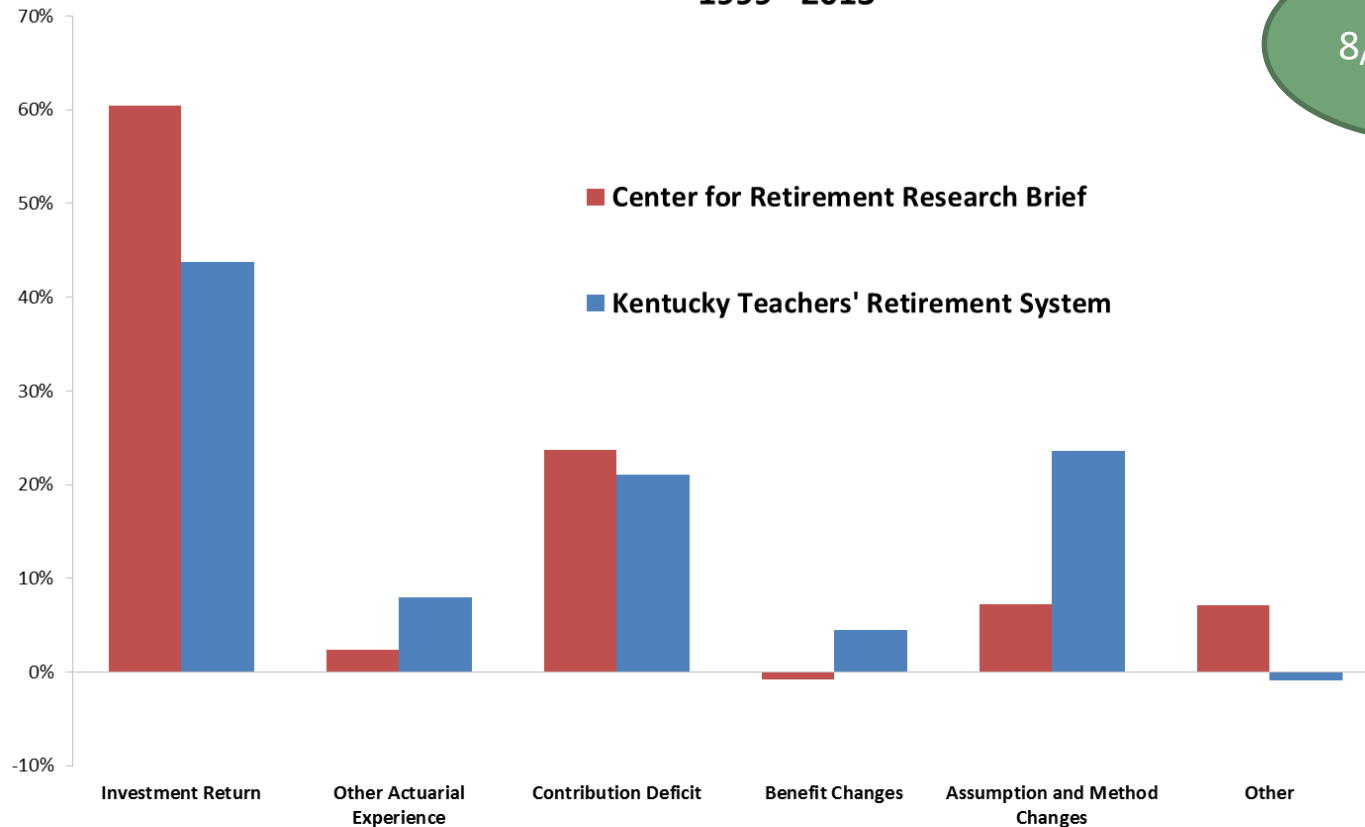
State	Reduce COLA	Raise Retirement Age	Increase Earnings Years	Decrease Multiplier	Increase Teacher Contributions
Ohio	X	X	X	X	X
Indiana					
Illinois	X	X	X		
Missouri					X
Tennessee				X	
Virginia					
West Virginia	X	X	X	X	X

Source: Plan CAFRs and NCTQ report

8/28 Recap

# Sources of increase in unfunded liabilities: TRS vs National Averages

PERCENT CHANGE IN UNFUNDED LIABILITIES BY CAUSE  
1999 - 2013



8/28 Recap

# Key points made by constituents on September 11

- Teachers rely on pensions
  - Teacher compensation is limited and stretched, particularly for new teachers with student loan debt
  - Weaker pensions could jeopardize recruiting and education quality
- Pension situation is a serious problem for Kentucky
  - Longer service teachers could receive benefits nearly as high as pre-retirement salaries
  - Unfunded liabilities place Kentucky's economy, budget, and schools at risk
- Need to consider all options to solve this problem



# Broad Alternatives to Strengthen Solvency

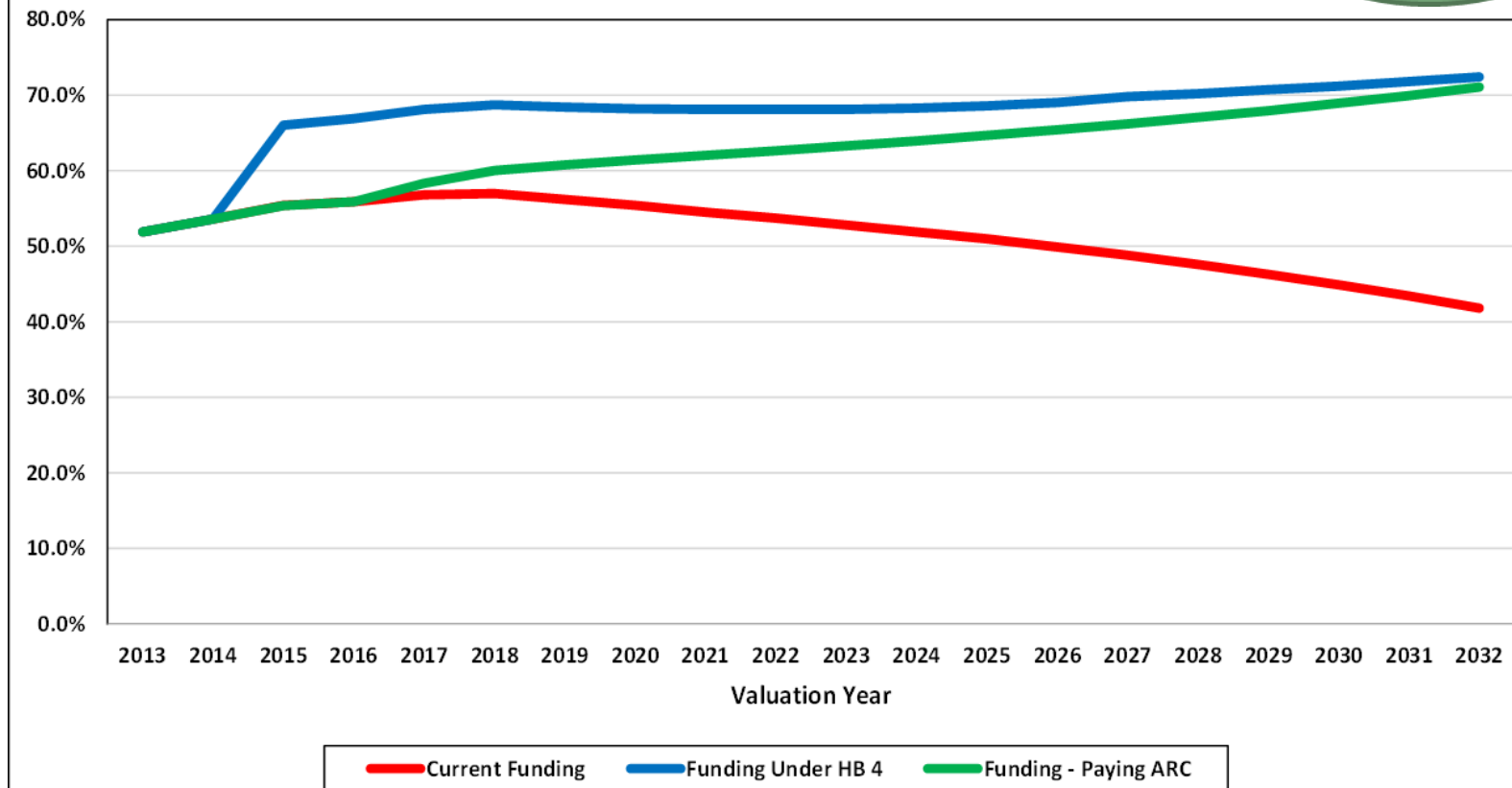
- Increase contributions
  - By the State
  - With or without Pension Obligation Bonds
  - By teachers
  - Contribution of other assets
- Reduce benefits
  - For future teachers
  - For current members to the extent not part of inviolable contract
- Combination of above
- Partial solution only

9/25  
Recap

# Paying ARC to prevent insolvency

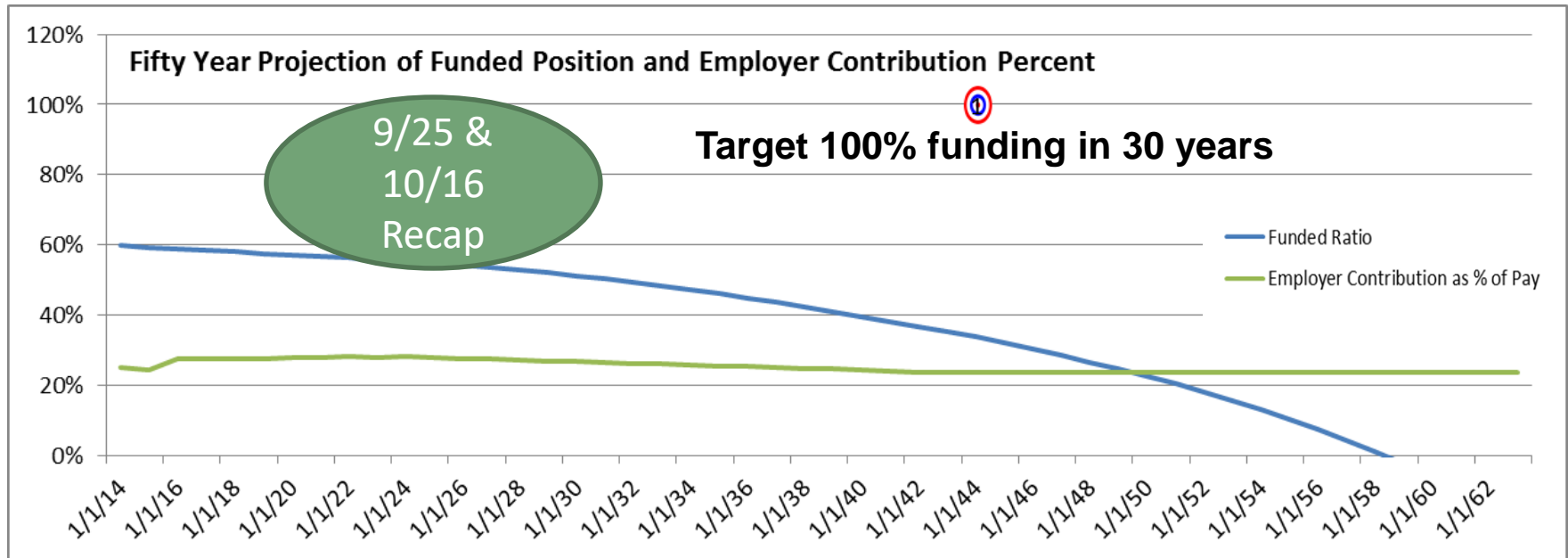
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Projection of Funding Ratio  
under Various Funding Methods



# Where Are We Now?

- Without action , will run out of money

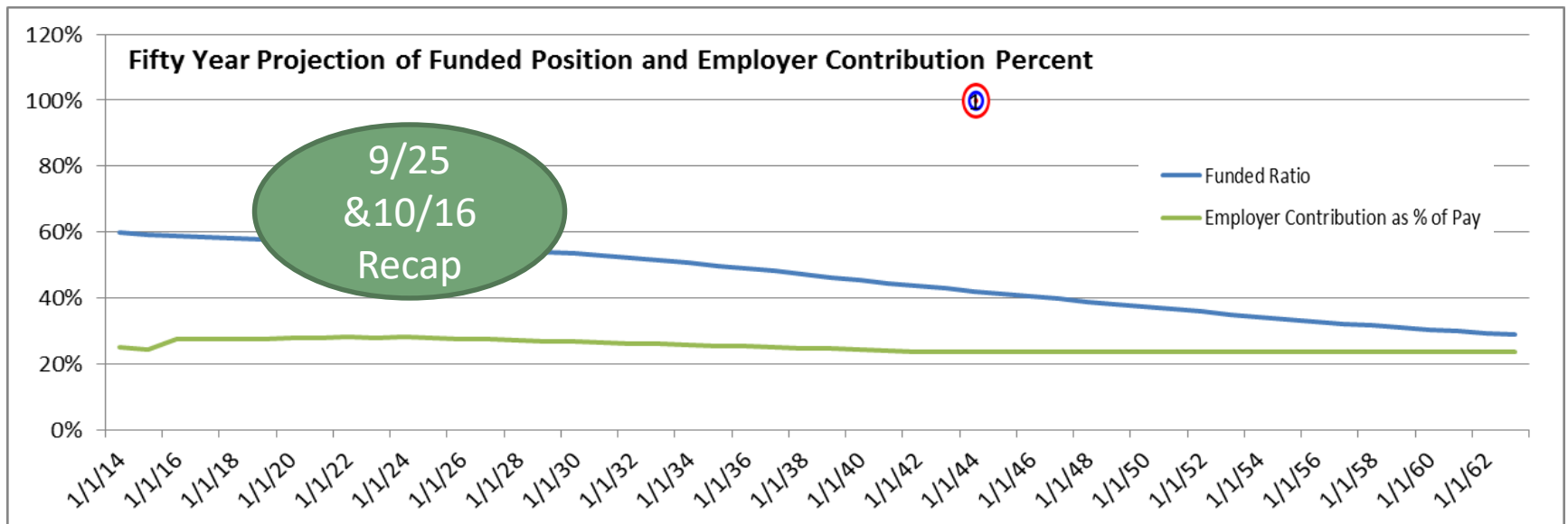
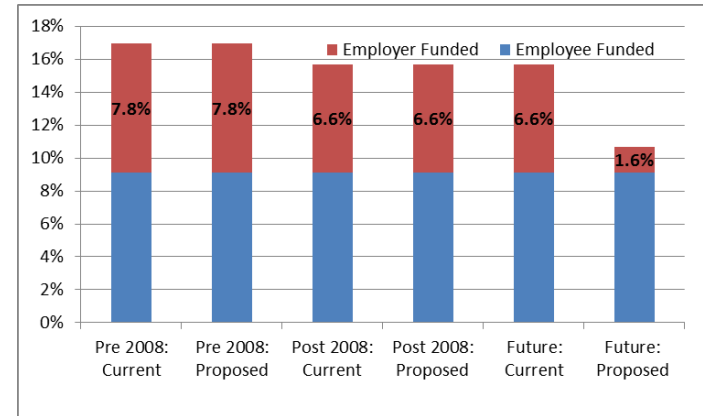


- No contribution increase (actually decrease from 28% of pay to 23% of pay as special appropriation ends)
- No benefit reductions

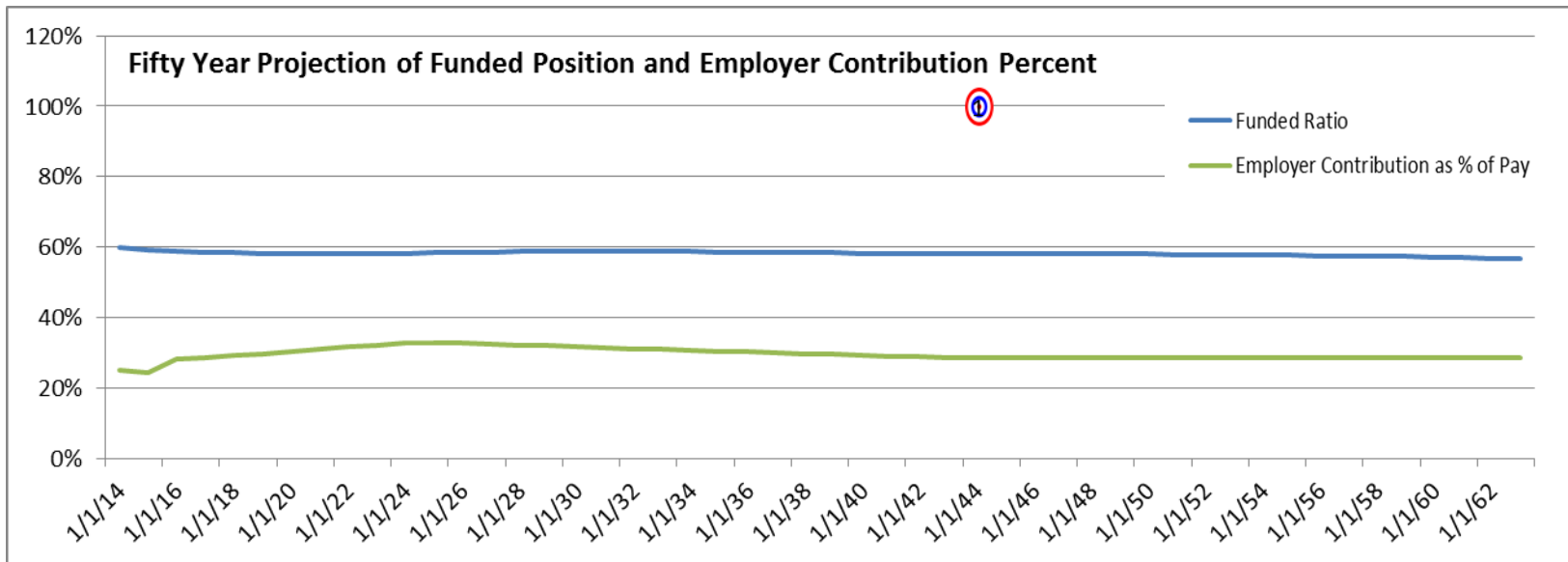
Note that this projection model is an estimate of future experience. Once the work group is closer to a proposed solution, TRS actuary can true-up these estimates

# Even with reduction for future teachers, will run out of money

- No contribution increase
  - ✓ 5% benefit reductions for future teachers



# Modest contribution Increase (5% of pay) will stretch solvency for over a decade

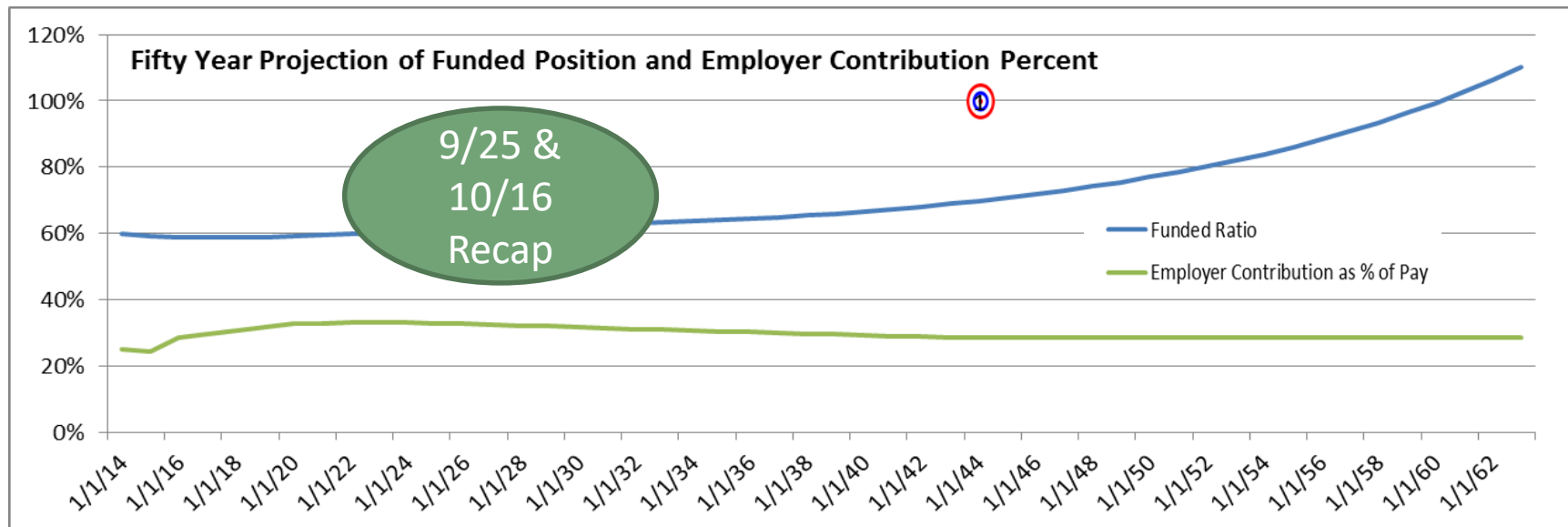
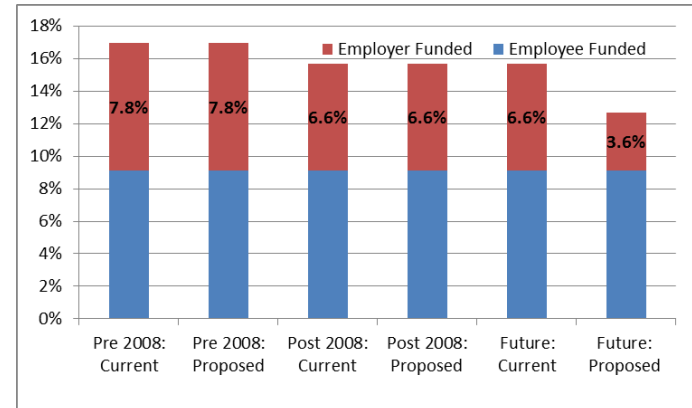


- ✓ 5% employer contribution increase
- ✓ Phase in over 10 years
  - No benefit reductions

9/25 &  
10/16  
Recap

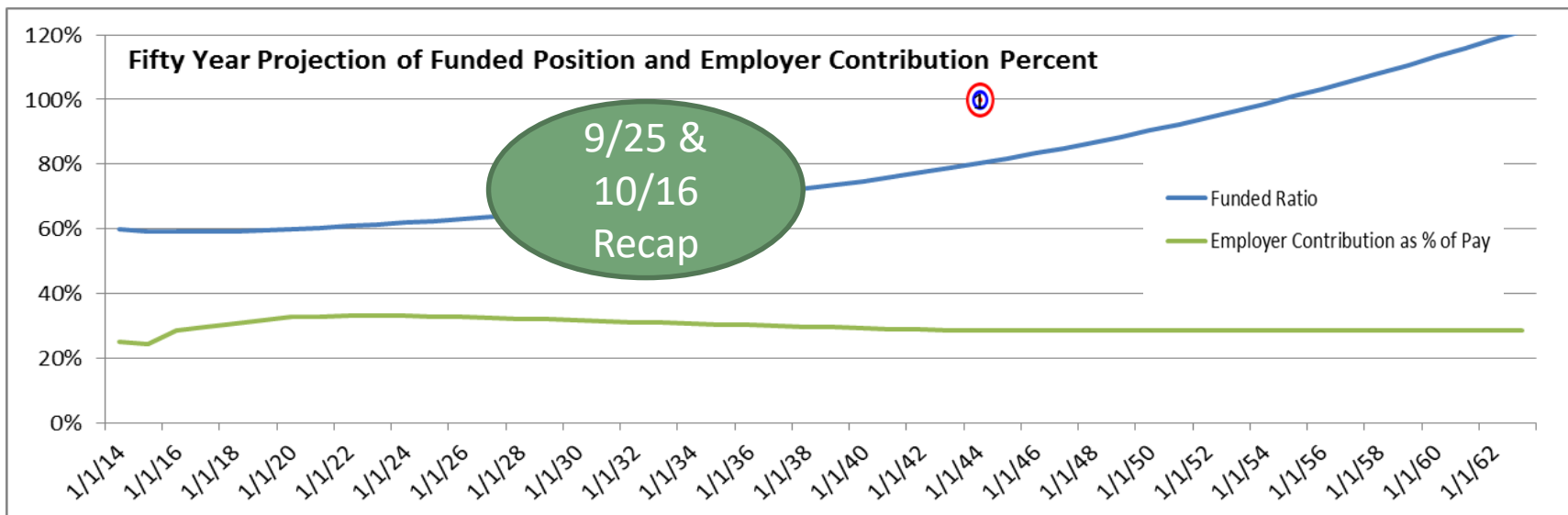
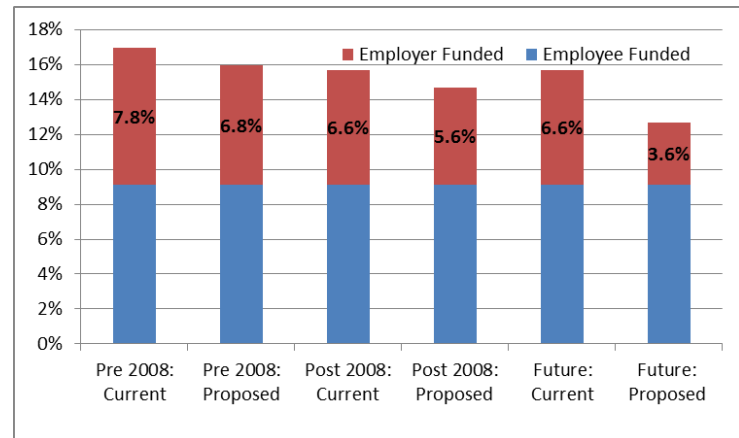
# Combine contribution Increase (5% of pay) with future benefit reductions (3% of pay) can create solvency for good

- 5% contribution increase
- Phase in over 5 years
  - ✓ 3% benefit reductions for future teachers



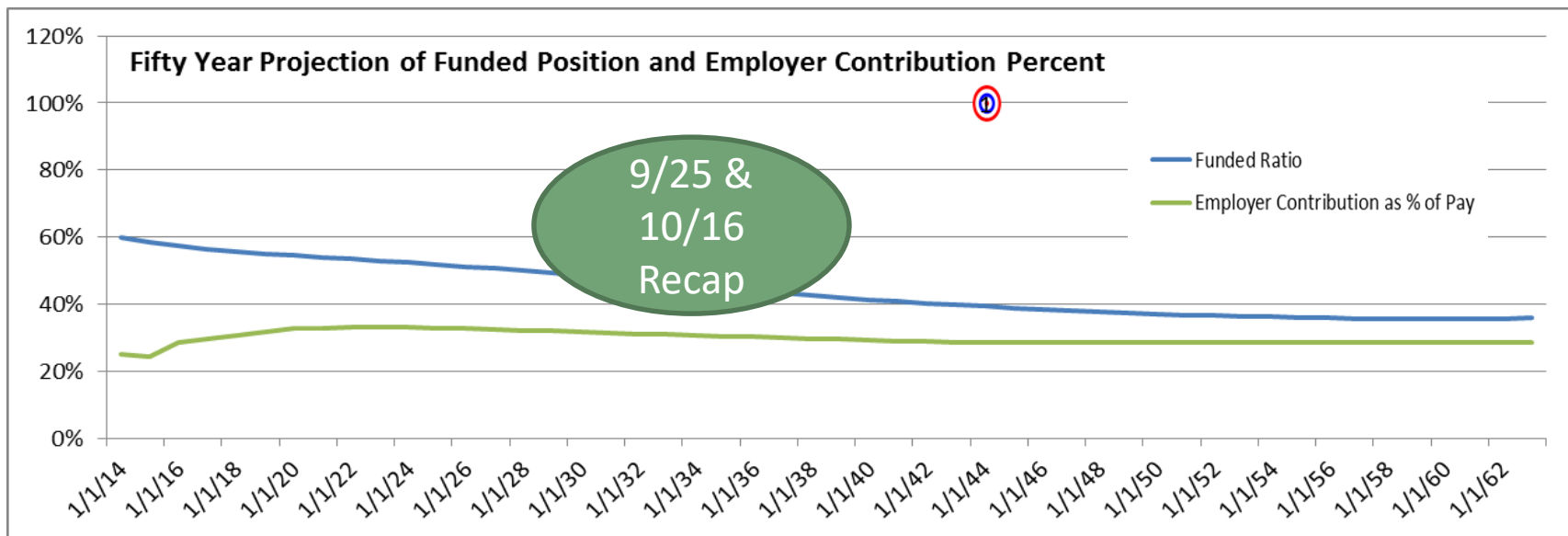
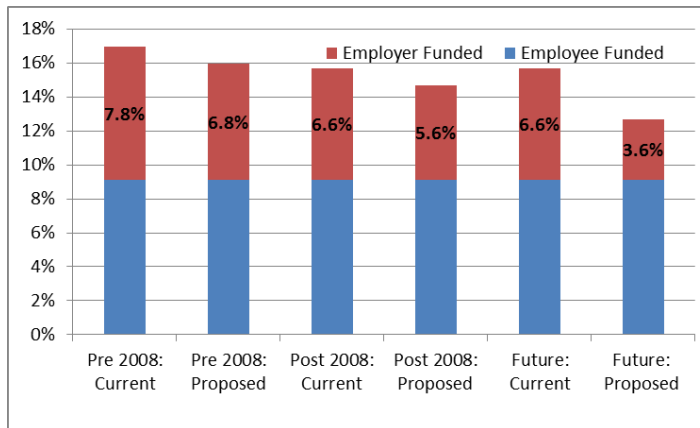
# Especially with 1% cut for current members

- 5% contribution increase
- Phase in over 5 years
- 3% benefit reductions for future teachers
  - ✓ 1% benefit reductions for current teachers



# But this gives little margin of error if we don't hit investment return target

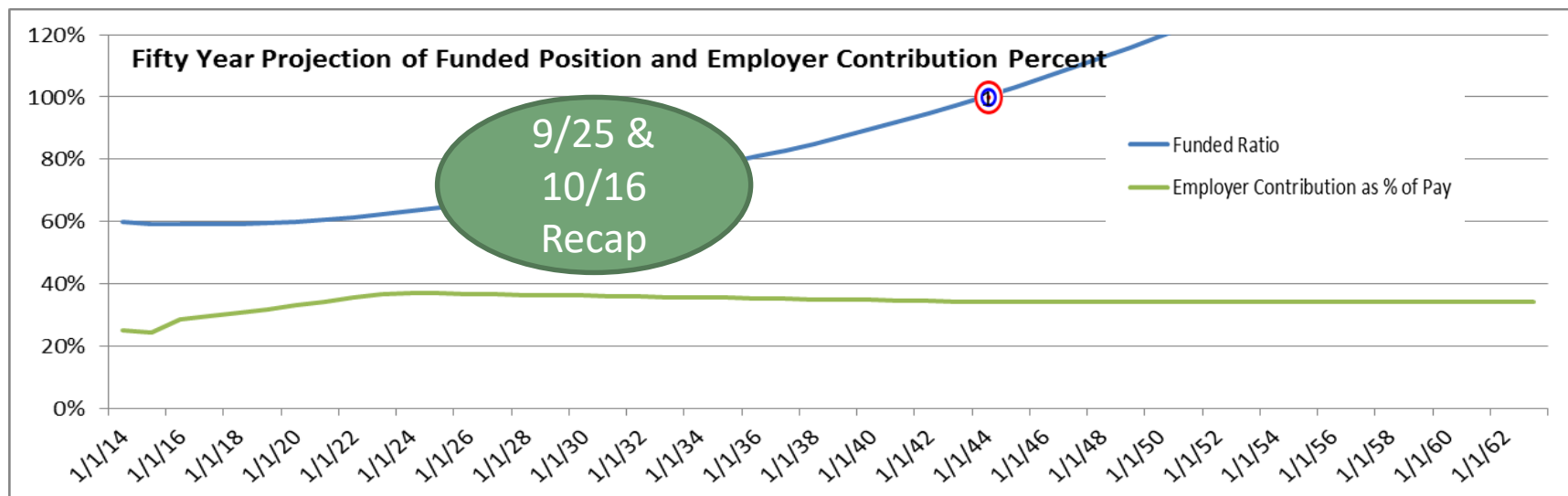
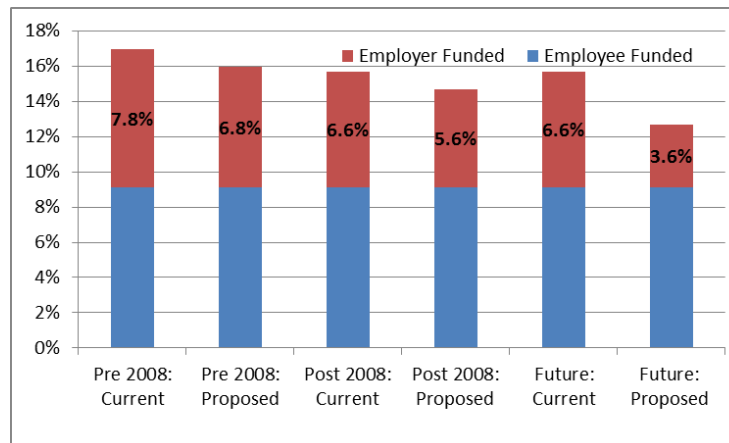
- 5% contribution increase
- Phase in over 5 years
- 3% benefit reductions for future teachers
- 1% benefit reductions for current
  - ✓ 6% investment return





# Getting to actuarial soundness requires more

- ✓ 8% contribution increase
- ✓ Phase in over 8 years
- ✓ Extend 2.7% special assessment
  - 3% benefit reductions for future teachers
  - 1% benefit reductions for current



# Cost Savings – Current Members

Potential Change	Cost Savings
Remove feature where highest average salary is based on three years instead of five years for those 55 with 27 years of service	0.65% of pay
Remove 3.0% formula multiplier service beyond 30 years of service. Continue with 2.7%	0.25% of pay
Sick Leave treatment (shift from salary credit to service credit)	0.66% of pay
Return to Work	None
Part time and substitutes	None

Note: Costs savings are for TRS pension impact only. Does not reflect potential increase in labor costs or retiree health care costs. Also does not reflect potential change in retirement ages. These should be considered the maximum possible savings.

9/25  
Recap

# Normal Cost Savings – Future Members (composite University & Non-University)

Potential Change	Cost Savings
Require minimum age 60 for full retirement	1.55% of pay
Require Rule of 90 for full retirement	1.10% of pay
Require Rule of 85 for full retirement	0.53% of pay
Require minimum age 55 for full retirement	0.48% of pay
Some other type of benefit reduction by 10% of full value	1.58% of pay
<b>Current Costs (blended University &amp; Non-University)</b>	
Current Total Normal Cost	15.84% of pay
Amount Paid by Member Contributions	9.01% of pay
Net amount paid by Employer	6.83% of pay

9/25  
Recap

# Rough Estimates of other Normal Cost Savings – Future Members

9/25  
Recap

Potential Change	Cost Savings
Require minimum age 61 for full retirement	1.7% - 1.8% of pay
Require minimum age 62 for full retirement	1.9% - 2.0% of pay
Require Rule of 87 for full retirement	0.7% - 0.8% of pay
Increase Employee Contribution Rate by 1.0%	0.6% - 0.8% of pay
Reduce Multiplier to 2.0% for all service	2.9% - 3.7% of pay
Remove feature where highest average salary is based on three years instead of five years for those 55 with 27 years	0.3% of pay
Remove 3.0% formula multiplier service beyond 30 years of service. Continue with 2.7%	0.1% of pay
Sick Leave treatment	0.3% of pay
Increase final average salary period from 5 to 7 years	0.6% of pay

# Potential Major Changes

- Some do not help with costs
  - Enter Social Security
  - Create Defined Contribution Plan
  - Create Hybrid Plan
- This is because current employer contribution toward future benefits is 6.83% on the average
- Pension Obligation Bonds best analyzed in tandem with State contribution increase

9/25  
Recap

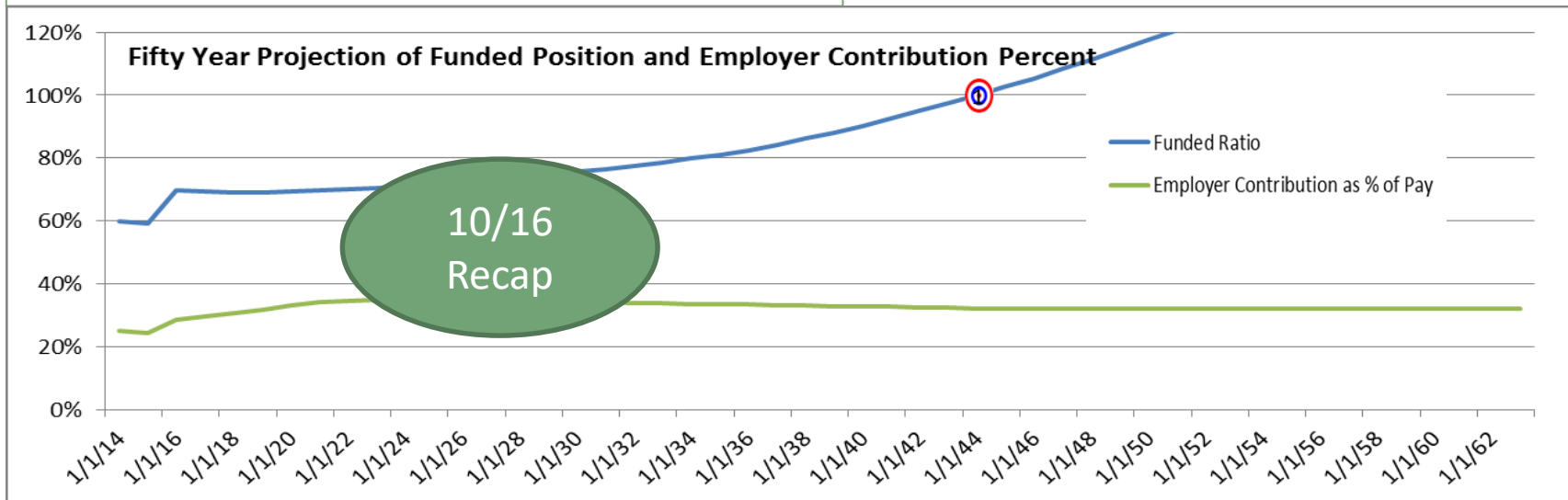
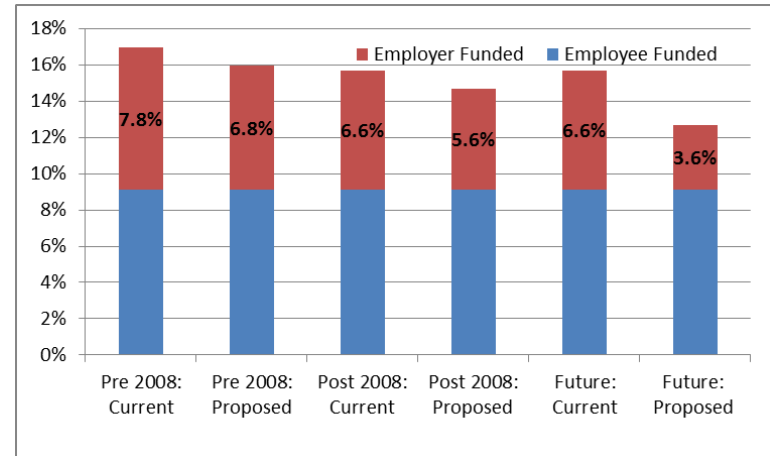
# Paying off Unfunded Liability Remains Necessary Regardless

- Cost to pay off current Unfunded Liabilities is about 21% of pay
- That cost cannot be reduced or eliminated by different benefits for new members

9/25  
Recap

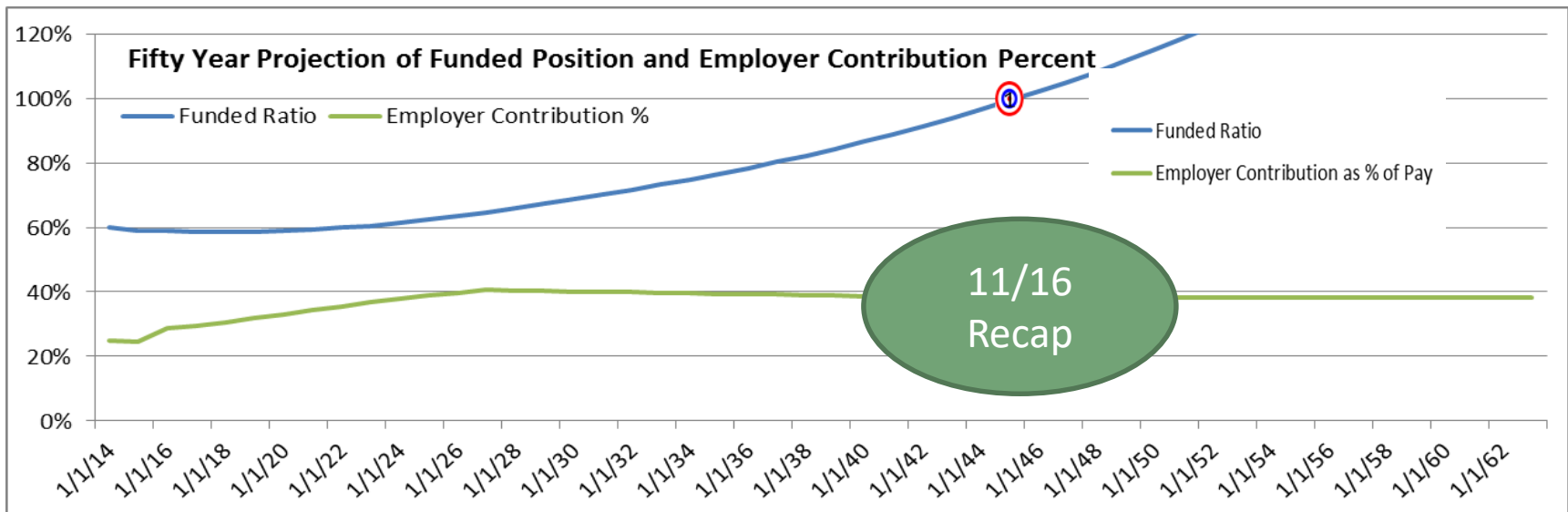
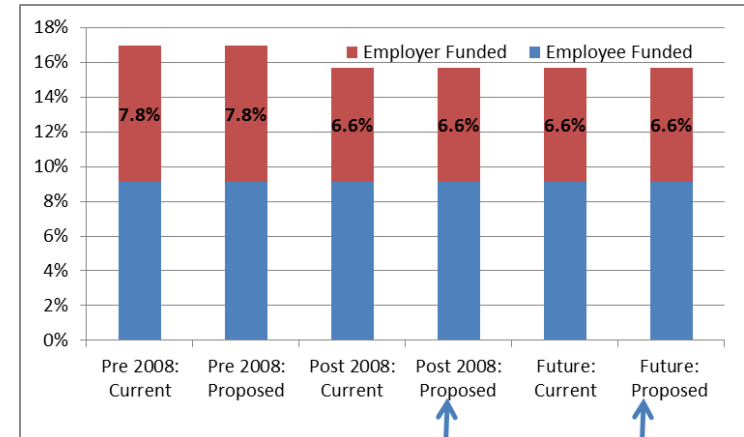
# POB could reduce additional employer costs

- ✓ **6% contribution increase**
- ✓ **Phase in over 6 years**
  - Extend 2.7% special assessment
  - 3% benefit reductions for future
  - 1% benefit reductions for current
    - **\$3.3 billion Pension Obligation Bond**



# What if, instead of paying full ARC or reducing any benefits, contribution increases phased in

- ✓ **12% contribution increase**
- ✓ **Phase in over 12 years**
  - Extend 2.7% special assessment
  - No benefit reductions
  - No POB





# How can it be that a 12% increase phased-in meets target, but is less than 14% ARC?

- Phased in 12% scenario is based on:
  - Continuing to fund 2.7% of payroll (current special appropriation cost) even though amounts are expected to decline
  - 1.3% reduction in benefit values for those hired since 2008
  - POB payments now budgeted (\$119 million, or 2.5% of pay) will go to TRS as they mature
- ARC is calculated based on current benefits structure
  - Can only consider those now employed
  - Does not reflect extending 2.7% or POBs

11/16  
Recap

# How can it be that a 12% increase phased-in meets target, but is less than 14% ARC?

FYE	Current Contribs	Additional to ARC		Special Assessments	Maturing POBs	Additional to ARC	
		Dollars	Percent			Percent	Dollars
15	851	488	14.0%		0		
16	874	506	14.1%	117	0	1.0%	36
17	905	511	13.8%	110	10	2.0%	74
18	941	470	12.3%	113	19	3.0%	114
19	986	475	12.1%	101	38	4.0%	157
20	1,032	433	10.7%	100	56	5.0%	203
21	1,070	419	10.0%	99	65	6.0%	252
22	1,119	417	9.6%	97	83	7.0%	303
23	1,166	423	9.4%	82	99	8.0%	358
24	1,215	430	9.3%	69	116	9.0%	416
25	1,249	456	9.5%	58	116	10.0%	478
26	1,283	482	9.8%	48	116	11.0%	543
27	1,319	421	8.3%	37	116	12.0%	612
28	1,356	444	8.4%	26	116	12.0%	633

# Long Term Consequences of Social Security

- Employer Social Security Contribution Requirement is 6.2% of pay
  - Based on \$3.5 billion pay, this would be \$217 million
- Current Employer Normal Cost is 6.58%
  - For non-university post 2008 group
  - Based on long-term \$3.5 billion pay, this is \$230 million
- If entered Social Security:
  - 0.38% of pay would be available to provide teacher pensions
  - This would provide only negligible DB or DC benefit

11/16  
Recap

# Long Term Consequences of Defined Contribution Plan

- DC is a less efficient retirement vehicle because:
  - Individuals cannot predict their life expectancy, while TRS can predict group life expectancies well
  - Individuals must invest conservatively as they age
  - Individual investment returns typically lag professional returns by more than 1% due to:
    - Individual recordkeeping and education expenses
    - Inferior investment skills compared to professionals
- DB delivers same retirement income at almost half the cost of DC

11/16  
Recap

# Long Term Consequences of Defined Contribution Plan (continued)

- So for 6.58% breakeven equivalent employer cost, DC would provide about half the benefits
  - Risk sharing is a more efficient approach to manage future state burden
- Closed TRS Plan might eventually have reduced investment returns
  - Increasing the cost of paying off legacy liabilities

11/16  
Recap

# Are there vastly different approaches that could be worthwhile?

- Future employee risk sharing
  - Investment return and possibly mortality improvement
  - Contribution amount sharing
  - Adjustable COLAs
  - Other benefits based on investment return
- Other approaches?

11/16  
Recap

# Dedicated Revenue Sources Seen in Other Jurisdictions

- Oklahoma TRS receives
  - 5% of sales, use and corporate and individual income taxes and lottery proceeds
  - 1% of cigarette taxes
  - Some surplus state revenue (if < 90% funded)
- Some Police & Fire – Insurance Premium Tax
- Kansas – some gaming revenue & sale of surplus state owned real estate
- Montana – some coal severance tax
- Some states – Judicial fees
- Illinois – dedicated property tax levies

11/16  
Recap

# Dedicated Revenue (continued)

- Studies have shown that dedicated revenue can have negative effect on pension funding
  - Might be because often insufficient
  - Might be because not tied to actuarial required contributions
  - Might be because only worst funded plans explore dedicated revenue

11/16  
Recap



# Actuarial Issues

- Segal has completed TRS actuarial audit
- No significant concerns which impact this study
- Remember that unfunded liability is attributed to prior teacher service and must be paid off
- Failure to do so over reasonable period (30 years)
  - Unfairly shifts cost to future Kentuckians
  - Puts plan at risk of future insolvency
  - Is clear red flag to bond rating agencies

11/16  
Recap

# Next Steps – For December 1

- Finalize Guiding Principles
- Provide additional information
  - On DC transition costs and implications
  - On other state costs
  - On 14% ARC versus 12% phase-in
- Reach conclusions
- Summarize findings



## **Aon Investments: Insights on Investment Climate**

Teachers' Retirement System of Kentucky  
Trustee Workshop  
November 23, 2020

# Agenda

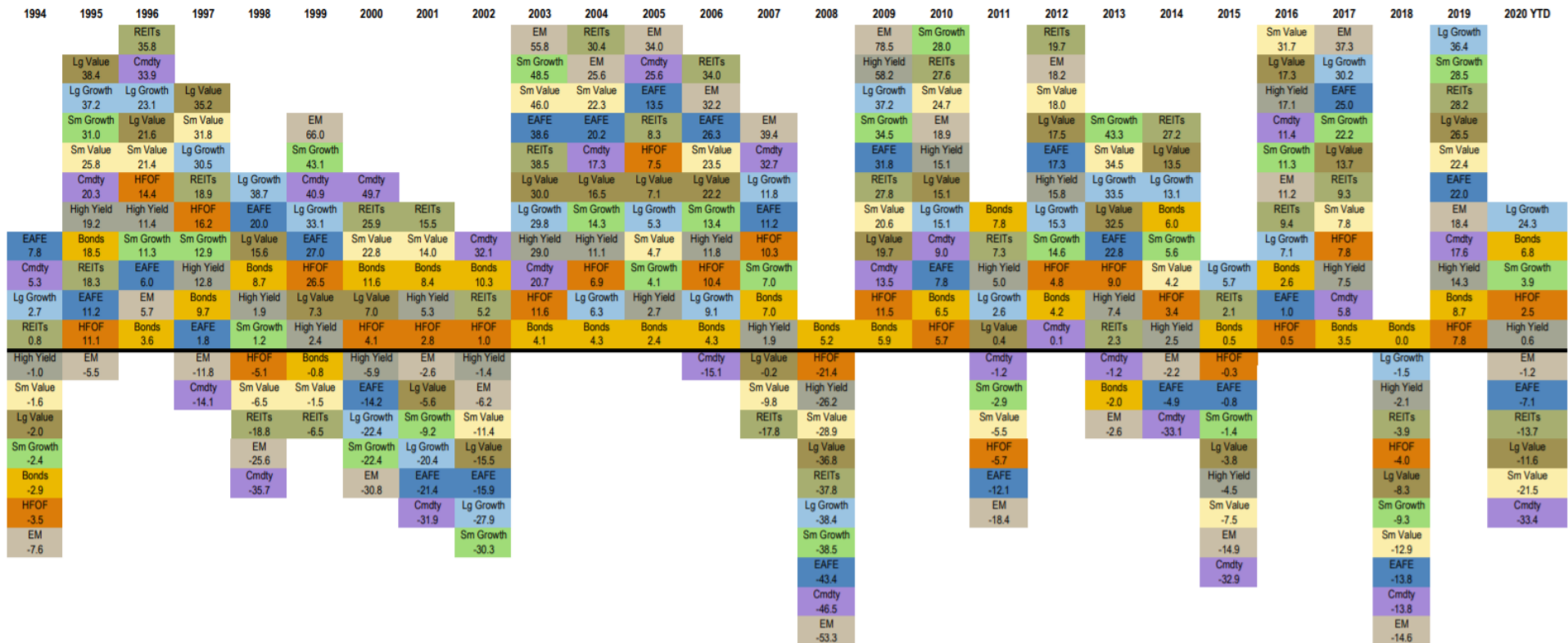
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- Section 1      Market Returns
- Section 2      Views on Equity Markets
- Section 3      TRS Equity Portfolio Analysis and Observations
- Section 4      Views on Fixed Income Markets
- Section 5      Appendix
  - Active Equity Risk Analysis
  - Additional Equity Holdings Based Analysis

## Major Capital Markets Performance Summary

	As of September 30, 2020					As of 11/18/2020	
	Year-to-Date 2020	1 Year	3 Years	5 Years	10 Years	Quarter- to-Date	Year-to- Date
<b>Global Stocks</b> MSCI All Country World IMI Index	0.5%	9.6%	6.5%	10.0%	8.5%	8.6%	9.1%
<b>US Stocks</b> DJ U.S. Total Stock Market Index	5.3	14.8	11.5	13.6	13.4	7.6	13.2
<b>Non-US Stocks (Developed)</b> MSCI EAFE Index	-7.1	0.5	0.6	5.3	4.6	10.1	2.3
<b>Non-US Stocks (Emerging)</b> MSCI Emerging Markets Index	-1.2	10.5	2.4	9.0	2.5	9.4	10.4
<b>US Investment Grade Bonds</b> Bl. Bar. U.S. Aggregate Index	6.8	7.0	5.2	4.2	3.6	0.0	6.9
<b>US High Yield Bonds</b> Bl. Bar U.S. High Yield Index	0.6	3.3	4.2	6.8	6.5	3.8	4.4
<b>US IG Intermediate Bonds</b> Blmbg. Barc. U.S. Inter. Agg.	5.2	5.7	4.2	3.3	3.0	0.0	5.2

## Capital Market Diversification Over Time (as of 9/30/2020)



\*Large Growth – Russell 1000 Growth; Large Value – Russell 1000 Value; Small Growth – Russell 2000 Growth; Small Value – Russell 2000 Value; EAFE – MSCI EAFE; EM – MSCI EM; REITs – NAREIT; Bonds – BC Aggregate; High Yield – BC High Yield; Cmdbty – GSCI; HFOF – HFR FOF



# Observations and Views on Equity Markets



## Major Capital Markets Performance Summary – Style Indices

	As of September 30, 2020					As of 11/18/2020	
	Year-to-Date 2020	1 Year	3 Years	5 Years	10 Years	Quarter-to-Date	Year-to-Date
<b>US Large Cap Growth</b> Russell 1000 Growth Index	24.3%	37.5	21.7	20.1	17.3	3.9%	29.1%
<b>US Large Cap Value</b> Russell 1000 Value Index	-11.6	-5.0	2.6	7.7	9.9	10.3	-2.5%
<b>US Small Cap Growth</b> Russell 2000 Growth	3.9	15.7	8.2	11.4	12.3	13.9	7.3
<b>US Small Cap Value</b> Russell 2000 Value	-21.5	-14.9	-5.1	4.1	7.1	21.5	-4.7
<b>Intl Growth</b> MSCI ACWI ex-US Growth	7.3	17.5	7.3	10.2	6.4	8.0	15.3
<b>Intl. Value</b> MSCI ACWI ex-US Value	-17.6	-10.8	-5.1	2.1	1.5	11.2	-6.4

- US Large Cap Growth Stocks have dominated performance
- Value and Small Cap Stock performance has improved most recently



## Valuation and Fundamentals

	As of October 30, 2020				
	Price to Earnings	Price to Book	Dividend Yield	5-Year Earnings Growth Rate	% in Top 5 Holdings
<b>US Large Cap Growth</b> Russell 1000 Growth Index	35	10	0.9%	20.3%	37.2%
<b>US Large Cap Value</b> Russell 1000 Value Index	20	2	2.7%	9.0%	7.8%
<b>US Small Cap</b> Russell 2000 Index	17	2	1.6%	11.4%	2.2%
<b>International</b> FTSE Global All Cap ex-US Index	17	2	2.9%	10.1%	7.7%

- US Growth Stock Performance has been fueled by stock earnings growth, but can this continue to justify high multiples?
- A handful of highly successful stocks (FAANGs and Microsoft) have created concentration in the US Large Cap Growth Index)

## The Valuation Gap Between Growth and Value is at Historic Highs

**Value versus growth valuation spread at multi-decade high**  
Price to sales ratio of MSCI World value divided by growth



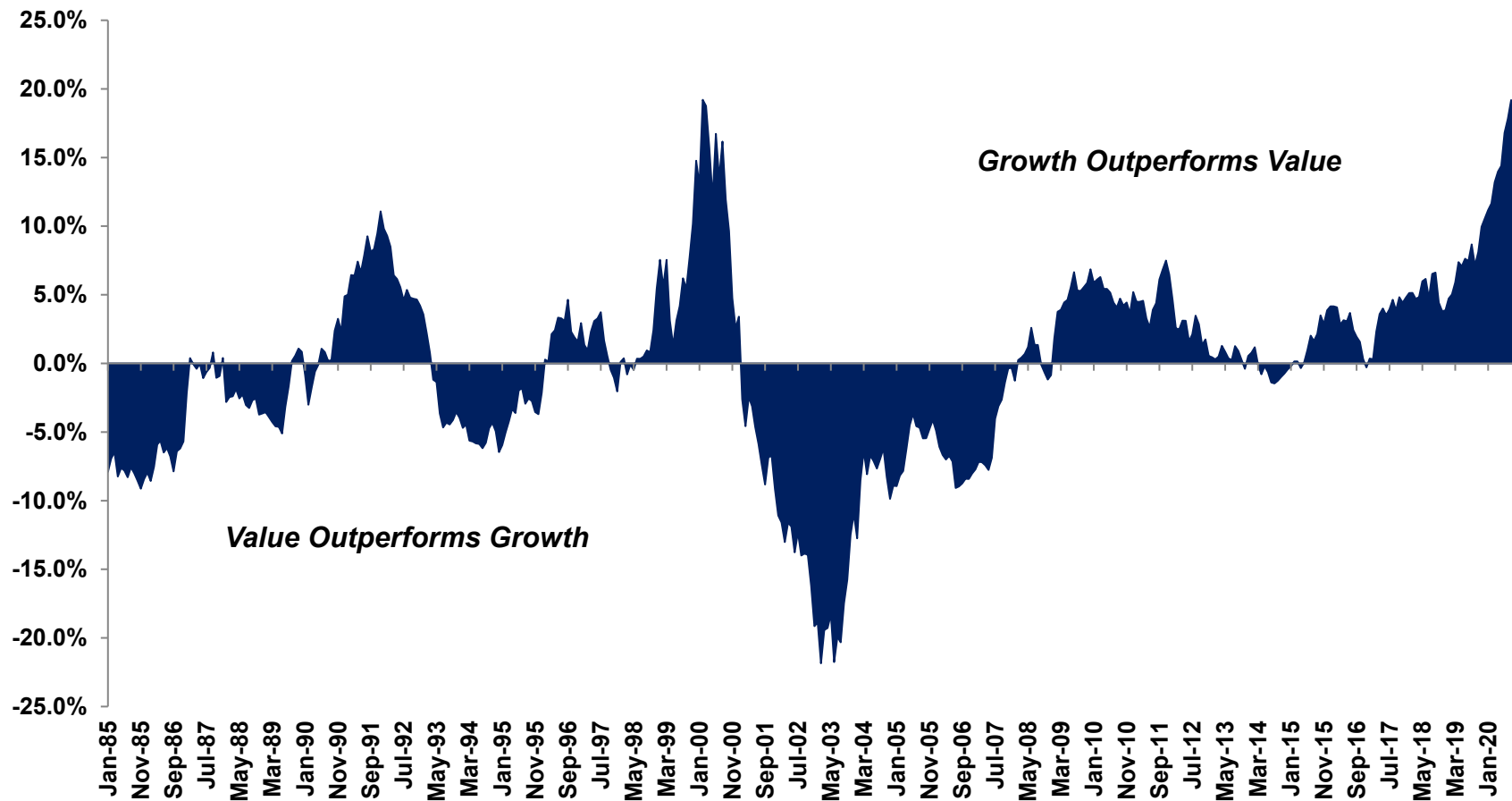
*Source: Factset and Aon calculation, data as at June 19<sup>th</sup>, 2020*

## S&P Sector Weighting and Performance

	As of October 31, 2020	As of November 18, 2020	
S&P 500 Sector Performance	% Weight	Quarter To Date	Year to Date
S&P 500 Index		6.34%	12.26%
Consumer Discretionary	11.6%	3.06%	27.15%
Consumer Staples	7.0	4.22%	8.52%
Energy	2.0	17.99%	-38.75%
Financials	9.9	13.64%	-9.37%
Healthcare	14.1	3.42%	8.61%
Industrials	8.4	13.33%	8.81%
Information Technology	27.5	3.12%	32.71%
Materials	2.7	9.24%	15.22%
Real Estate	2.6	5.17%	-1.95%
Communication Services	11.1	8.46%	17.80%
Utilities	3.2	8.11%	1.97%

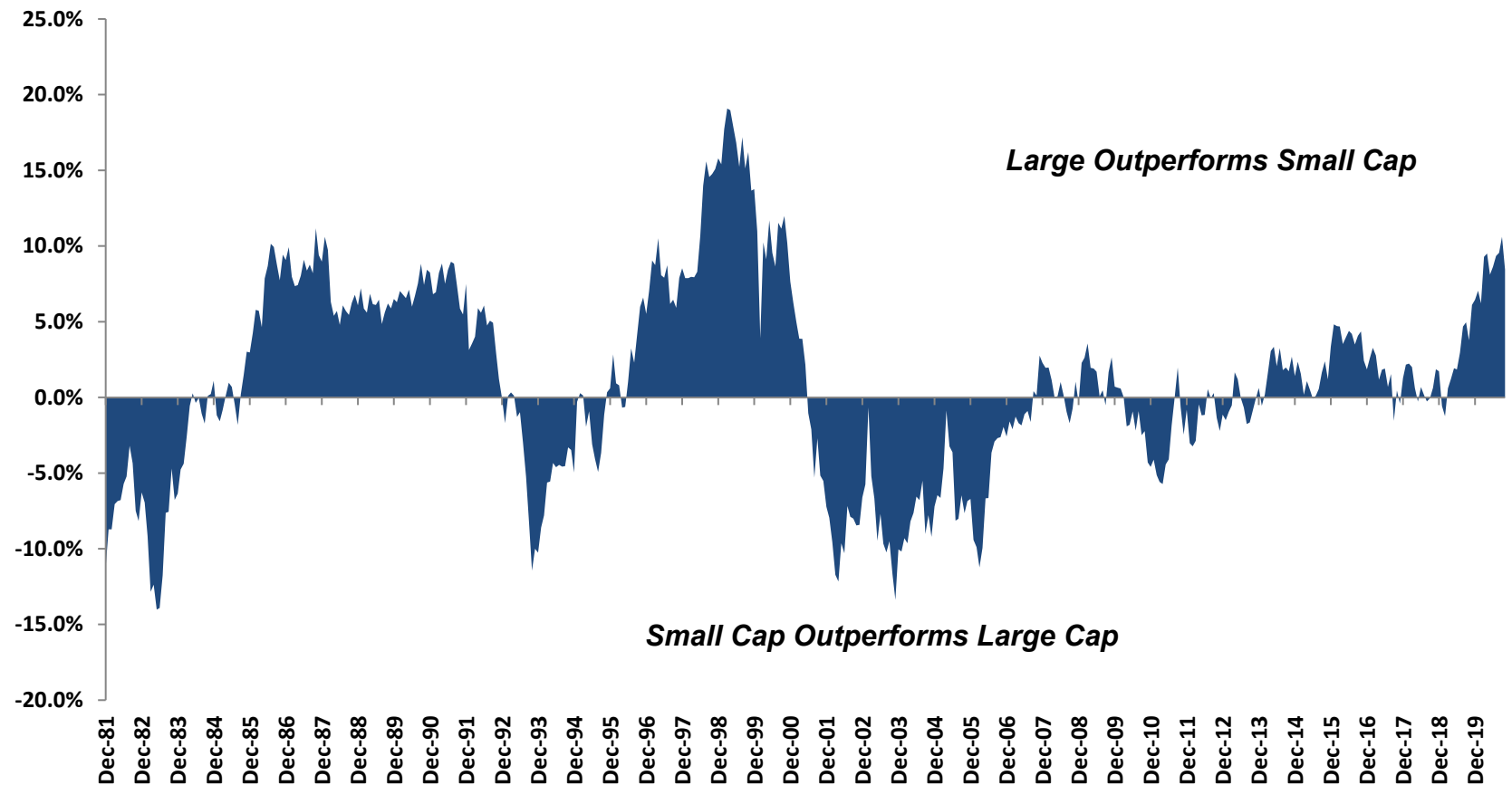
- Apple (6.4%), Microsoft (5.6%), Amazon (4.7%), Facebook (2.3%) and Alphabet aka Google (3.5%) constitute 22.6% of the S&P 500 Index

## Rolling 3 Year Returns: US Growth vs. US Value Equities



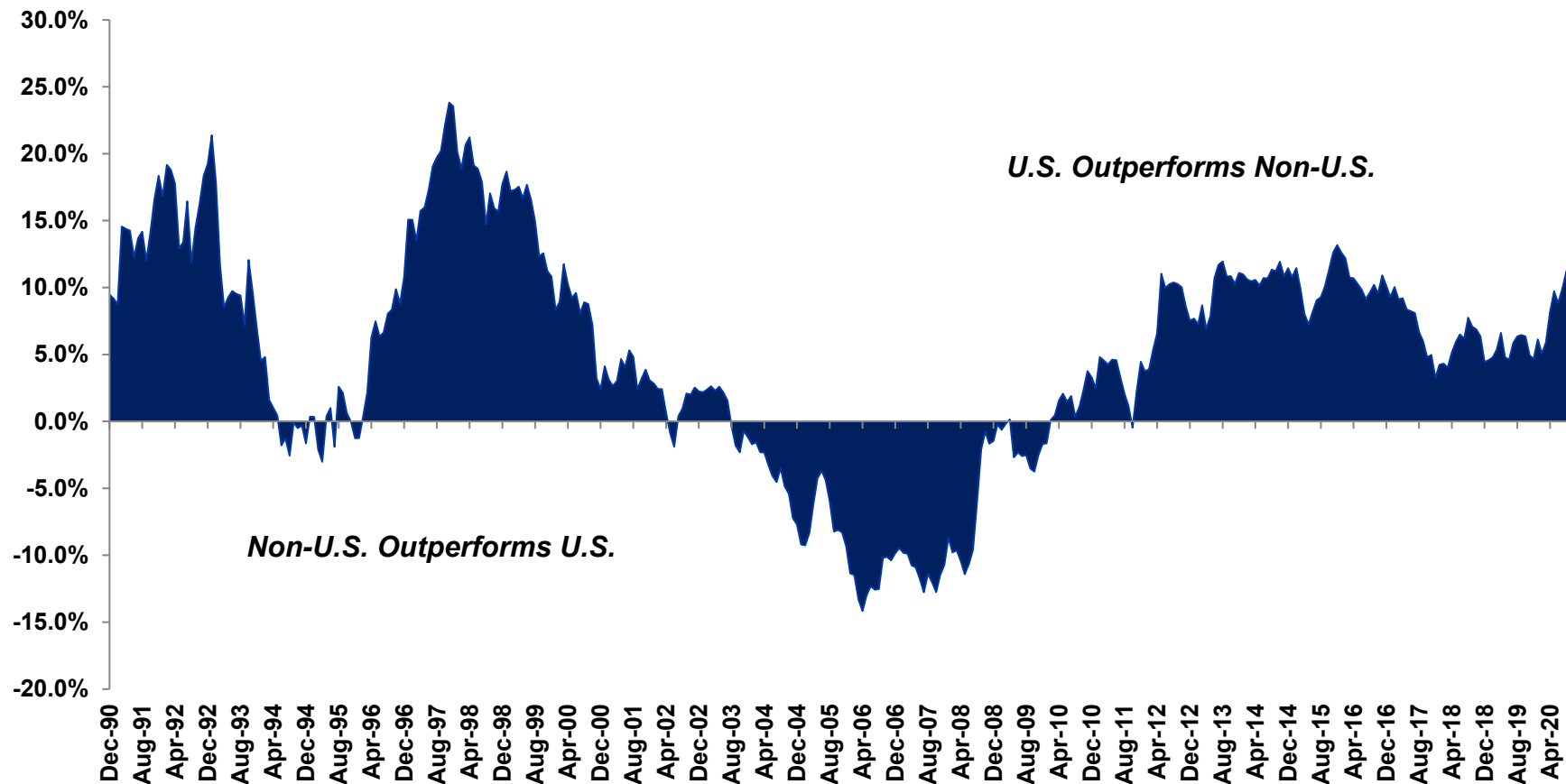
\*Growth equities represented by the Russell 3000 Growth Index. Value equities represented by the Russell 3000 Value Index

## Rolling 3 Year Returns: U.S. Large Cap Vs. US Small Cap



\*U.S. large cap represented by the Russell 1000 Index. U.S. small cap represented by the Russell 2000 Index

## Rolling 3 Year Returns: U.S. vs. Non-U.S. Equities



\*U.S. equities represented by the Dow Jones U.S. Total Stock Market Index. Non-U.S. equities represented by the MSCI AC World ex-U.S. Index

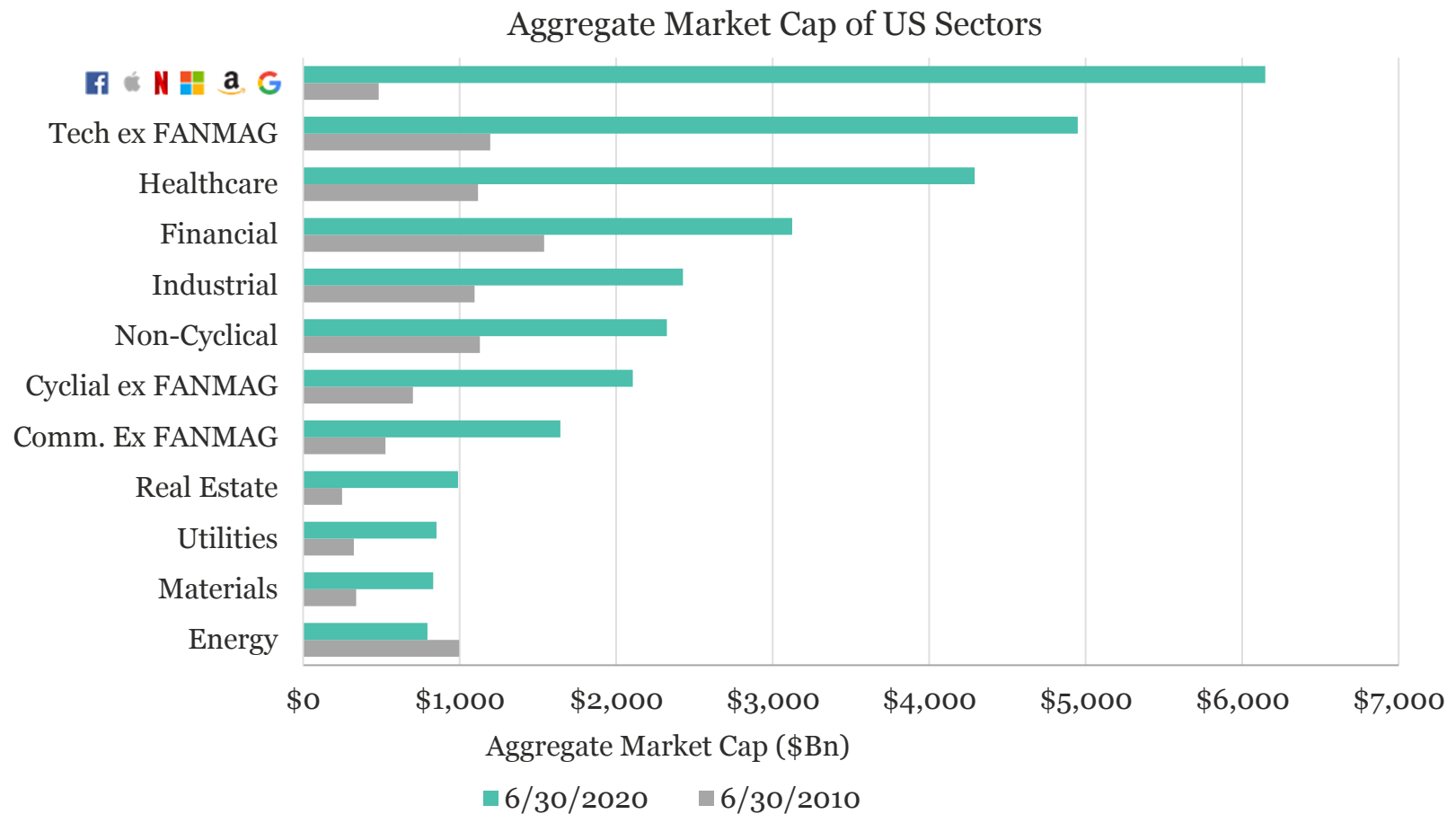
# Will These Stocks Continue to Lead the Markets?

As of 6/30/2020	Position in Russell 1000	Current P/E	10-Year Cumulative Return
Microsoft	1	35.3	1,020%
Apple	2	27.7	1,073%
Amazon	3	106.0	2,425%
Alphabet	4	31.6	537%
Facebook*	5	27.7	586%
Netflix	24	76.8	2,832%
FANMAGs	--	37.2	1,036%
<b>Russell 1000</b>	<b>--</b>	<b>24.5</b>	<b>271%</b>

\*Facebook cumulative return represents cumulative return as of IPO, (5/18/2012 – 6/30/2020).

**Source:** Research Affiliates, LLC, based on data from FactSet. Market cap for sectors represents the sum of the market caps for their constituents in the Russell 1000 Index. Market caps for Facebook, Apple, Netflix, Microsoft, Amazon, & Google are excluded from the Technology sector. Current P/E is calculated as a weighted harmonic average P/E based on market capitalization for each security. 10-year cumulative return for FANMAG stocks represent a market capitalization weighted index of the FANMAG stocks from the period 6/30/2010 – 6/30/2020..

# Impact of Facebook, Apple, Amazon, Netflix, Google and Microsoft



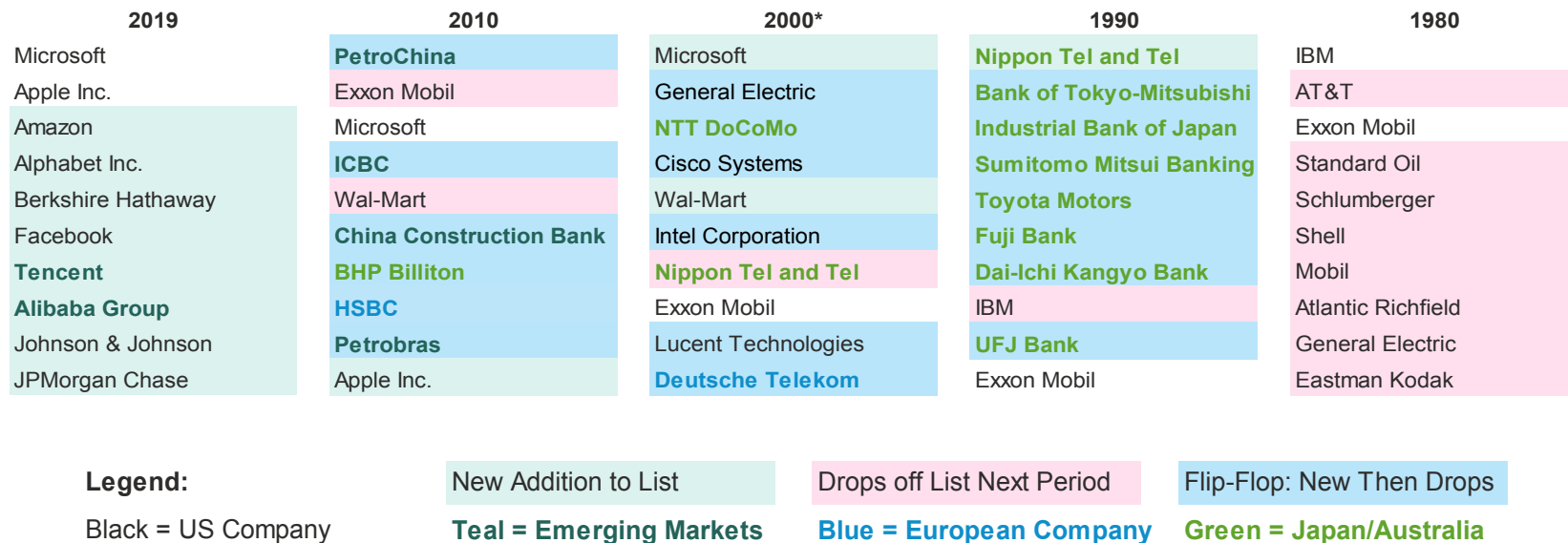
**Source:** Research Affiliates, LLC, based on data from FactSet. Market cap for sectors represents the sum of the market caps for their constituents in the Russell 1000 Index. Market caps for Facebook, Apple, Netflix, Microsoft, Amazon, & Google are excluded from the Technology sector. Current P/E is calculated as a weighted harmonic average P/E based on market capitalization for each security. 10-year cumulative return for FANMAG stocks represent a market capitalization weighted index of the FANMAG stocks from the period 6/30/2010 – 6/30/2020..



# Market Leadership Has Changes Through Time

Since 1980, typically only two of the top 10 companies in the market remain among the largest companies 10 years later.

Ten Largest Market Capitalization Stocks in the World, at the Beginning of Each Year



**Source:** Research Affiliates, LLC using data from Financial Times and Wikipedia and Gavekal Research. Rankings shown represent beginning-of-year rankings.

\*Year 2000 represents holdings as of March

## Is Value Investing Dead?

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- We think not...
  - Traditional methods of identifying value, such as Price-to-Book ratio, should be reconsidered and not be used as a sole means to invest
  - Increased investment in intangible vs. tangible assets can distort financial metrics
  - Cheap doesn't necessarily mean a good value
  - Events such as changes in economic environment, interest rates, competition, consumer preferences and hopefully a resolution to the Covid-19 pandemic may serve as trigger events to change market leadership

## Key Takeaways

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- US Growth stocks have dominated performance since the Great Financial Crisis
  - Covid-19 has fueled this further given our increased reliance on technology and conveniences such as online retail
- The style of stocks, growth vs. value, large vs. small and U.S. vs. non-U.S. have performed in cycles in the past and will likely continue to do so in the future
- What to do?
  - Stay well diversified in geography, style and capitalization
  - Take reasonable active positions with capable and qualified active managers
  - Give active managers sufficient latitude to be opportunistic and add value, but style considerations are important when evaluating
  - The leading companies in the stock market have changed over time and will likely continue do so in the future as the World and markets develop and adapt



# TRS Equity Structure Analysis

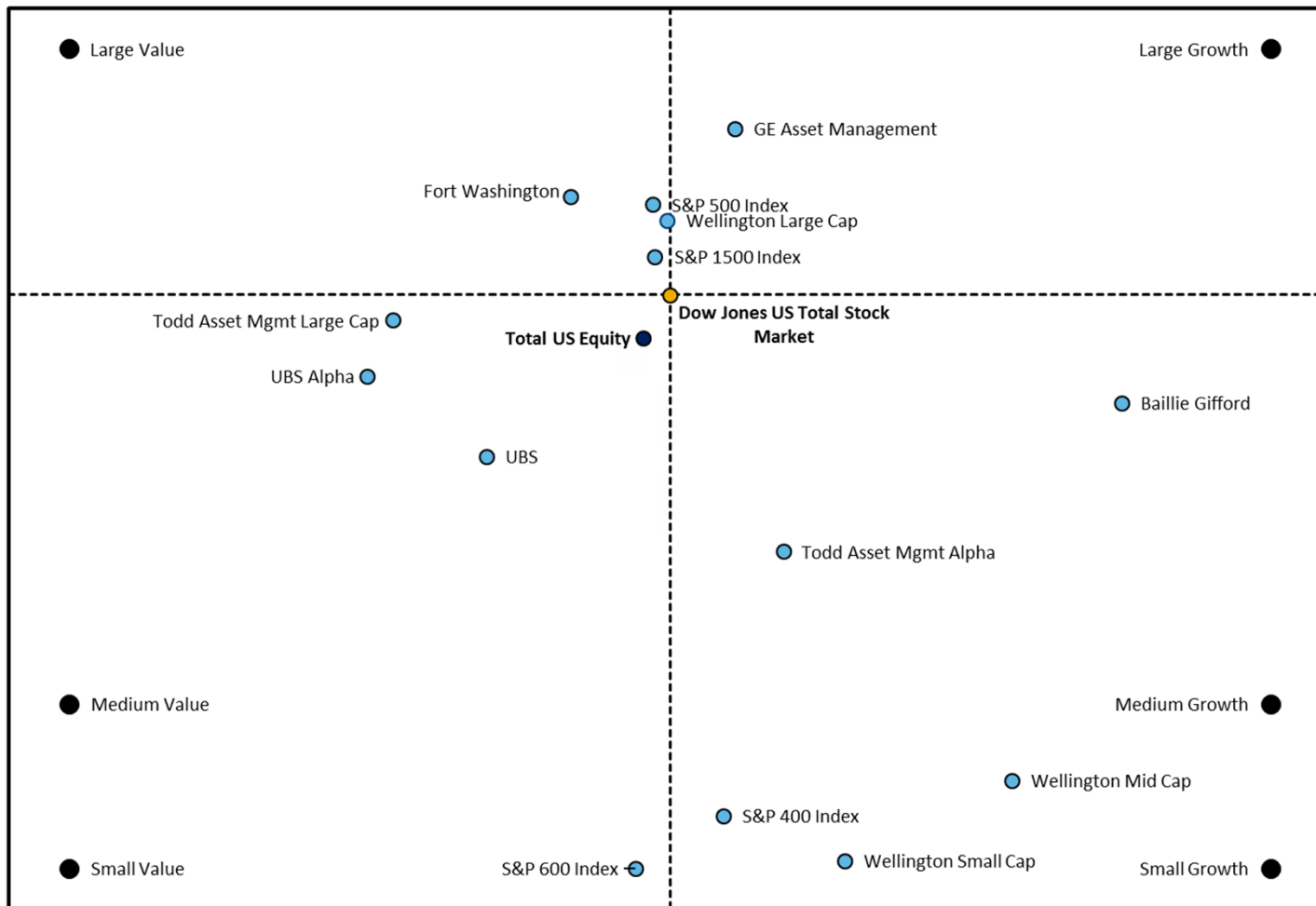
## TRS Equity Portfolio Performance

	As of September 30, 2020				
	3Q 2020	1-Year	3-Year	5-Year	10-Year
<b>TRS Total Equity</b> MSCI All Country World Index	9.2% 8.3	16.3% 11.0	9.1% 7.7	12.1% 10.9	11.5% 9.1
<b>TRS U.S. Equity</b> S&P 1500 Index	9.2% 8.6	15.5% 13.4	10.9% 11.3	13.0% 13.6	13.3% 13.5
<b>TRS Non-U.S. Equity</b> MSCI All Country World Ex-US Index	9.1% 6.4	17.5% 3.4	6.0% 1.6	10.3% 6.7	6.9% 4.5

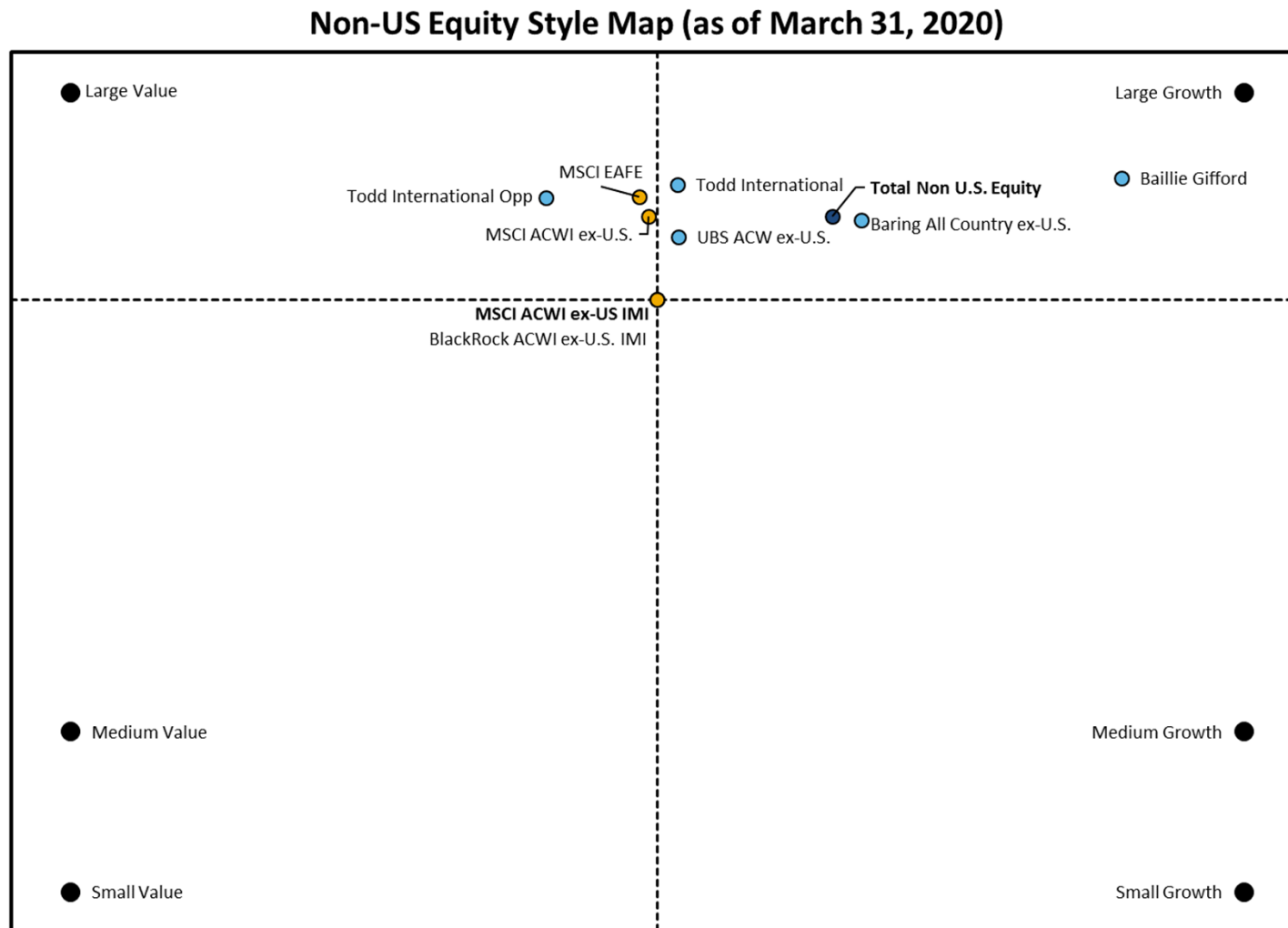
- TRS Total Equity performance has been strong on a relative and absolute basis
- The relative performance of the US equity portfolio was hampered somewhat over longer periods due to a modest bias towards value and small cap stocks
- Adding growth exposure to U.S. equity has served to better balance this portfolio

# TRS U.S. Equity Style Map

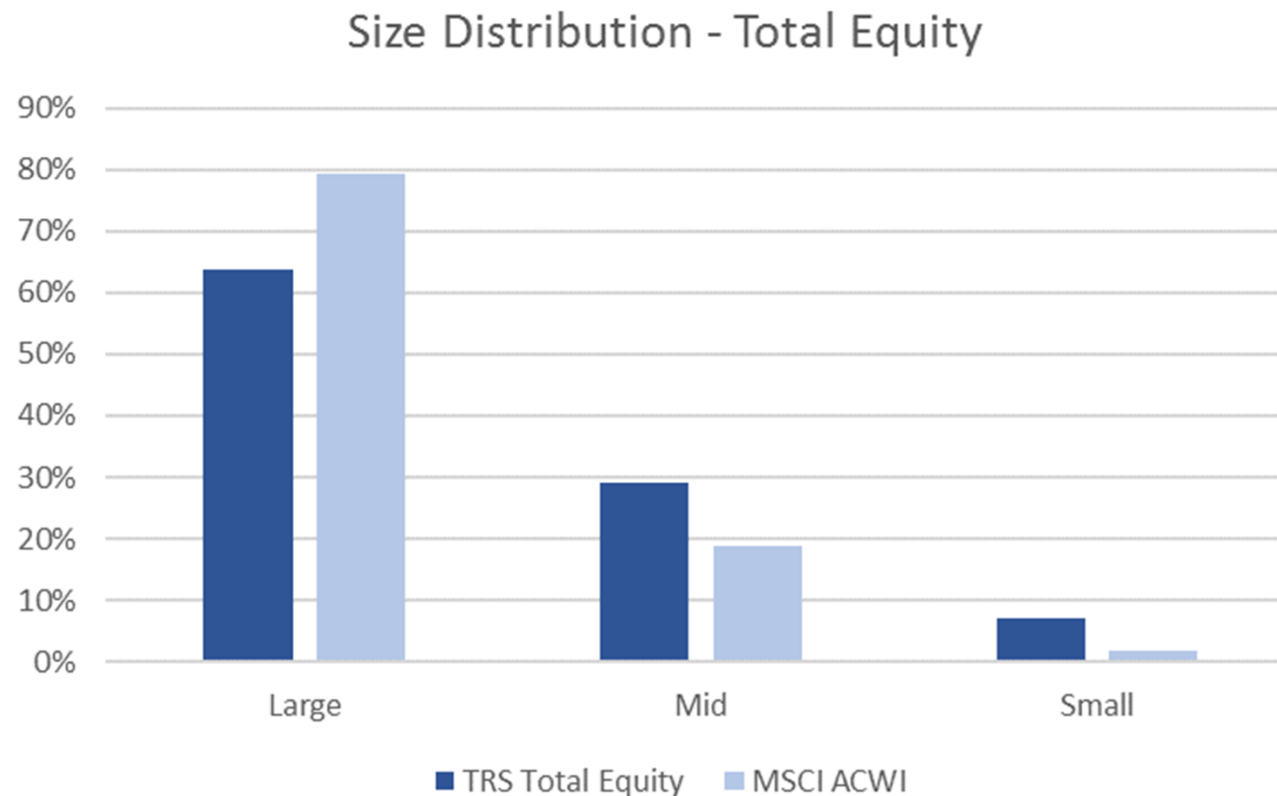
US Equity Style Map (as of March 31, 2020)



## TRS Non-U.S. Equity Style Map



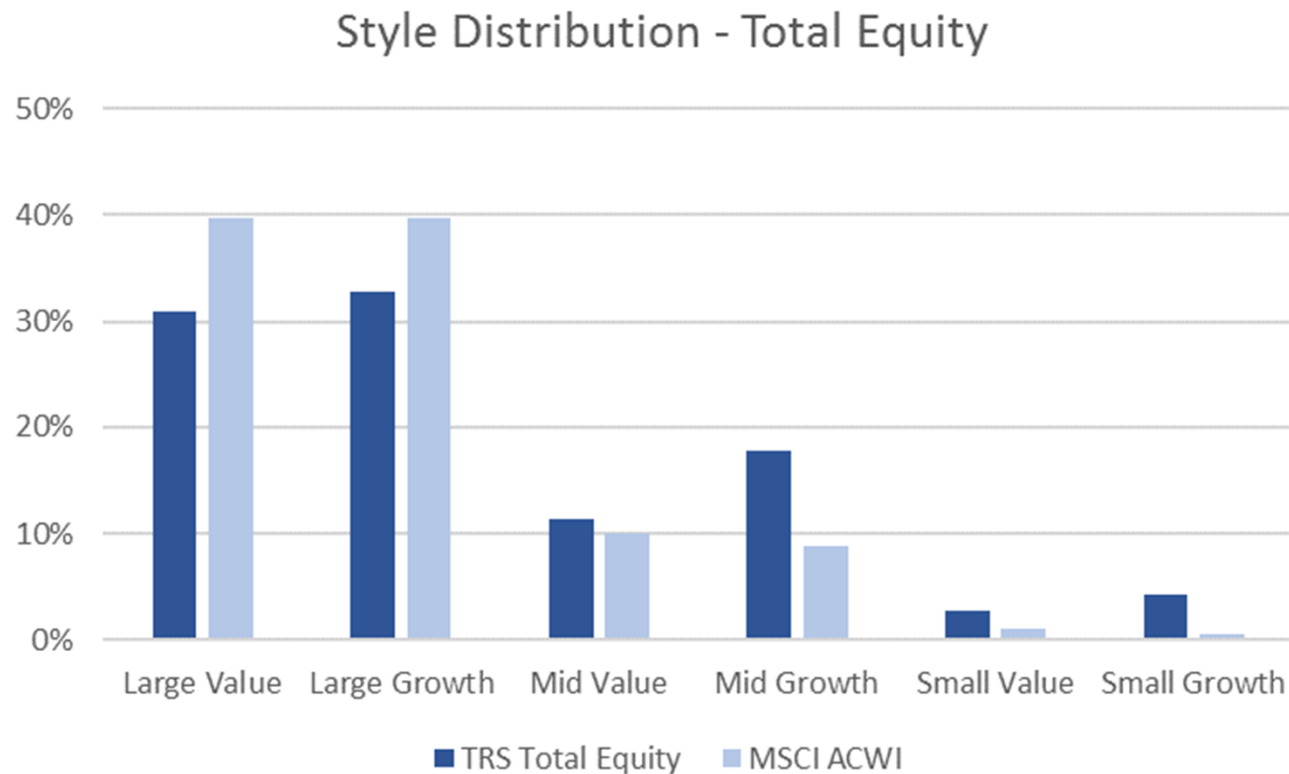
## TRS Total Equity Size vs. MSCI All Country World Index



- The aggregate TRS equity allocation has a bias towards small- and mid-cap stocks relative to the MSCI All Country World Index

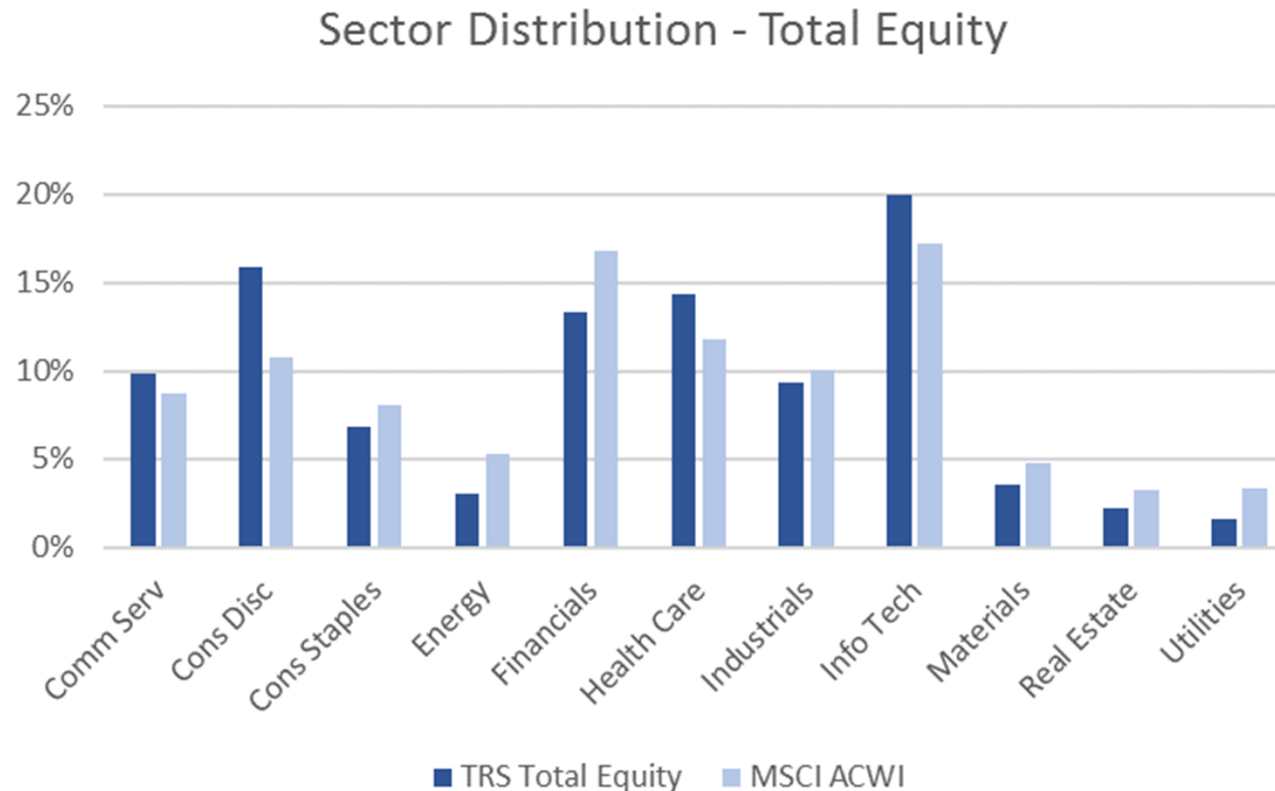


## TRS Total Equity Style vs. MSCI All Country World Index



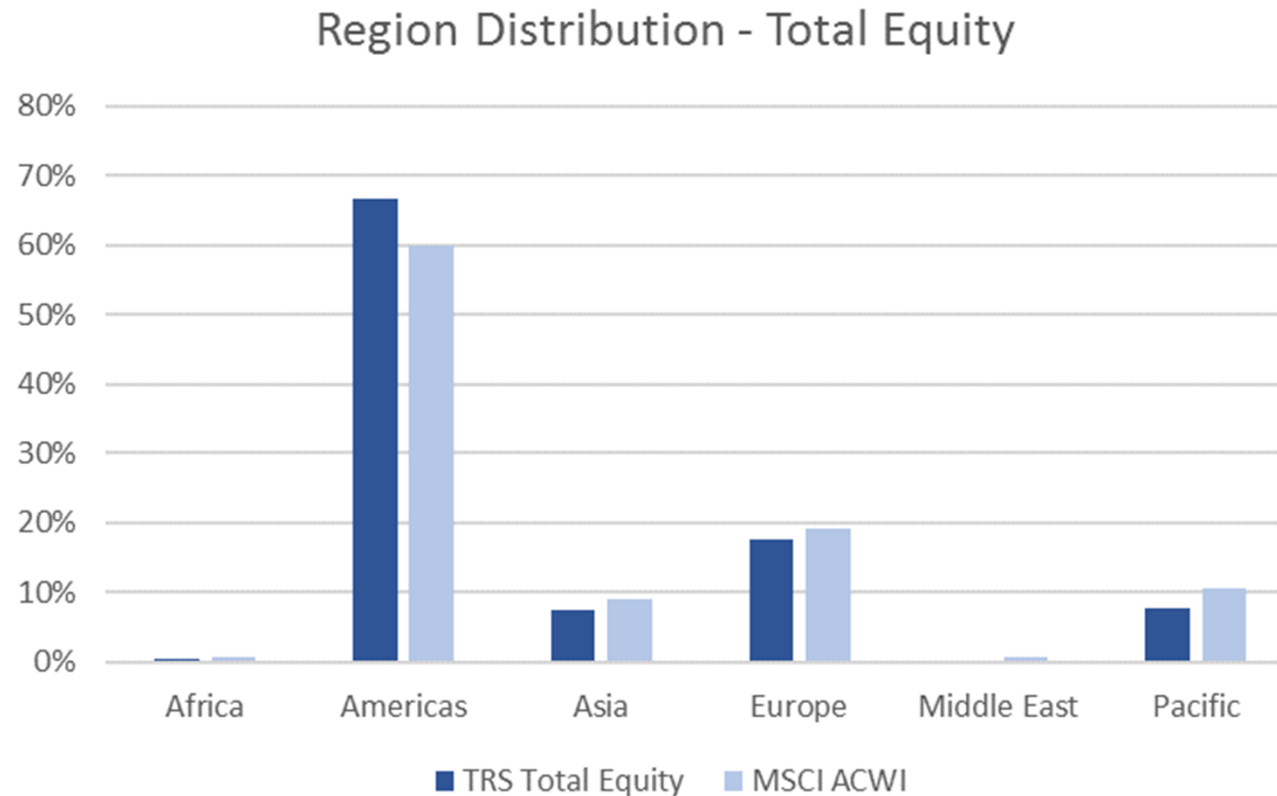
- TRS's total exposure to equities tilts slightly towards growth stocks relative to the broad global stock market opportunity set

## TRS Total Equity Sector vs. MSCI All Country World Index



- From a sector perspective, the aggregate TRS equity allocation is overweight to consumer discretionary and information technology stocks and underweight to financials and energy stocks relative to the broad global equity market opportunity set

## TRS Total Equity Region vs. MSCI All Country World Index



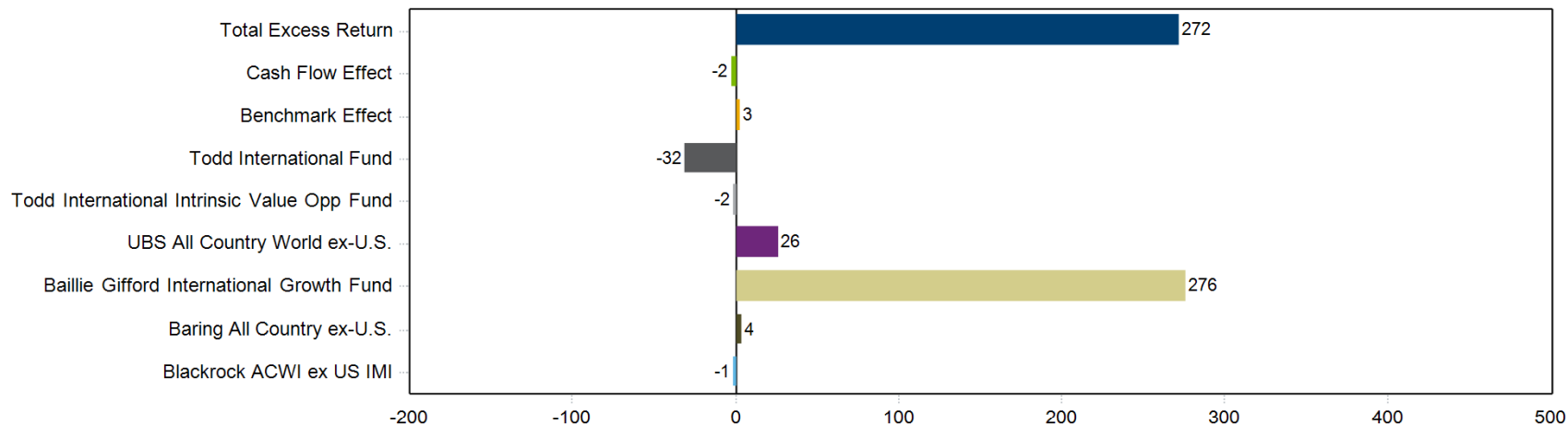
- TRS's aggregate equity portfolio exhibits a moderate home-country bias relative to the MSCI All Country World Index

# Total International Equity

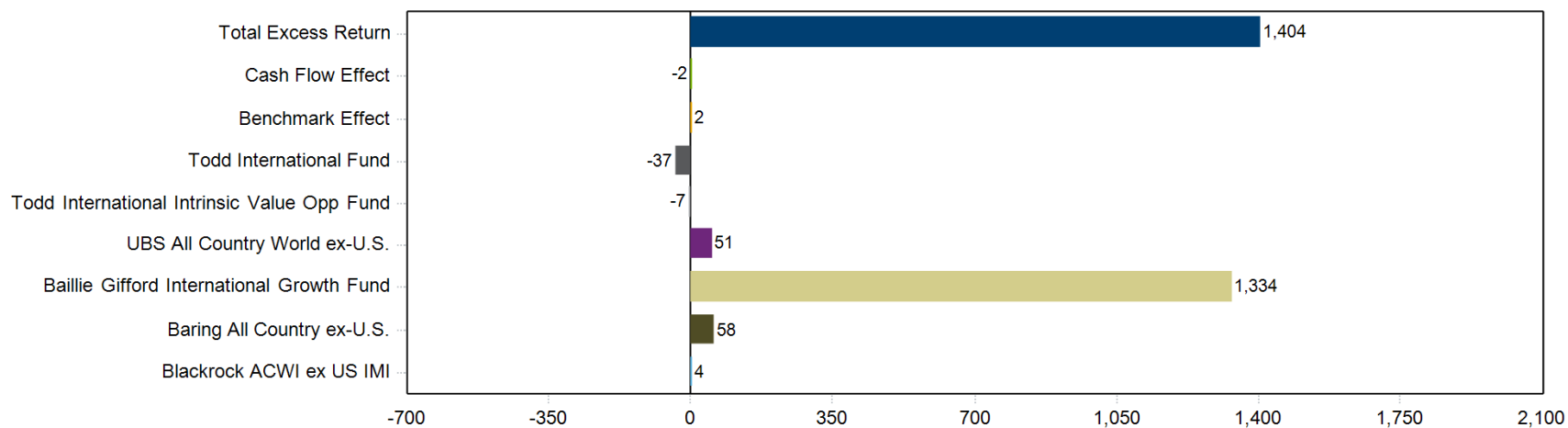
As of September 30, 2020

## Asset Class Attribution

### 1 Quarter



### 1 Year

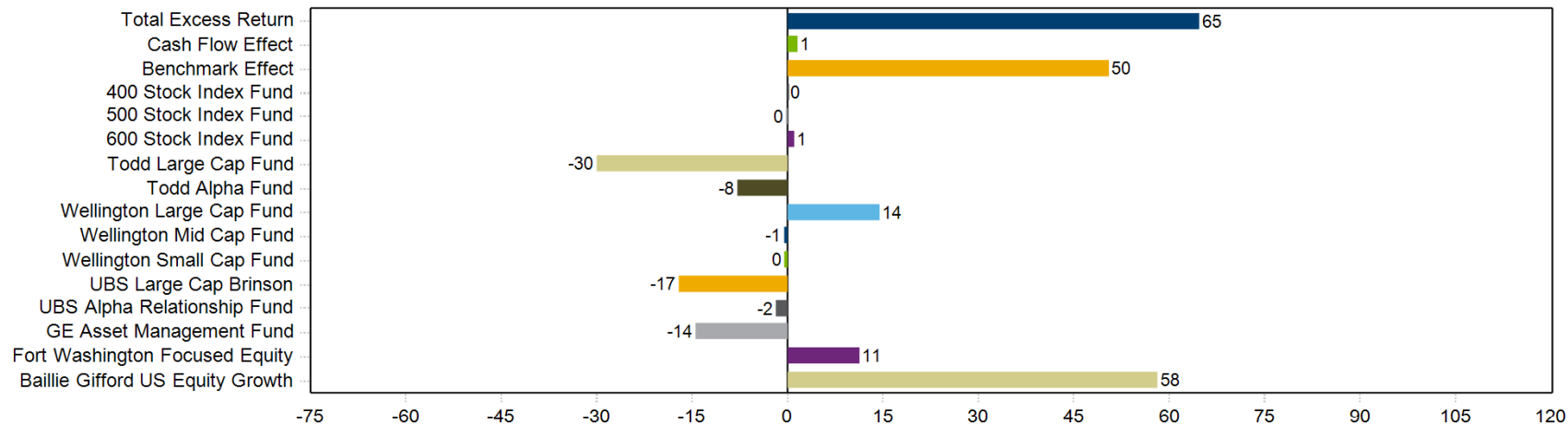


# Total U.S. Equity

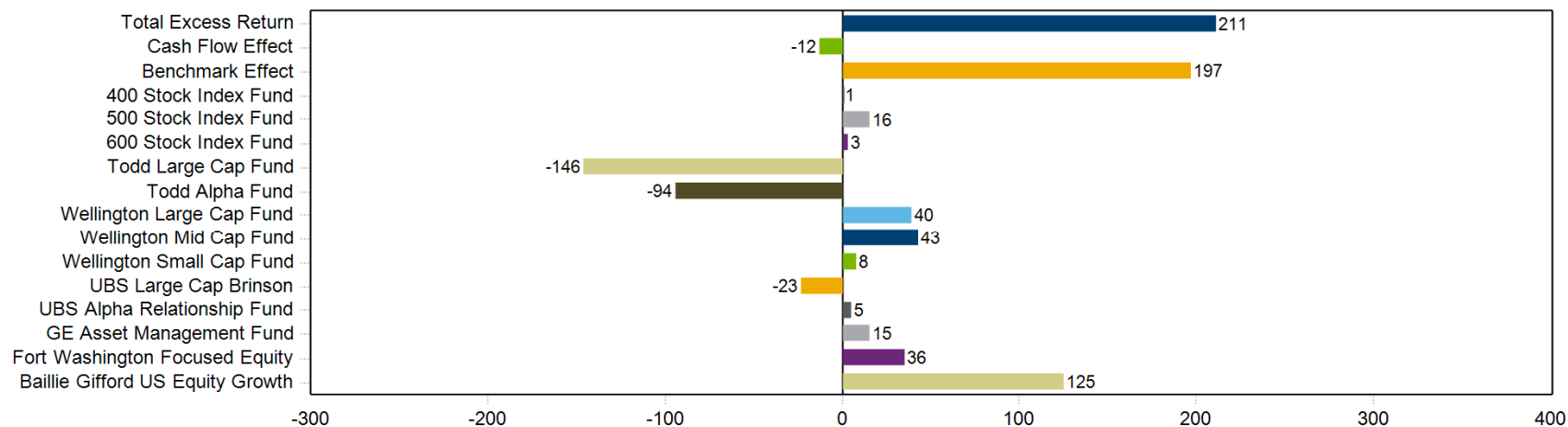
As of September 30, 2020

## Asset Class Attribution

### 1 Quarter



### 1 Year



## TRS Equity Structure Observations

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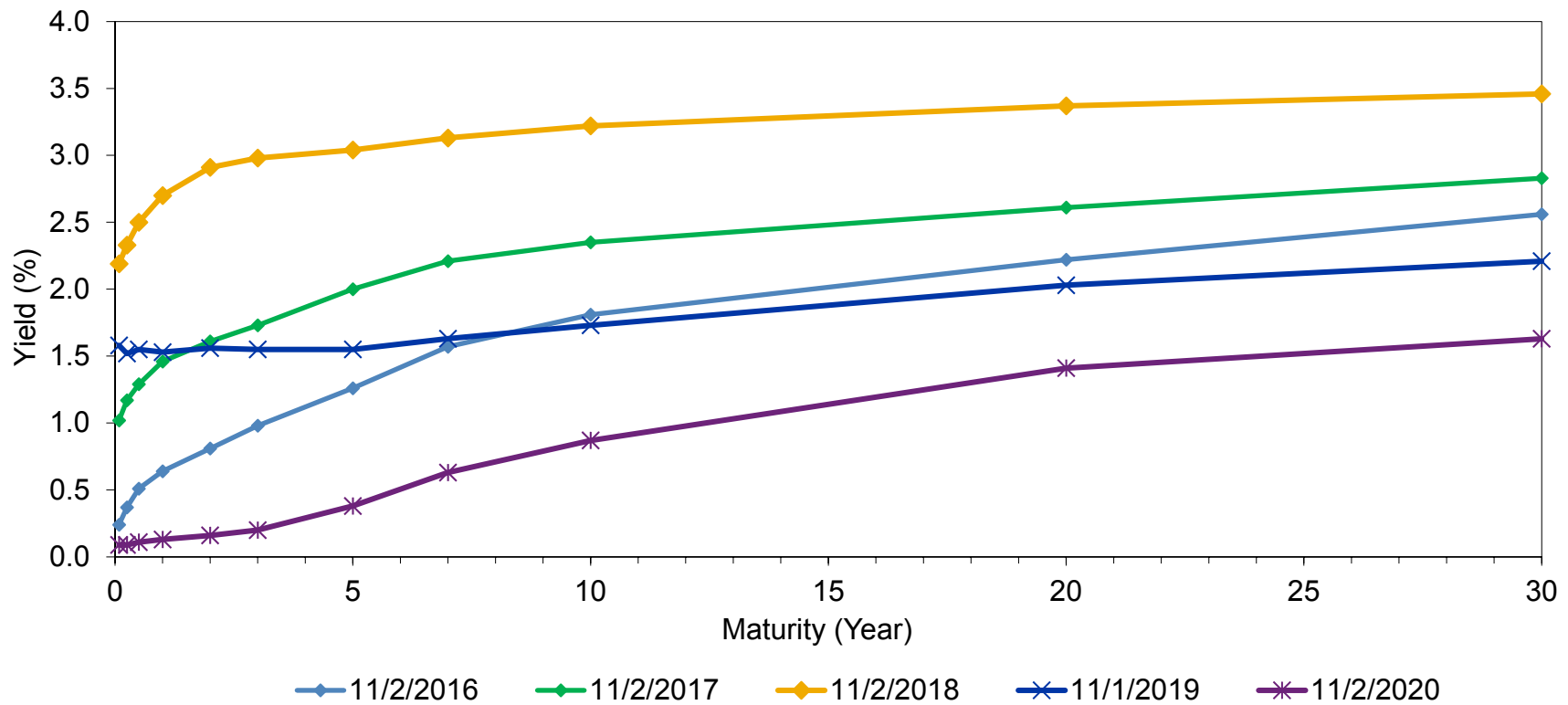
■ TRS Equity Structure Observations:	Grade:
– Broad, diversified, low-cost index portfolios are used for passive mgmt.	A
– The overall portfolios are relatively style neutral and well diversified	A
– Active management is diversified with experienced and capable firms	A
– The overall portfolio has performed very well style aside	A
• Credit to successful selection of investment managers and structure	
– Highly competitive cost structure to minimize drag	A



# Fixed Income Market Update and Views

# U.S. Fixed Income Markets

U.S. Treasury Yield Curve



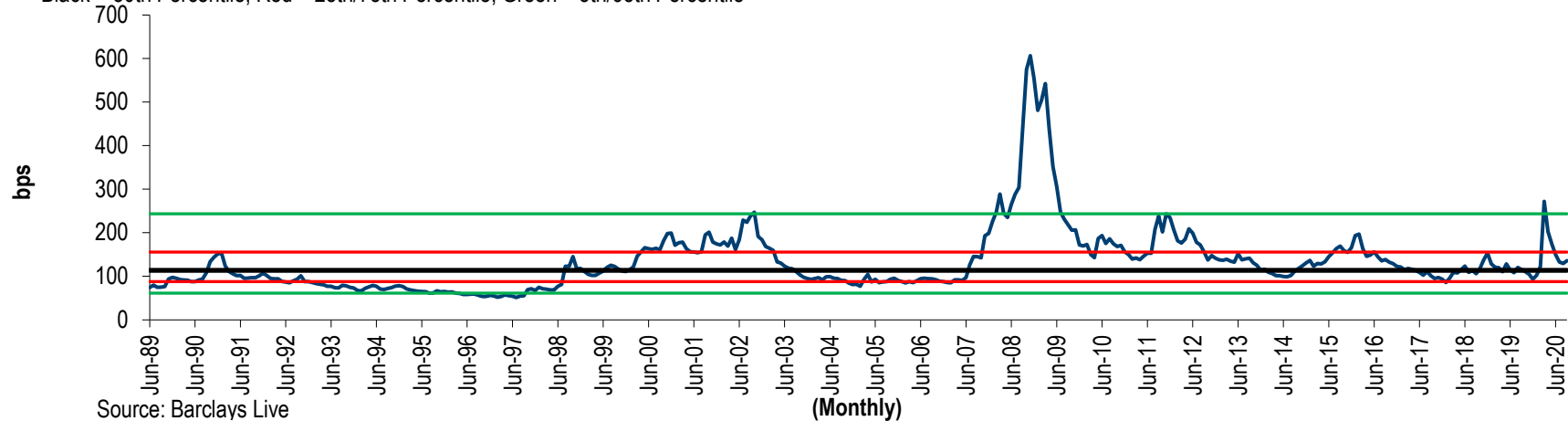
Source: U.S. Dept. of Treasury



## U.S. Fixed Income Markets (cont'd)

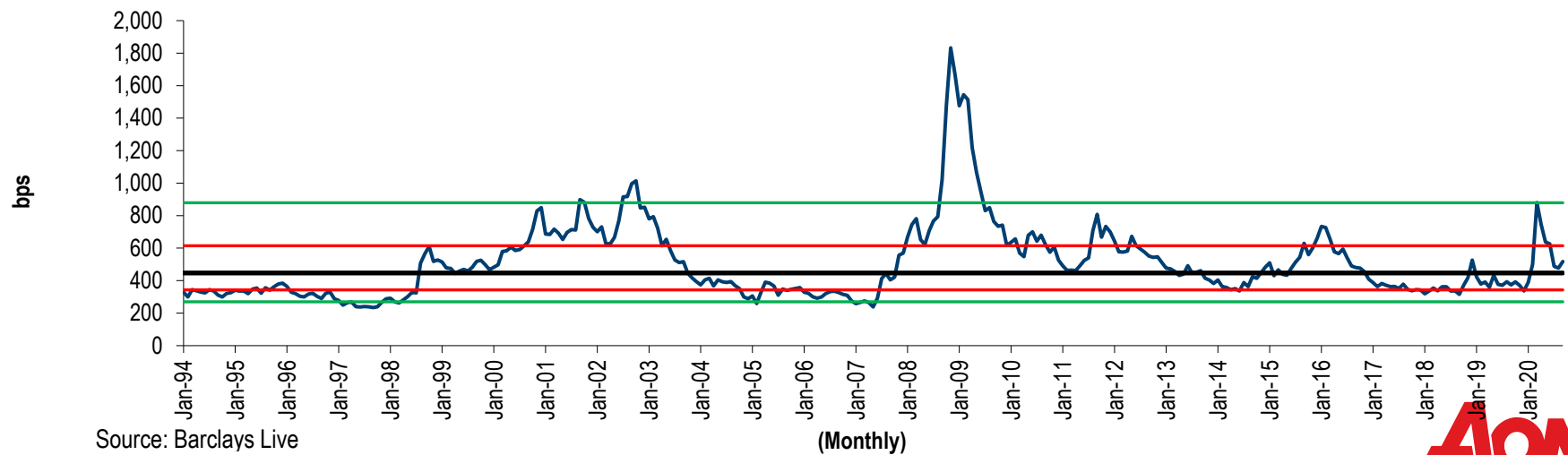
### U.S. IG Corporate Credit: OAS over Treasuries (bps) through September 2020

Black = 50th Percentile, Red = 25th/75th Percentile, Green = 5th/95th Percentile



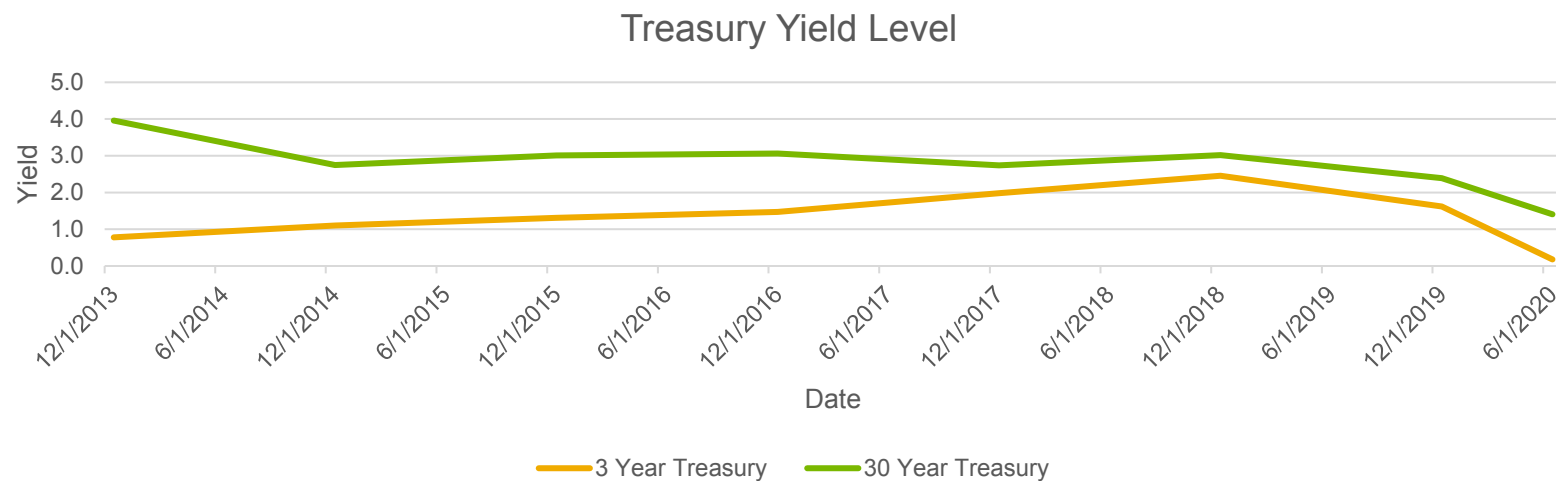
### U.S. High Yield Corporates: OAS over Treasuries (bps) through September 2020

Black = 50th Percentile, Red = 25th/75th Percentile, Green = 5th/95th Percentile



## Threat of Rising Interest Rates

- In the years following the Global Financial Crisis, there was a majority thesis that interest rates would begin to rise after significant Fed intervention to artificially drive down rates
- While there was a brief period of rising rates for intermediate duration bonds, the same experience was not shared by long duration bonds
- Many investors that have attempted to time the market and predict interest rate movements have been hurt from a relative return perspective



## Bonds - Diversification Benefit

Benchmark	Returns - (11/2007 - 02/2009)	Returns - (05/2010 - 08/2010)	Returns - (05/2011 - 09/2011)
	Global Financial Crisis	European Debt Crisis	United States Credit Downgrade
Bl. Bar. US Int. Treasury	9.18	4.86	4.76
Bl Bar. US Long Treasury	12.38	16.63	26.49
MSCI ACWI-ND	-44.99	-8.45	-20.47
S&P 500	-41.39	-10.90	-16.26

Benchmark	Returns - (08/2015 - 02/2016)	Returns - (10/2018 - 12/2018)	Returns - (01/2020 - 03/2020)
	Commodity Price Crash	Fed Rate Increases	Coronavirus Pandemic
Bl. Bar.US Int. Treasury	2.11	2.24	5.25
Bl. Bar. US Long Treasury	8.29	4.19	20.90
MSCI ACWI-ND	-12.01	-12.75	-21.37
S&P 500	-6.90	-13.52	-19.60

## Diversification of Bonds



- Over the past 20+ years, intermediate Treasuries have showed a stronger negative correlation to the equity market than the long bond sector, with a brief period of exception
- Despite this, the inclusion of long duration bonds has helped mitigate the volatility of a stock/bond portfolio during market shocks as shown in the table below

## Impact of Rising Interest Rates – Intermediate Vs. Aggregate

- In a rising interest rate environment, a lower duration fixed income allocation will provide for a higher return at a specific point in time
- However, interest rates have to rise to a level that is above the yield advantage that longer duration bonds hold
- As of 6/30/20, the Intermediate Aggregate Index (relative the Aggregate Index) had:
  - A shorter duration by 2.6 years
  - 28 basis points less yield
- We've illustrated the expected annualized five-year return of the Intermediate Aggregate and Aggregate benchmarks when there are parallel shifts in the yield curve in the table to the right
  - Interest rates will need to rise 55 bps over the next five years for the two benchmarks to have an equal expected return

Expected Five-Year Return

	Blmbg. Barclays Intermediate Aggregate	Blmbg. Barclays Aggregate
+2.00%	+0.4%	-0.3%
+1.50%	+0.5%	+0.1%
+1.00%	+0.7%	+0.5%
+0.50%	+0.8%	+0.9%
+0.00%	+1.0%	+1.3%
-0.50%	+1.1%	+1.7%

Returns are annualized

Assumes the interest rates will shift an equal amount over each year in the five year time period and that credit spreads remain constant

Based on index characteristics as of 6/30/2020

## Fixed Income Market Takeaways

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- Fixed Income has historically served as a good diversifier to stock market risk, and we expect this to continue
- Many, but not all, economic environments where rates rise tend to benefit other parts of your portfolio in the long run
- The benefit of shortening duration is offset by the yield advantage of holding longer bonds and the downside protection to stock market risk isn't as great



# Appendix

- Active Risk Analysis
- Additional Holdings Based Equity Style Analysis Output

## Active Risk Modeling

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- Sources of Risk
  - Percentage contribution to risk
    - Total Fund Level (by asset class)
      - Risk due to implementation within asset classes (“manager effect”)
      - Risk due to deviation from policy targets (“allocation effect”)
    - Asset Class Level (by manager portfolio)
      - Risk due to deviation from policy targets (“misfit risk”). This results when there are significant biases in the portfolio relative to the asset class benchmark (i.e. too much in value relative to the broad benchmark)
      - Risk due to manager active bets (“manager-specific risk” relative to their given benchmark)
- Contribution to risk is determined by three factors:
  1. Size of allocation
    - Larger allocation → larger contribution to risk
  2. Benchmark risk
    - Higher risk → larger contribution to risk
  3. Relationship (correlation) with other asset classes/managers
    - Higher correlation → larger contribution to risk
- Contribution to risk can be negative for a manager that is a strong diversifier (low-to-negative correlation)



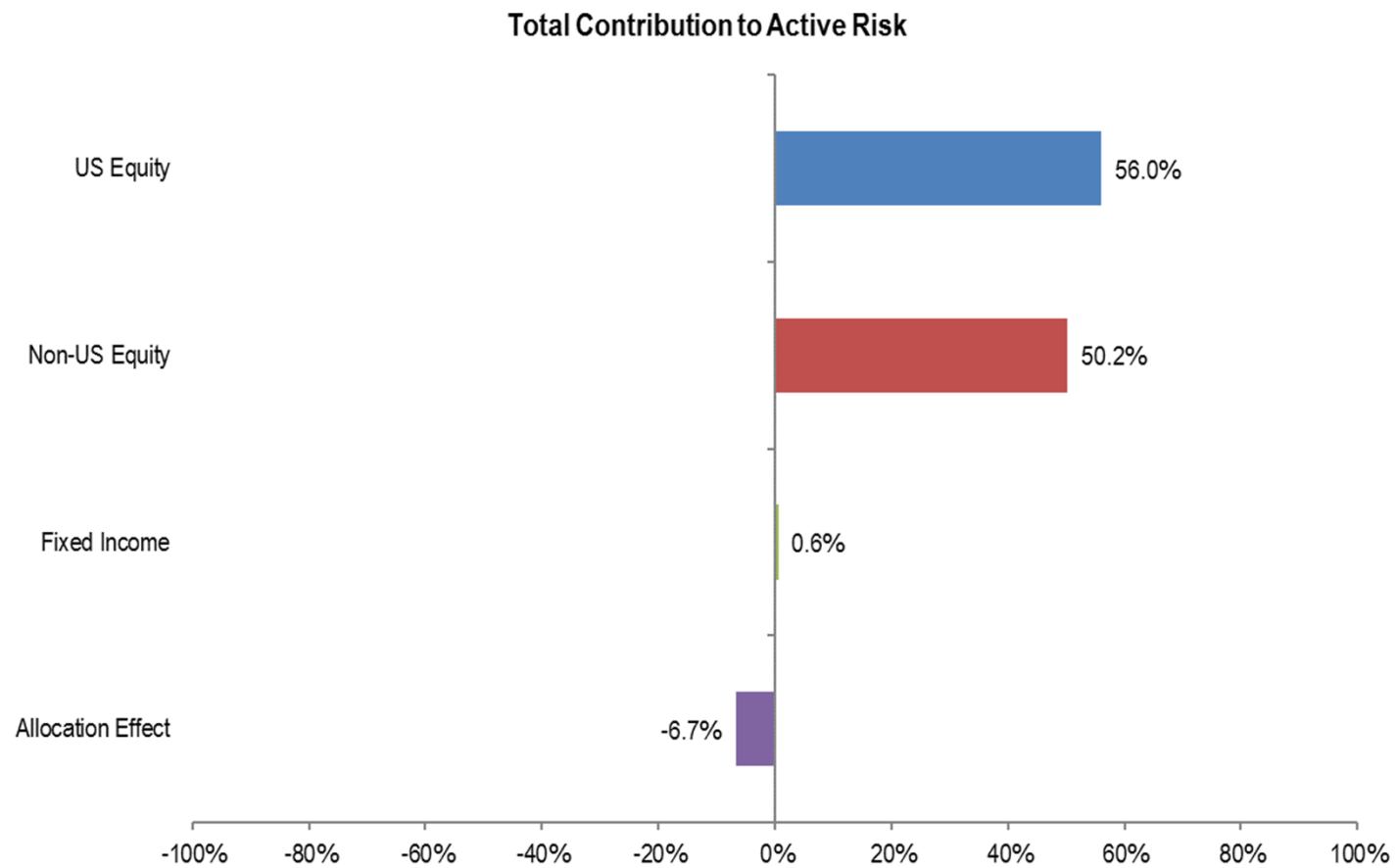
## Total Fund Risk Analysis for Marketable Securities

Asset Class	Allocation			Benchmark Risk	Benchmark Risk Attribution		
	(\$ millions)	Percent of Total	Policy		Manager Effect	Allocation Effect	Total
US Equity	\$ 6,923	51.0%	51.9%	1.99%	56.0%	-3.7%	52.3%
Non-US Equity	\$ 3,773	27.8%	28.6%	3.26%	50.2%	-2.4%	47.8%
Fixed Income	\$ 2,882	21.2%	19.5%	0.33%	0.6%	-0.7%	-0.1%
<b>Total Fund</b>	<b>\$ 13,578</b>	<b>100.0%</b>	<b>100.0%</b>	<b>1.60%</b>	<b>106.7%</b>	<b>-6.7%</b>	<b>100.0%</b>

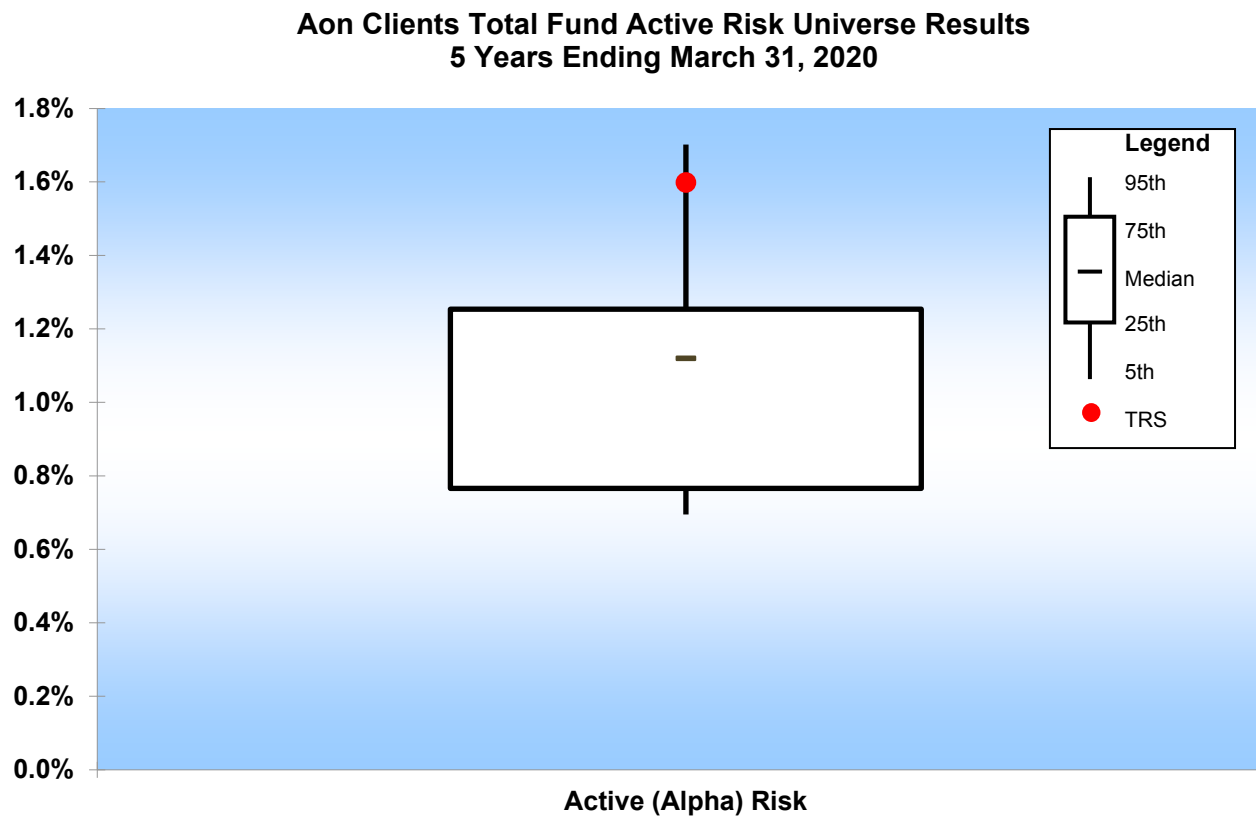
- The current benchmark risk level of the TRS portfolio is 1.60%, meaning that in two of every three years we expect the return of assets to be +/- 1.60% relative to the return of the benchmark. The following slides show the asset class contribution to the current risk level.

## Asset Class Contribution to Total Fund Risk

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## TRS Total Fund Active Risk vs. Other Aon Clients

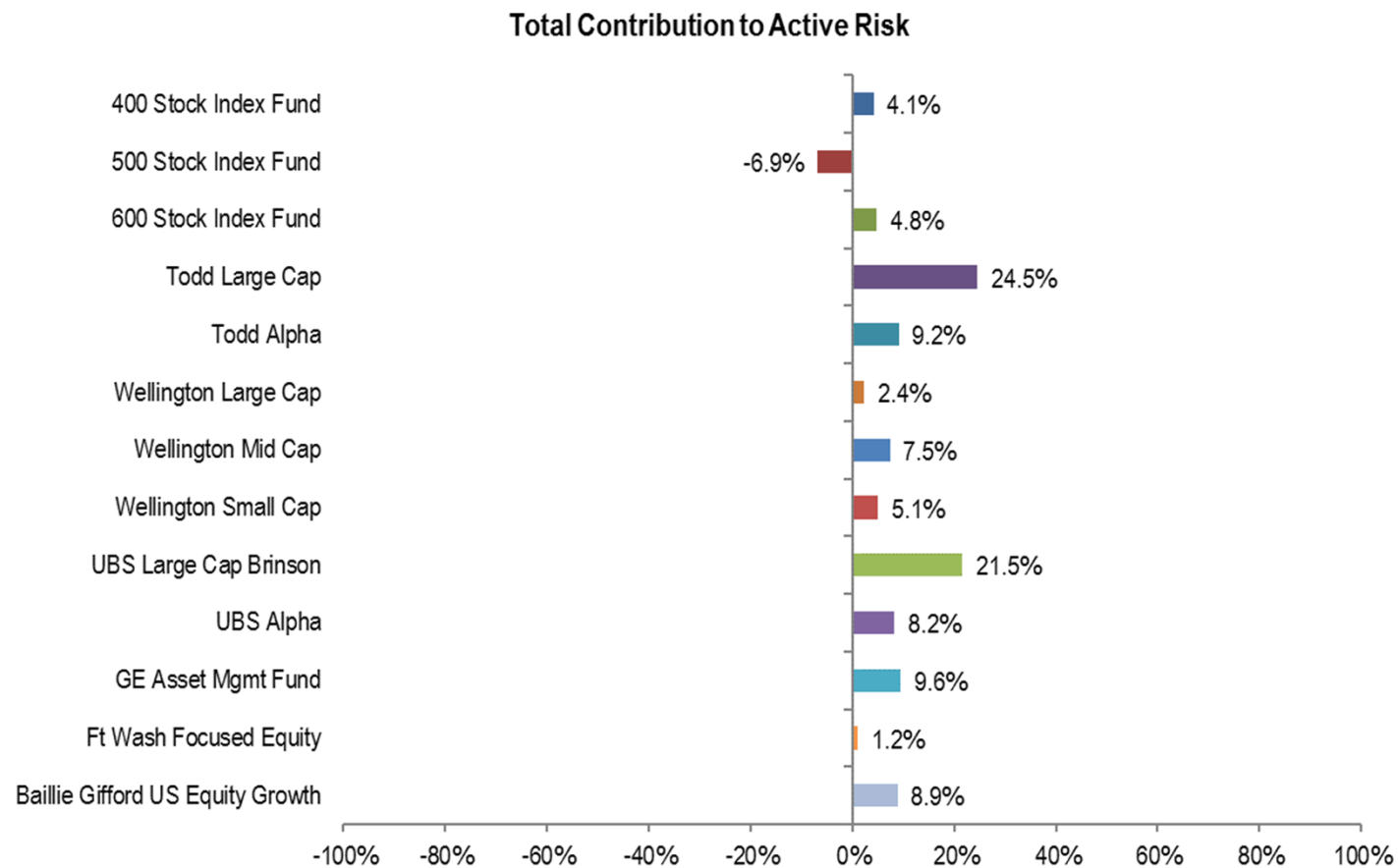


\* The total fund median for Aon's public fund clients is 1.1%.

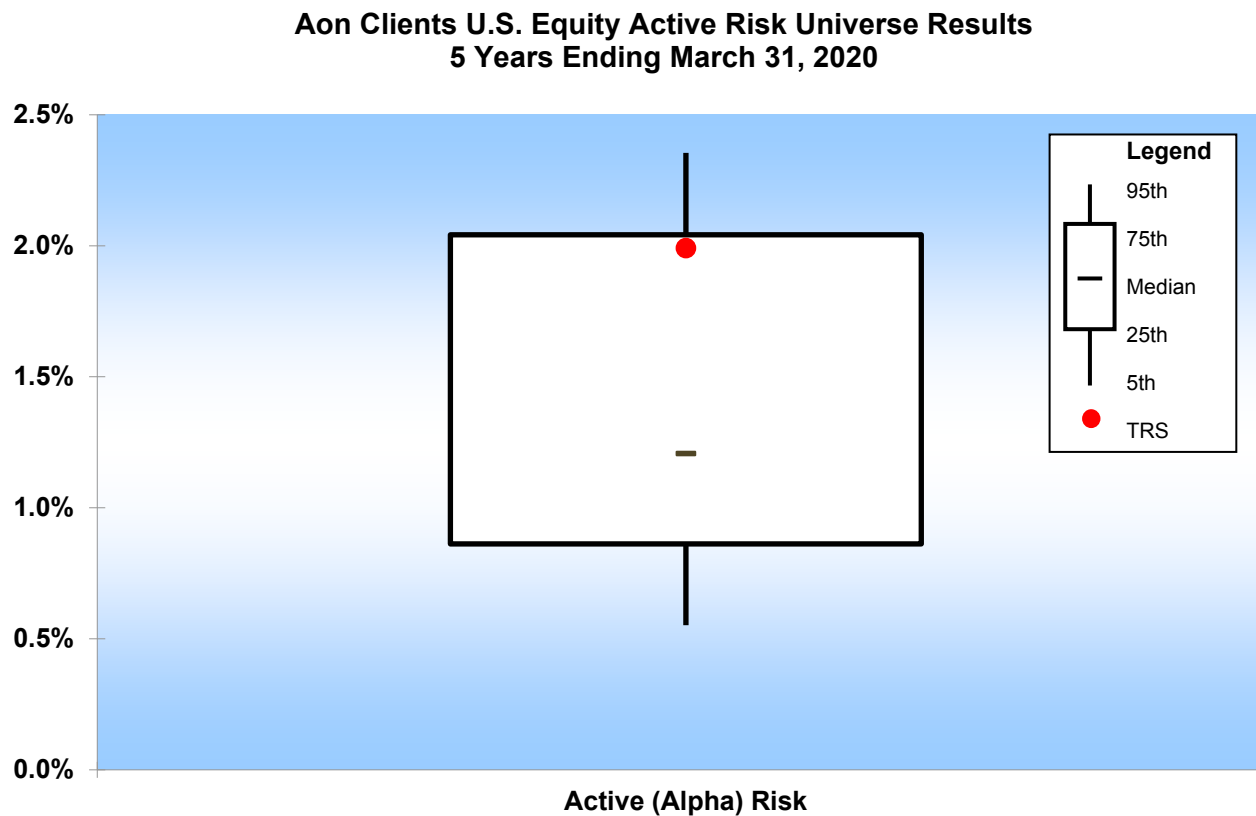
## Total U.S. Equity – Risk Analysis

Manager	Allocation	Allocation Percentage	Annualized Active Risk	Manager-Specific	Misfit	Total
400 Stock Index Fund	\$ 209	3.0%	0.42%	-0.2%	4.4%	4.1%
500 Stock Index Fund	\$ 2,252	32.5%	0.23%	-1.2%	-5.7%	-6.9%
600 Stock Index Fund	\$ 152	2.2%	0.40%	-0.1%	4.9%	4.8%
Todd Large Cap	\$ 864	12.5%	6.02%	26.7%	-2.2%	24.5%
Todd Alpha	\$ 344	5.0%	7.99%	10.0%	-0.9%	9.2%
Wellington Large Cap	\$ 531	7.7%	2.08%	3.7%	-1.3%	2.4%
Wellington Mid Cap	\$ 295	4.3%	4.53%	1.3%	6.2%	7.5%
Wellington Small Cap	\$ 148	2.1%	2.90%	-0.7%	5.8%	5.1%
UBS Large Cap Brinson	\$ 655	9.5%	5.13%	19.9%	1.6%	21.5%
UBS Alpha	\$ 240	3.5%	6.20%	8.1%	0.2%	8.2%
GE Asset Mgmt Fund	\$ 693	10.0%	4.38%	7.1%	2.4%	9.6%
Ft Wash Focused Equity	\$ 304	4.4%	3.16%	0.1%	1.0%	1.2%
Baillie Gifford US Equity Growth	\$ 236	3.4%	11.03%	9.0%	-0.1%	8.9%
<b>Total Asset Class</b>	<b>\$ 6,923</b>	<b>100.0%</b>	<b>1.99%</b>	<b>1.7%</b>	<b>0.4%</b>	<b>100.0%</b>
				<b>83.74%</b>	<b>16.26%</b>	

## Total U.S. Equity – Contribution to Active Risk



## TRS U.S. Equity Active Risk vs. Other Aon Clients



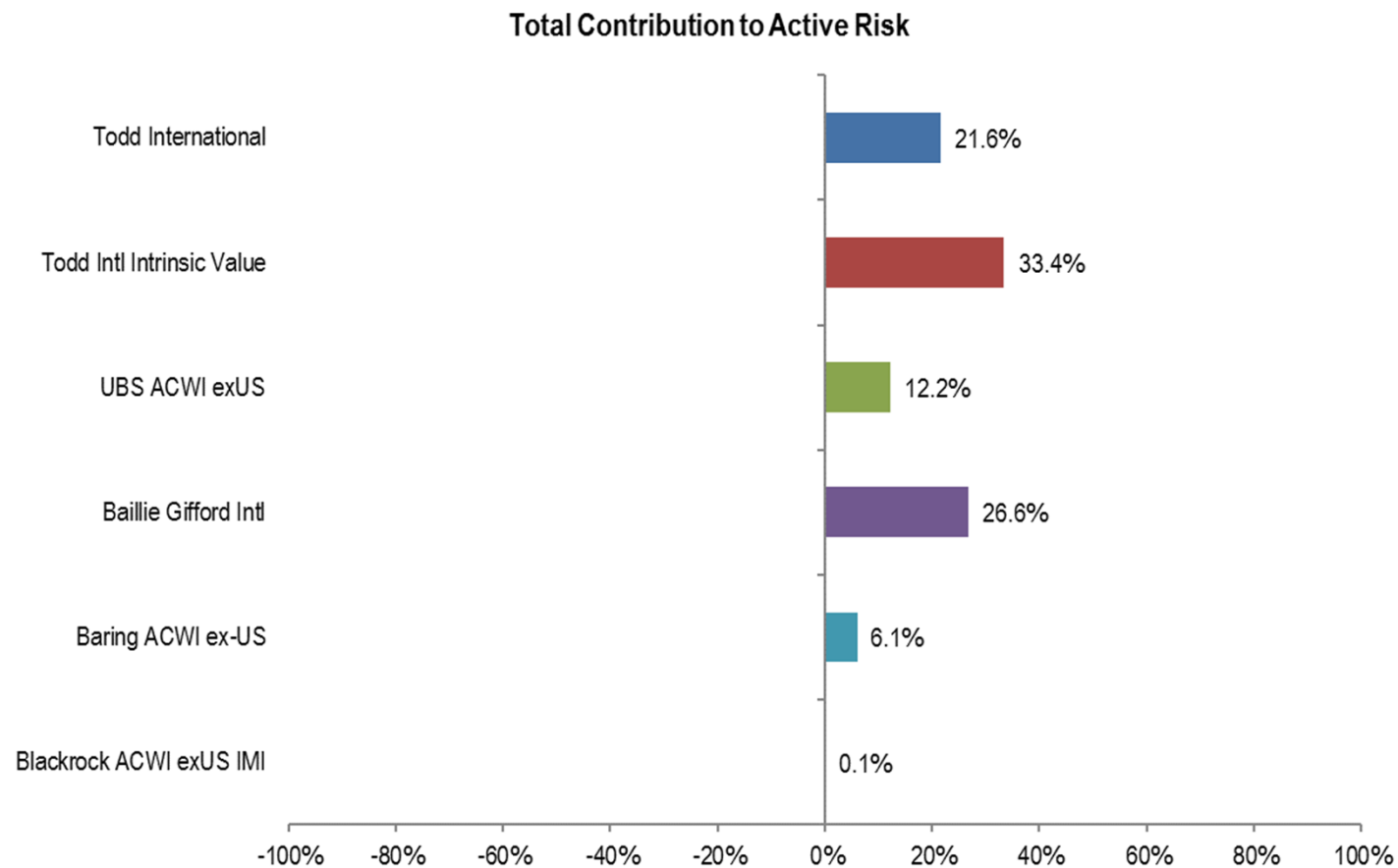
\* The total fund median for Aon's public fund clients is 1.2%.

## Total Non-U.S. Equity – Risk Analysis

Manager	Allocation	Allocation Percentage	Annualized Active Risk	Manager-Specific	Misfit	Total
Todd International	\$ 653	17.3%	4.96%	21.6%	0.0%	21.6%
Todd Intl Intrinsic Value	\$ 1,116	29.6%	5.26%	33.4%	0.0%	33.4%
UBS ACWI exUS	\$ 791	21.0%	3.04%	12.2%	0.0%	12.2%
Baillie Gifford Intl	\$ 592	15.7%	8.56%	28.1%	-1.4%	26.6%
Baring ACWI ex-US	\$ 554	14.7%	4.22%	6.1%	0.0%	6.1%
Blackrock ACWI exUS IMI	\$ 68	1.8%	0.36%	0.0%	0.1%	0.1%
<b>Total Asset Class</b>	<b>\$ 3,773</b>	<b>100.0%</b>	<b>3.26%</b>	<b>3.3%</b>	<b>0.4%</b>	<b>100.0%</b>
				<b>101.35%</b>	<b>-1.35%</b>	

## Total Non-U.S. Equity – Contribution to Active Risk

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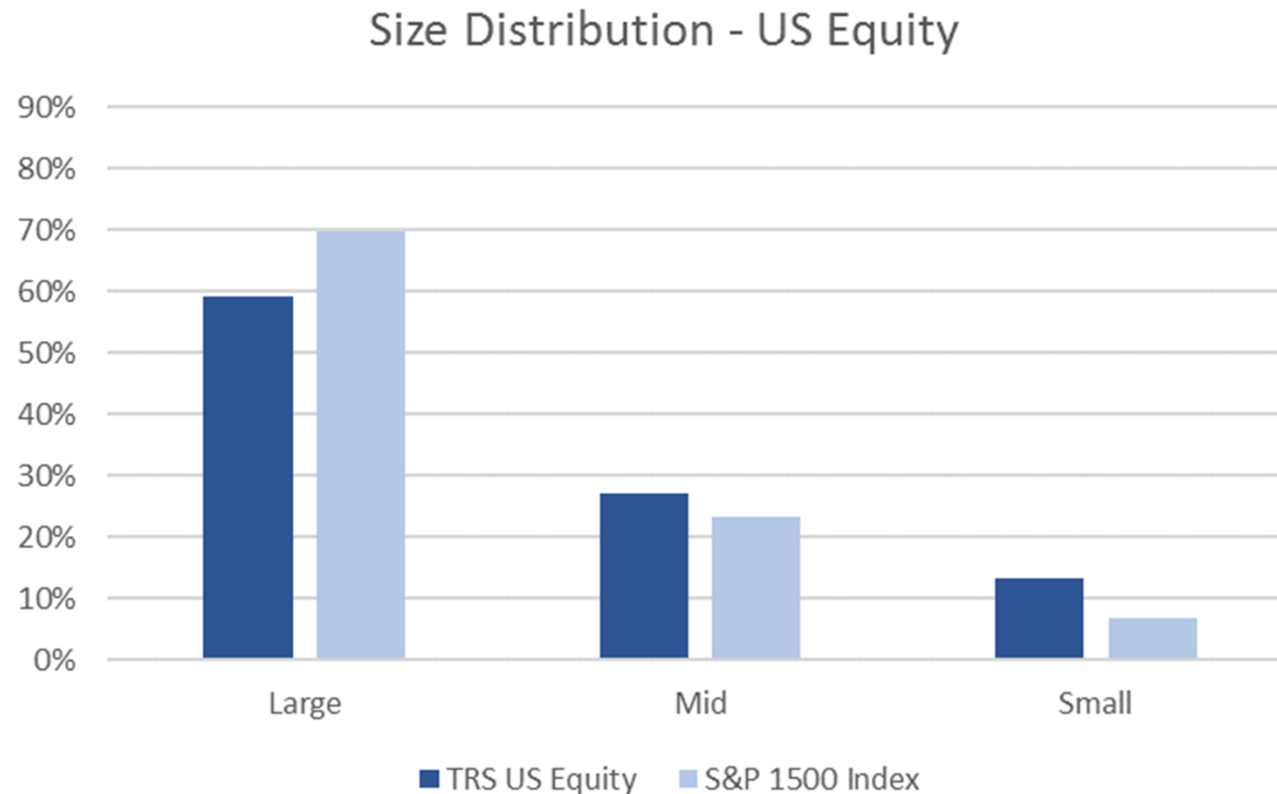


## Holdings Based Analysis

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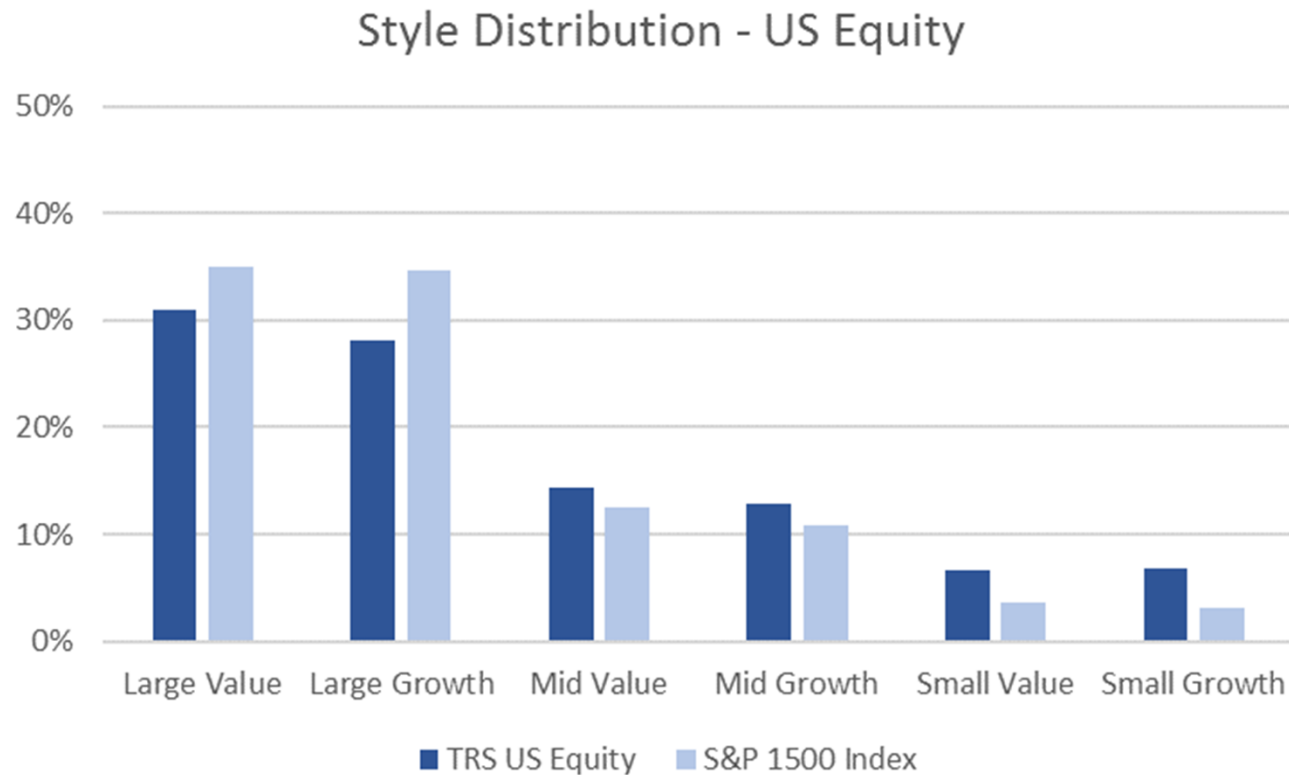
- The balance of this presentation provides a holdings-based analysis of TRS's equity allocations
- Using holdings data as of March 31, 2020, we compare the U.S. Equity and Non-U.S. Equity asset classes to their respective benchmark indices
- Comparisons include:
  - Size (i.e., capitalization)
  - Style (i.e., value vs. growth)
  - Sector
  - Region
- We have also included an analysis of the aggregate of TRS's equity asset classes vs. the broad global equity market opportunity set, for reference

## TRS U.S. Equity Size vs. S&P 1500 Index



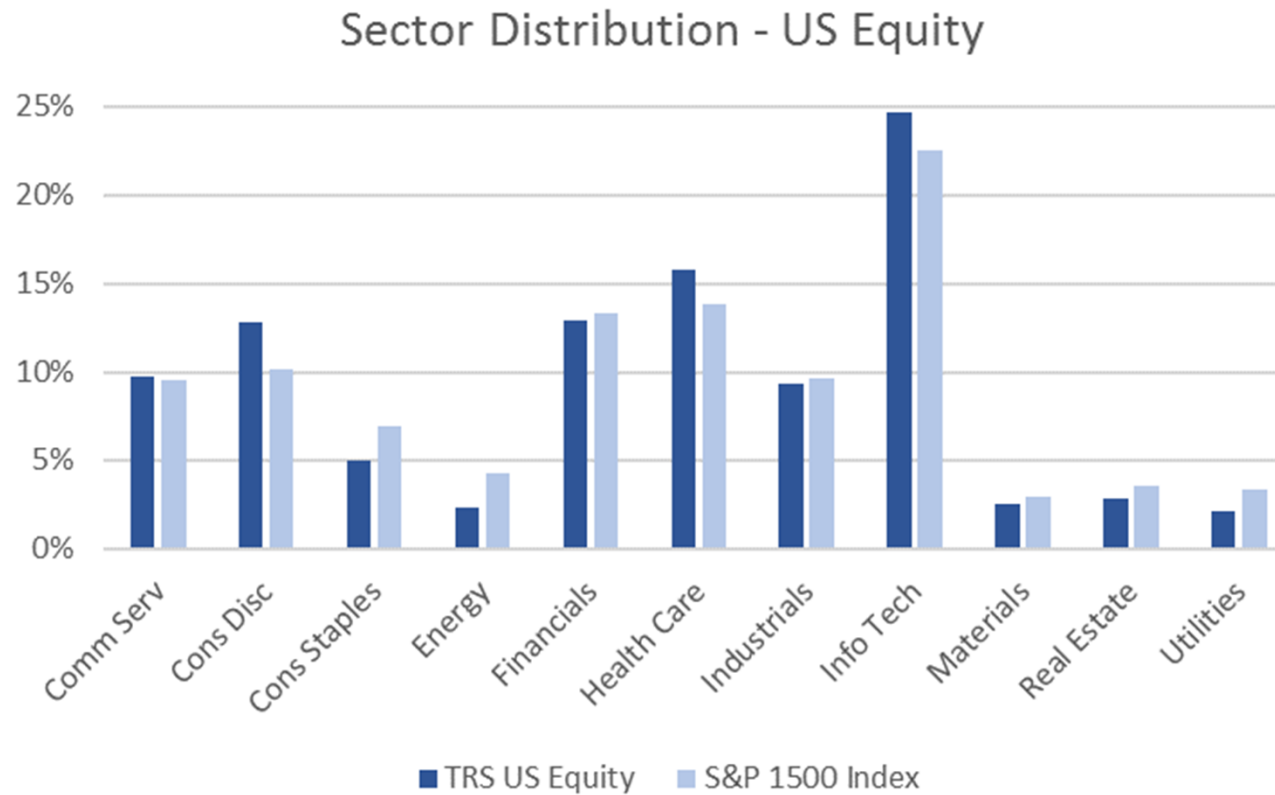
- Relative to the U.S. stock market opportunity set, TRS's U.S. equity allocation has a bias to mid- and small-cap stocks

## TRS U.S. Equity Style vs. S&P 1500 Index



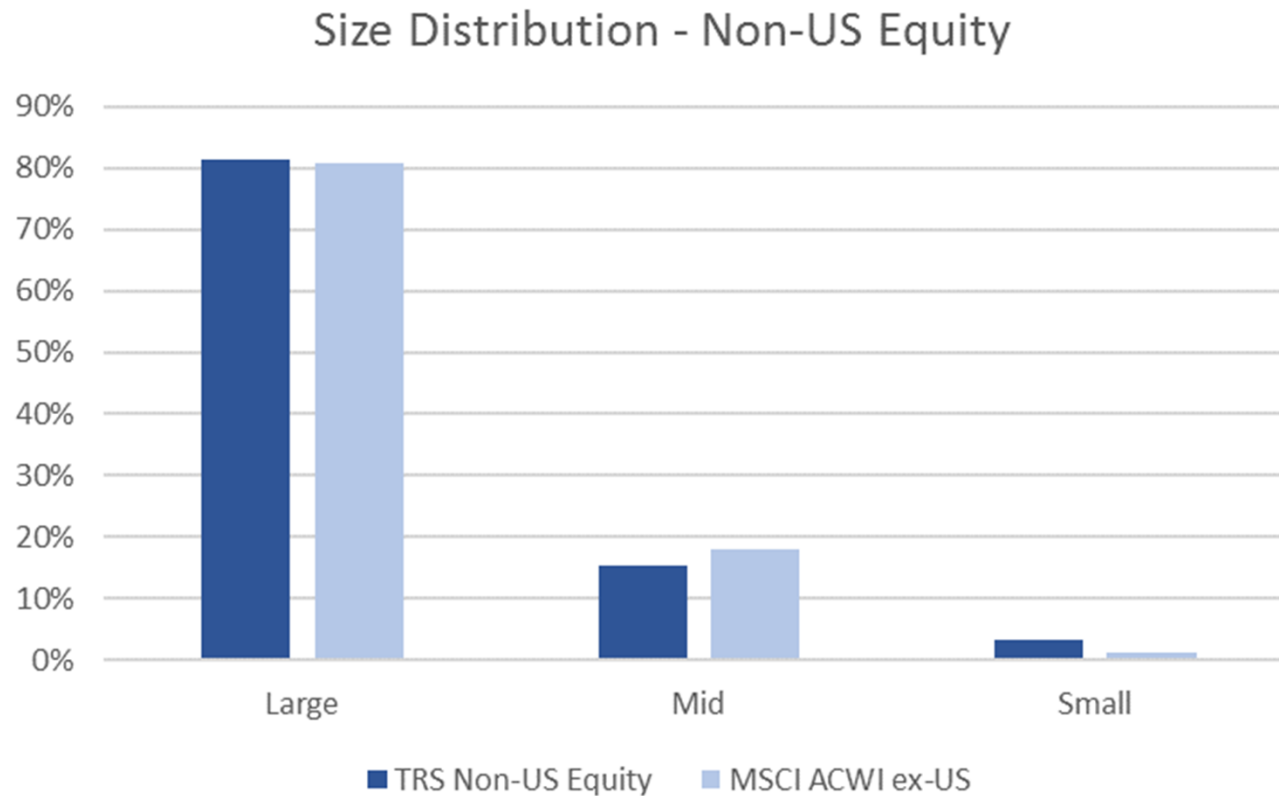
- TRS's U.S. stock allocation is approximately style-neutral in aggregate relative to the S&P 1500 Index

## TRS U.S. Equity Sector vs. S&P 1500 Index



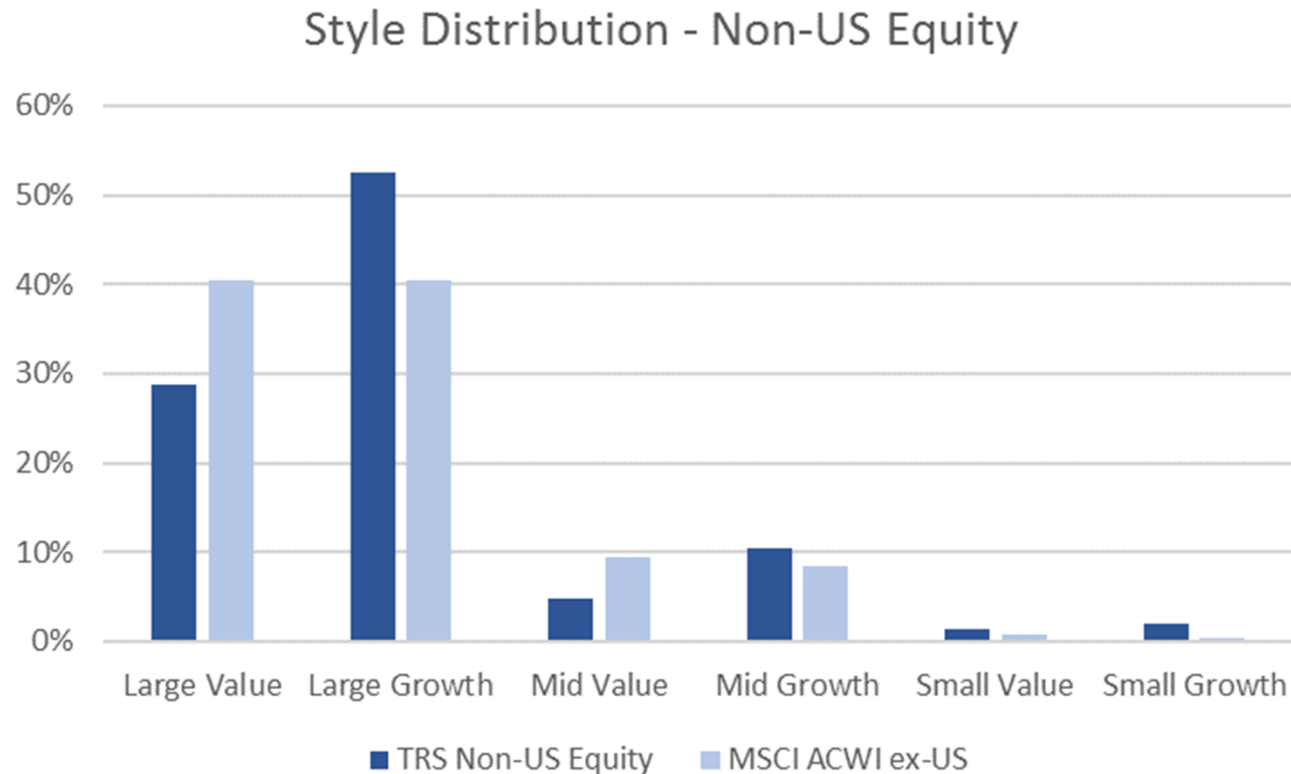
- From a sector perspective, TRS's U.S. equity allocation has a bias to consumer discretionary and information technology stocks relative to the S&P 1500 Index

## TRS Non-U.S. Equity Size vs. MSCI ACWI ex-US



- TRS's non-U.S. stock allocation is approximately size-neutral in aggregate relative to the MSCI ACWI ex-US Index

## TRS Non-U.S. Equity Style vs. MSCI ACWI ex US

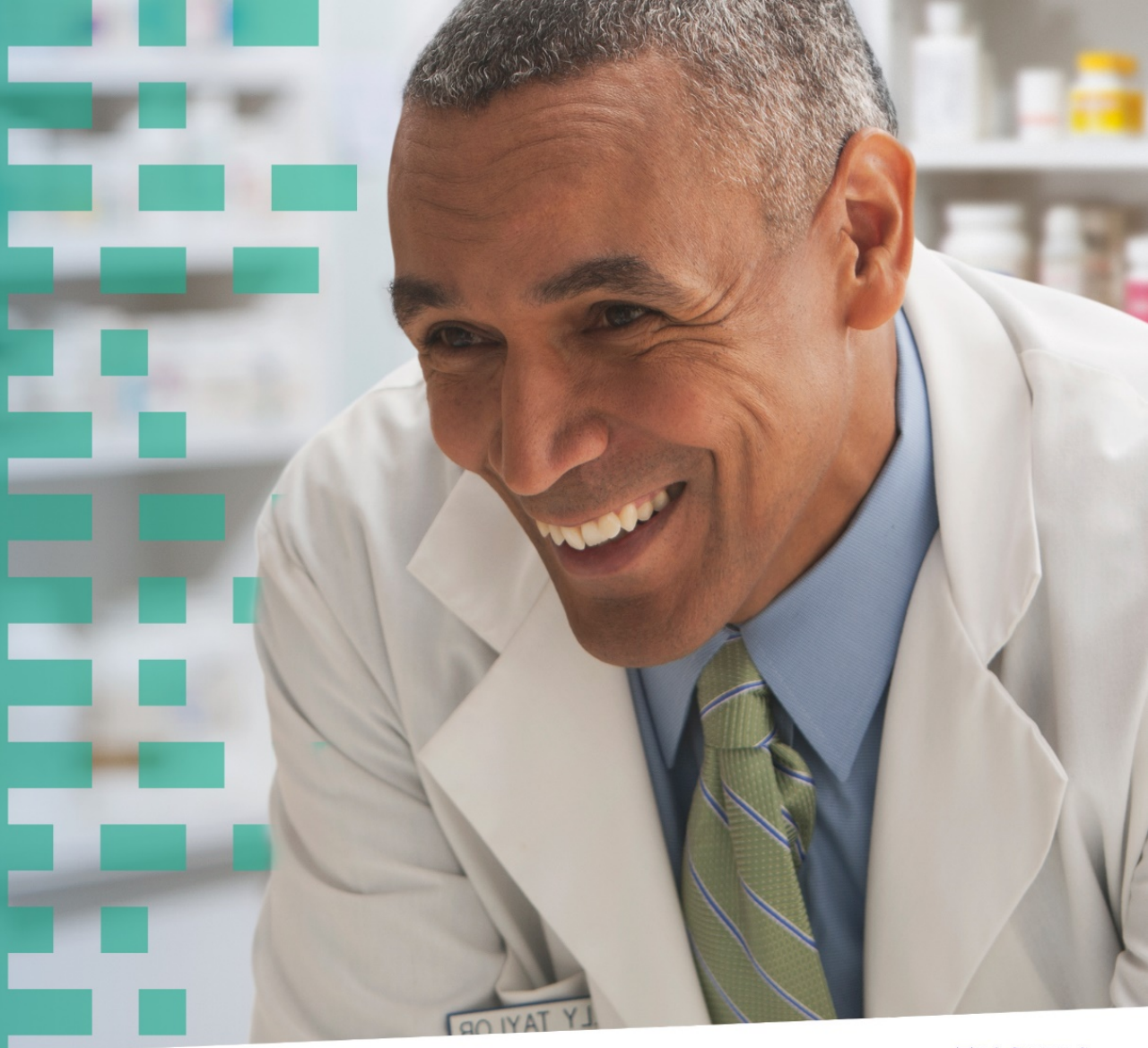


- TRS's non-U.S. equity allocation has a modest overweight to growth stocks in aggregate relative to the MSCI ACWI ex-US Index

CORIELL  
LIFE SCIENCES

# Personalized Medicine Program

For the Teachers' Retirement System  
of the State of Kentucky (TRS)



“

I am **so grateful** for the information that was given to me and my physician.  
I was taking metoprolol for my **heart condition**. Your tests showed that it **stayed too long in my system**. I sometimes had the feeling that I was on the verge of **fainting**.  
I had not had that feeling since I started taking the **new suggested medication**.  
I **thank you** from the bottom of my heart.

”

*Member, Teachers' Retirement System of the State of Kentucky*



# Agenda

1. Introduction & Background
2. Mission & Goals
3. Key Players
4. Coriell Life Sciences
5. Program Overview
6. Aon Validation
7. Getting the Word Out
8. Goals
9. Next Steps

# Where To Begin



Gary L. Harbin, CPA  
Jane Cheshire Gilbert, CPA



# Medication: Expense and Risk



Prescription drug spending has exceeded \$300 billion a year since 2015.<sup>1</sup>



Adverse drug events account for nearly 700,000 emergency department visits and 100,000 hospitalizations a year.<sup>3</sup>



Medication errors occur in 3.8 million inpatient admissions and 3.3 million outpatient visits.<sup>2</sup>



There are 275,689 deaths a year attributable to medication errors.<sup>4</sup>

1. "A Look at Drug Spending in the U.S.," Pew Charitable Trust, 28 Aug. 2018. <https://www.pewtrusts.org/en/research-and-analysis/fact-sheets/2018/02/a-look-at-drug-spending-in-the-us>. Accessed 18 Feb 2020.

2. "Preventing Medication Errors: A \$21 Billion Opportunity," Network for Excellence in Health Innovation, 2011. [https://www.nehi.net/bendthecurve/sup/documents/Medication\\_Errors\\_%20Brief.pdf](https://www.nehi.net/bendthecurve/sup/documents/Medication_Errors_%20Brief.pdf). Accessed 18 Feb 2020.

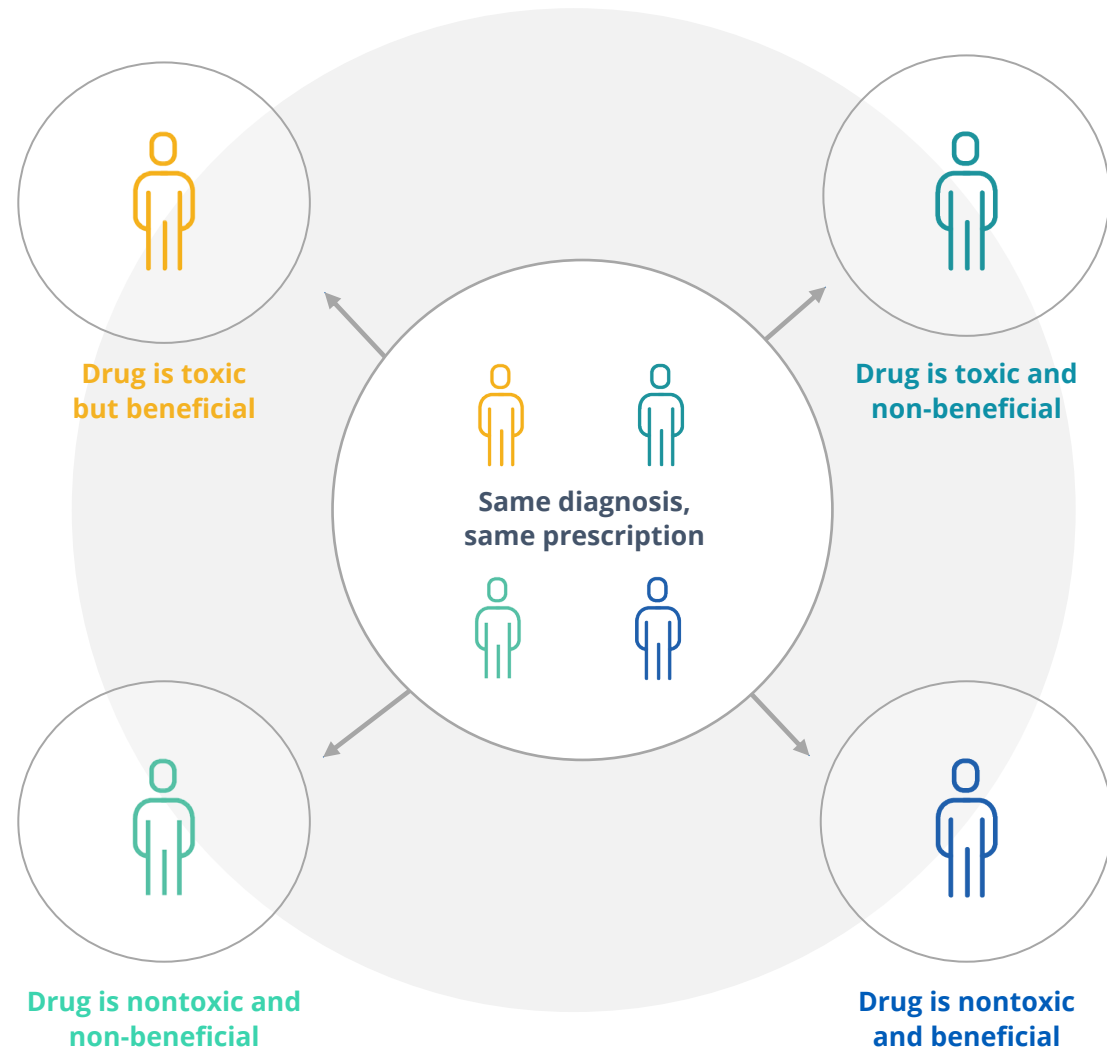
3. "Medication Errors and Adverse Drug Events," US Health and Human Services, Sept 2019. <https://psnet.ahrq.gov/primer/medication-errors-and-adverse-drug-events>. Accessed 18 Feb 2020.

4. Watanabe J, et al, "Cost of Prescription Drug-Related Morbidity and Mortality," Ann Pharmacother. 2018 Sep;52(9):829-837

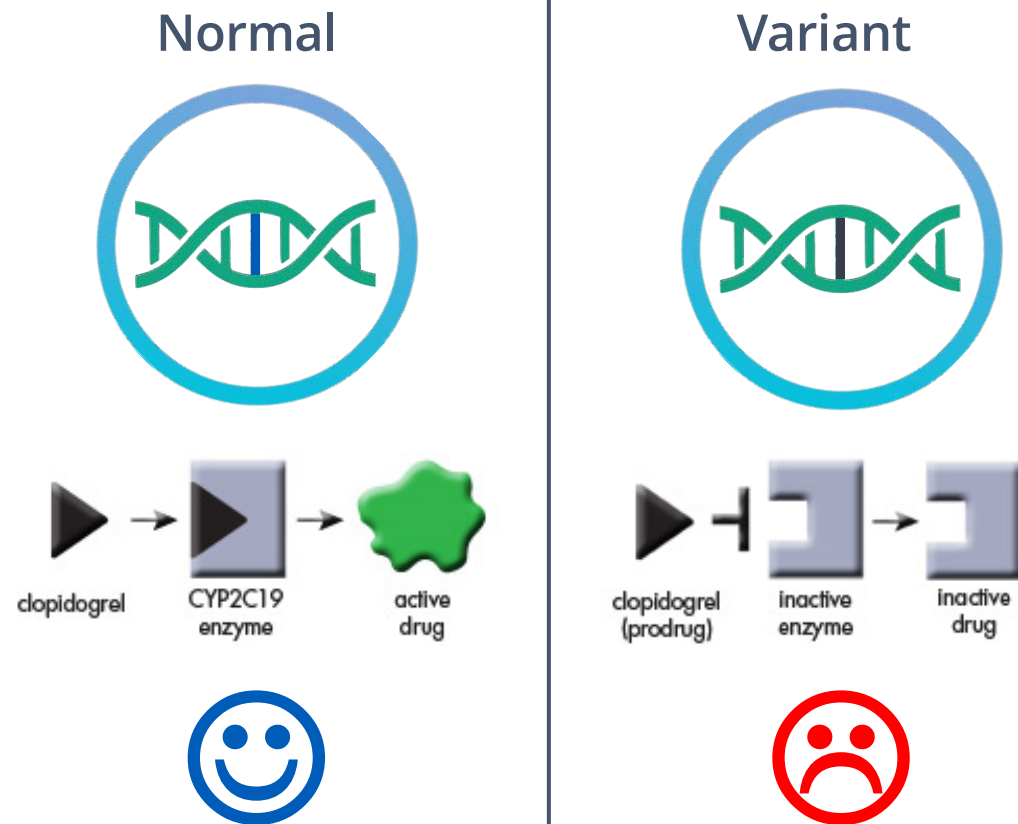
# Your DNA Really Matters

## Pharmacogenomics (PGx)

Using DNA to see what drugs will be safe and effective



# Why Most Drugs Only Work in Some Patients



27% of the U.S. population cannot metabolize Clopidogrel

Codeine has little effect on as much as 20% of the population

Even everyday drugs, such as Advil and Tylenol, can have widely varying effects

# DNA Testing is NOT Sufficient

## CLS' Personalized Medicine Program

brings together rigorously-vetted genetic guidance with **dozens of other factors** of patient-specific prescribing risk.

Healthcare providers are **empowered with answers** rather than research materials.

Real-time modeling allows pharmacists and doctors to see the results of medication changes **before they experiment** with them on their patients.



# MA<sup>3</sup> – Cost of Getting it Wrong

## MA<sup>3</sup>



### Medication Adherence



### Medication Appropriateness



### Medication Adverse Drug Reactions

Medication Adherence	Medication Appropriateness	Medication ADRs
Limited patient engagement in treatment decisions	Use not justified	Dose-related
Cost	Not effective	Idiosyncratic
Low perceived need/efficacy	Age-related	Long-term exposure
Concern about side effects	Genetics	Time-related
Forgetfulness	Impractical directions	Withdrawal
Complex drug regimen / high pill burden	High risk of drug-drug interactions	Failure of therapy
Impaired cognition	Duplicative therapy	Allergic
Misunderstood medication instructions	High risk of drug-disease interactions	Pharmacodependence
Low health literacy	Time-related	
Lack of social support	Phenoconversion	

# MA<sup>3</sup> – Getting it Right

## MA<sup>3</sup>



**Medication  
Adherence**



**Medication  
Appropriateness**



**Medication  
Adverse Drug  
Reactions**

**PGx  
Empowered  
MTM**



- **Patient satisfaction**
- **Overall patient health**
- **Quality-of-life**
- **Use of generic medications**



- Adverse drug events
- Cost of medications
- **Number of outpatient visits**
- **Cost of outpatient visits**
- Number of laboratory tests
- Emergency department visits
- **Number of hospitalizations**
- **Cost of Hospitalization**



# Mission & Goals From Program Kickoff

The Teachers' Retirement System of the State of Kentucky will reduce healthcare costs by implementing a program focused on improving medication safety and efficacy for its members.

The program will utilize genetic testing and personalized therapy analysis delivered to physicians through expert pharmacist consultation.

## Overarching Goals

- Provide a 'zero disruption' implementation.
- Achieve 5-star feedback from participant members.
- Demonstrate 3x return on program investment over 3 years.
- Be perceived as fiscally responsible, ethically motivated, and medically innovative by all stakeholders.
- Become a national example of progressive, creative, and innovative leadership in pension fund healthcare management.

# Key Players

## Teachers' Retirement System of the State of Kentucky

- Gary L. Harbin, CPA
- Jane Cheshire Gilbert, CPA
- Grace H. Dotson
- Leeann Uebel
- Members
- Board of Trustees

## Coriell Life Sciences

- Scott Megill
- Jennifer Ferrang
- Steve Kradel
- Paul Chernin
- Victoria Clements
- Shana Shterban
- Tonya Bell
- Jeffrey Shaman
- Revel Health

## Know Your Rx (KYRx) Coalition

- Lucy B. Wells, RPh
- April Prather, PharmD, MS
- Gina Beanland, PharmD
- Zachary Wilkerson, PharmD, MBA
- Richard Amos, Executive Director
- Full Team Support

## Aon

- Curt Dame
- Aon Health Solutions
- Aon Health Analytics Solutions; Pharmacy Practice
- Aon U.S. Health Solutions

# Who We Are

Coriell Life Sciences is a precision medicine company  
using genetic science and research to

**Improve Lives**

**Reduce Healthcare Costs**

**Simplify Decision-Making**



# TRS Program Overview



# Program Components

**The Personalized Medicine Program** is a turnkey solution that combines genetic testing with expert pharmacy review to provide what physicians really need – credible and immediately actionable treatment guidance.



Population  
Analytics

“Will this program  
provide benefit for  
our members?”



Member  
Engagement

Fully-coordinated  
education and  
enrollment



Genetic  
Testing

Cost-effective,  
comprehensive DNA  
testing by CLIA-  
licensed laboratories



Pharmacy  
MTM Review

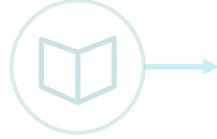
Clear, actionable  
recommendations  
via Medication  
Action Plan (MAP)



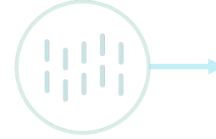
# Program Overview



POPULATION ANALYTICS



MEMBER ENGAGEMENT



GENETIC TESTING



PHARMACY MTM REVIEW

## 36,000 retirees aged 65 to 109

Using de-identified claims information, CLS provided the TRS pension fund with an in-depth analysis of the potential return on investment with the program.



**15** Average # of prescriptions



**75%** Had high BP/heart disease



**58%** Had high cholesterol

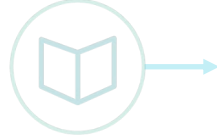


**50%** Had pain/inflammation

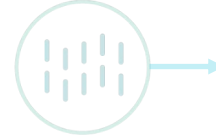
# Program Overview



POPULATION ANALYTICS



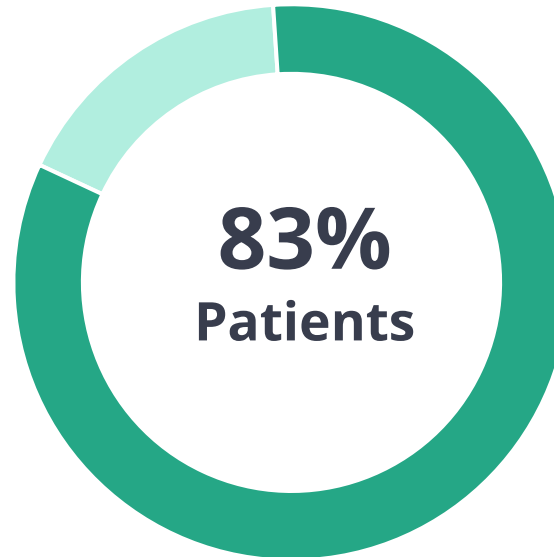
MEMBER ENGAGEMENT



GENETIC TESTING

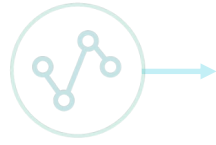


PHARMACY MTM REVIEW

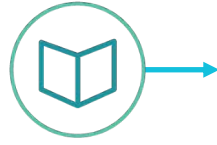


% of Patients taking meds that  
have known PGx implications

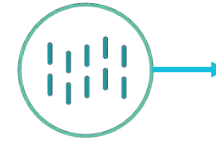
# Program Overview



POPULATION ANALYTICS



MEMBER ENGAGEMENT



GENETIC TESTING



PHARMACY MTM REVIEW

**A PERSONALIZED MEDICINE PROGRAM DESIGNED FOR YOU**  
Teachers' Retirement System of the State of Kentucky

**What's Being Said**  
"I think the best aspect of DNA testing is the peace of mind it offers. Members I have spoken with often express concern about whether the medications they are taking are working effectively. Members participating in the DNA testing service can learn how their unique genetic make-up affects their medications, receive one-on-one medication review with a pharmacist and get insight on medications to avoid in the future. With this information in hand, members can feel more confident about the medications they are taking."  
- KIDZ Pharmacy

**Enrollment**  
Participating in this program is free and can be done from the comfort of your home. To enroll, or for more information, call Coriell Life Sciences toll-free at 888-454-9024, Monday - Friday, 9 a.m. - 5 p.m. ET or visit [www.coriell.com/ky](http://www.coriell.com/ky). You'll be asked for your current mailing address, date of birth and about certain lifestyle factors. You'll also be asked about certain lifestyle factors, food and drinks that we know to impact the effectiveness of your medications. You also may be hearing directly from Coriell Life Sciences, if you haven't already, to encourage you to participate.

**Program Success**  
More than 6,400 of your retired teacher peers have only taken advantage of this benefit to having their DNA tested. The results are amazing! As a result of recommendations, members have received medication changes, reduced medication costs, avoided hospitalizations, and more. DNA test recommendations were accepted by 90% of members. Members who participated in the program received less medication cost, avoided hospitalizations, and more. DNA test recommendations were accepted by 90% of members. Members who participated in the program received less medication cost, avoided hospitalizations, and more. DNA test recommendations were accepted by 90% of members.

**Protected**  
Your results will be shared with TRS. TRS will be able to use your results to provide you with information to help you make decisions about your health. Your results will be shared with TRS. TRS will be able to use your results to provide you with information to help you make decisions about your health. Your results will be shared with TRS. TRS will be able to use your results to provide you with information to help you make decisions about your health.

**CORIELL LIFE SCIENCES**

**Personalized Medicine Program**

For the Teachers' Retirement System of the State of Kentucky (TRS)

**Personalized Medicine Program for Retired Teachers of Kentucky**

Enroll in this free TRS program today!

More than 6,400 of your retired teacher peers have already participated.

CORIELL  
LIFE SCIENCES

KNOW  
YOUR  
Rx  
COALITION

TEACHERS'  
RETIREMENT  
SYSTEM  
OF THE  
STATE OF  
KENTUCKY

Improving how you feel every day

To request a free DNA test kit, or for more information, please call  
**888-454-9024**

Coriell Life Sciences  
4247 S Broad St #222  
Philadelphia, PA 19112

Postage  
\$1.00

Address Area FPO

**TEACHERS' RETIREMENT SYSTEM**  
of the State of Kentucky

GARY L. HARRIS, CPA  
Executive Secretary

ROBERT E. BARNES, JD  
Deputy Executive Secretary  
Operations and General Counsel

J. KIRK WAMPLER, JD  
Deputy Executive Secretary  
Finance and Administration

April 2020

**Staying well with TRS**

In these times of staying home and healthy as the world deals with COVID-19, it's imperative that we do all we can to ensure our own wellness. If nothing else, this condition reminds us that good health practices are crucial.

Teachers' Retirement System of the State of Kentucky (TRS) has two great programs retirees can use to manage their own health and wellness at no additional cost to you. Both of these honor the request of health officials to stay healthy at home. If you're not already participating, I want to make you aware of these benefits. If you are participating in these programs for over-65 and Medicare-eligible retirees, feel free to use this to tell your friends (while - of course - maintaining good social distancing).

**Personalized medicine**  
As an addition to TRS's wellness programs, TRS launched a cutting-edge medication safety program in 2017 under TRS's health plan. This personalized medicine program uses DNA testing to help your doctor ensure your medications are safe and beneficial for better health outcomes.

**Participating in this program is free and can be done from the comfort of your home.**  
TRS's partners in this program - Coriell Life Sciences and the Know Your Rx Coalition - work to best manage your medication therapies. Though participation is optional, we are confident that the results - which you'll be able to use the rest of your life - likely will benefit your health and could save you money. Many retired teachers already have had their DNA tested using an easily provided saliva sample. The results are amazing. Almost two-thirds of participants have had a medication change as a result of this program.

**To enroll, or for more information, call Coriell toll-free at 888-454-9024, Monday-Friday, 9 a.m.-5 p.m. ET or visit [www.coriell.com/ky](http://www.coriell.com/ky).** You'll be asked for your current mailing address, date of birth and about certain lifestyle factors, foods and drinks that are known to impact the effectiveness of your medications. You also may be hearing directly from Coriell, if you haven't already, to encourage you to participate.

**SilverSnakers**  
Another way retirees in the Medicare-eligible plan can keep well at home and get the daily exercise that is recommended by health officials is participating in videos on the SilverSnakers website. SilverSnakers offers on-demand exercise videos so members can continue to work-out at home. For more information: <https://tools.silversnakers.com/>.

Know that we're thinking of all of you. TRS will continue to contact you through a variety of means, particularly during this time when we are open for business even though we can't take visitors. Feel free to reach out to TRS should you need anything related to your retirement or health care benefits.

Sincerely,  
*Gary L. Harris*  
Gary L. Harris, CPA  
Executive Secretary

**our Kit Has Expired**  
if your retired teacher peers in taking  
advantage of this benefit.



Medication Safety Program sponsored by the Teachers' Retirement System of the State of Kentucky. We've noticed you didn't send your sample back and we don't want you to miss out on this program!

**Why Participate?**

Medications do not work in the same way for everyone. Your DNA determines how safe and effective many medications will be. In fact, 48% of your retired teacher peers already participating in this program were on medications that reacted poorly with their DNA. This genetic test can help your pharmacists and doctors make better choices just for you.

**How to Order Your New Kit**

Please order a new kit by calling the number below. You do not need to re-enroll in the program and there is absolutely no cost to you.

Enrollment Support Center  
Toll-free: 888-454-9024 | Monday - Friday, 9 a.m. to 5 p.m. ET

Coriell Life  
SCIENCES

KNOW  
YOUR  
Rx  
COALITION

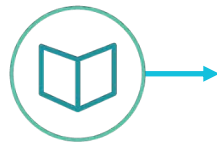
TEACHERS'  
RETIREMENT  
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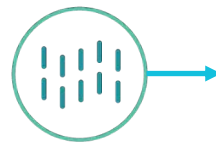
# Program Overview



POPULATION ANALYTICS



MEMBER ENGAGEMENT

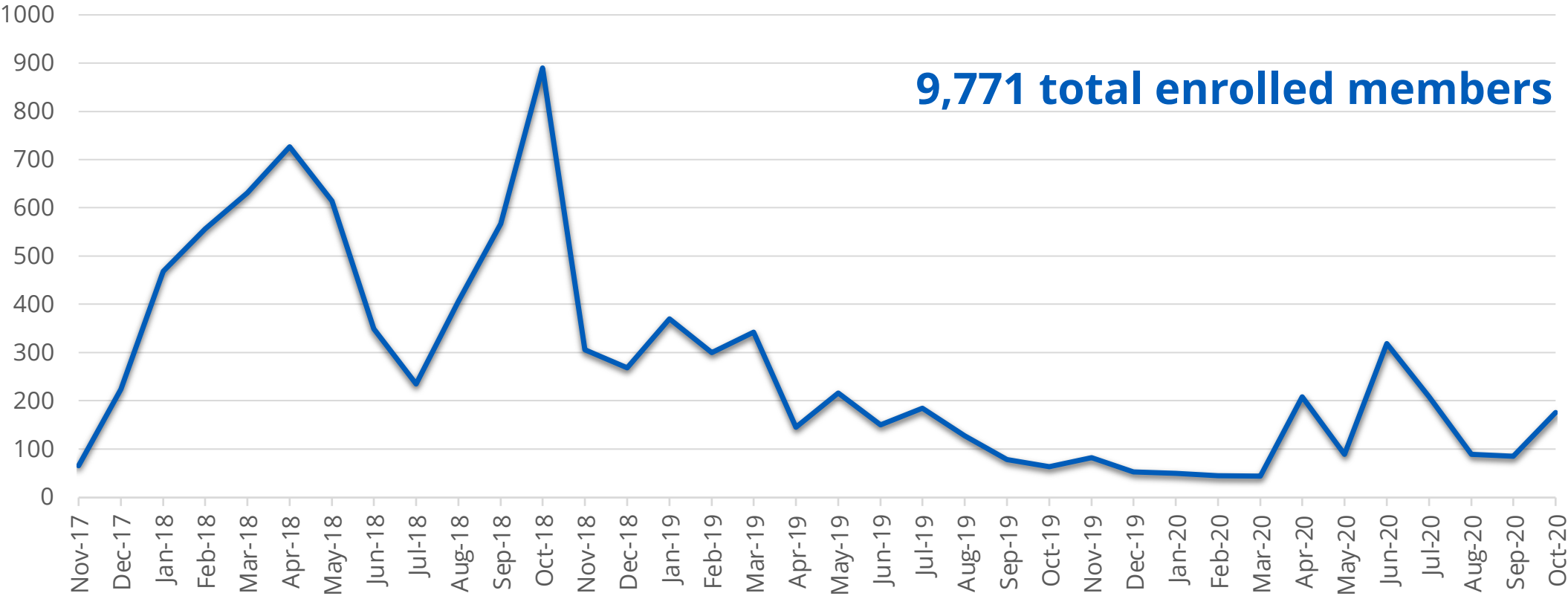


GENETIC TESTING

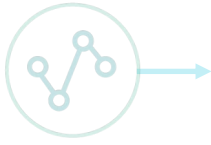


PHARMACY MTM REVIEW

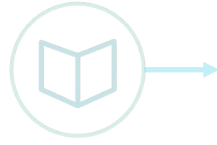
## Monthly Enrollment



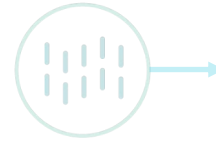
# Pharmacist Review & Report



POPULATION ANALYTICS



MEMBER ENGAGEMENT



GENETIC TESTING



PHARMACY MTM REVIEW


CLS proprietary software, **GeneDose LIVE™** allows teams of pharmacists and physicians to review the genetic and non-genetic concerns for individual patients and **quickly shows which alternatives would be best suited.**



The MAP document provides a **clear and concise** way for the pharmacist to **communicate the updated plan** to the prescriber.

# Program Success: ECH Outcomes

<sup>E</sup>  Savings & ROI

<sup>C</sup>  Clinical Outcomes

<sup>H</sup>  Satisfaction



 Total Program Value

# Program Success



**64%**

resulted in medication  
change recommendation

**87%**

of recommendations  
accepted by prescribers

*At 18-month evaluation.*

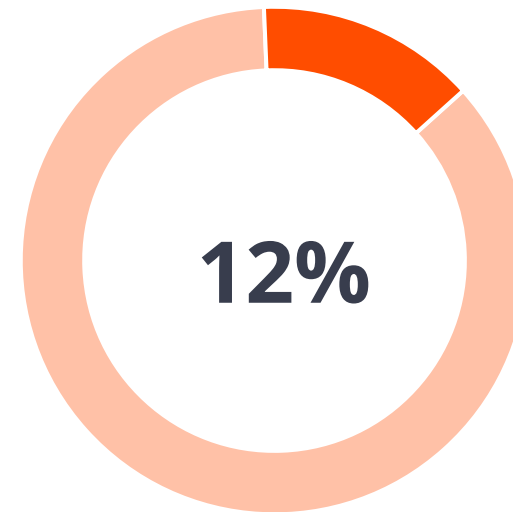
# Program Success

Patients have enrolled each month since the start of the program in January 2018. Cost impact is measured looking prior to and after the delivery of the pharmacist recommendation to normalize data.

Average Savings\*:

**\$5,176**

per enrolled member



**Non-enrolled members'** costs\*  
grew **12% faster** than those in the Program

*\*Based on charged amount at 18-month evaluation.*

# Program Success

## Feedback Survey

- How was your experience enrolling in the program? **4.24/5**
- How was your experience with the pharmacists at the KYRx Coalition? **4.37/5**
- Do you feel that the program was valuable to you? **4.14/5**





# Talk to it: Aon Evaluation and Validation of Findings

“Aon has been asked to evaluate and, if possible, validate the CLS methodology used for identifying the overall findings and impact of the PGx / MTM program on the TRS members participating for the time period May 31, 2018 through May 31, 2019.”



## Review Provided by Aon:

- ✓ "Aon agrees with the propensity score matched difference-in-difference statistical model used in this analysis."
- ✓ "We agree with the methodology of the modeled population."
- ✓ "Aon agrees with the methodology of the Propensity Score Matching Analysis."
- ✓ "Aon agrees with the use of the methodology for statistical significance."



**Nauman M. Shaikh, ASA, MAAA**  
Vice President Aon Health Solutions

**Kim Ren, Ph.D., FSA, MAAA**  
Senior Actuarial Consultant Aon Health Analytics Solution

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**Richard C. Dame** | Vice President  
Aon Health Solutions

# Professional Memberships: Have Heard the TRS Story

CORIELL  
LIFE SCIENCES



# Mission & Goals From Program Kickoff

-  Provide a 'zero disruption' implementation.
-  Achieve 5-star feedback from participant members.
-  Demonstrate a 3x return on program investment over 3 years.
-  Be perceived as fiscally responsible, ethically motivated, and medically innovative by all stakeholders.
-  Become a national example of progressive, creative, and innovative leadership in pension fund healthcare management.

# Next Steps

- Three-year cumulative results
- White paper and scientific publications
- TRS/CLS collaborative speaking opportunities
- Continued vigilance for the existing enrollees
- Expansion within the TRS membership

# Thank You

[www.coriell.com](http://www.coriell.com)



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“

I needed to change a **medication that was not working** like it should to another one that is **working much better**. Blood pressure and heart rate are **normal again**. This probably would have never been done **had it not been for the DNA testing**.

”

*Member, Teachers' Retirement System of the State of Kentucky*

“

“I received a call from a TRS member who had participated in the DNA testing program with her spouse. The spouse had a **heart attack earlier in the year** and was being discharged on **Clopidogrel**. They called to check this against his DNA results and found out **Clopidogrel would have been ineffective**.

The Pharmacist worked with the patient and his doctor to get an **effective medication**. Had the patient not called, there would be a high **likelihood of a readmission and recurrence of future heart attack**.

Not only did this preventive action dramatically affect the member's **quality of life**, but it also **prevented the costs of hospital admission** and **downstream costs** surrounding heart attack treatment and recovery.”

”

*KYRx team member*

“

**All retirees should take advantage of this program.**

The nurses who provided follow up were extremely conscientious and professional. They shared 2 genetic issues with me and explained **how my health could be affected**. I was glad to hear that my current medications were appropriate and not presenting any interactive issues. The results were transmitted to my primary care physician so that he could **monitor my health in a more effective manner**.

”

*Member, Teachers' Retirement System of the State of Kentucky*



# Professional Memberships: Have Heard the TRS Story

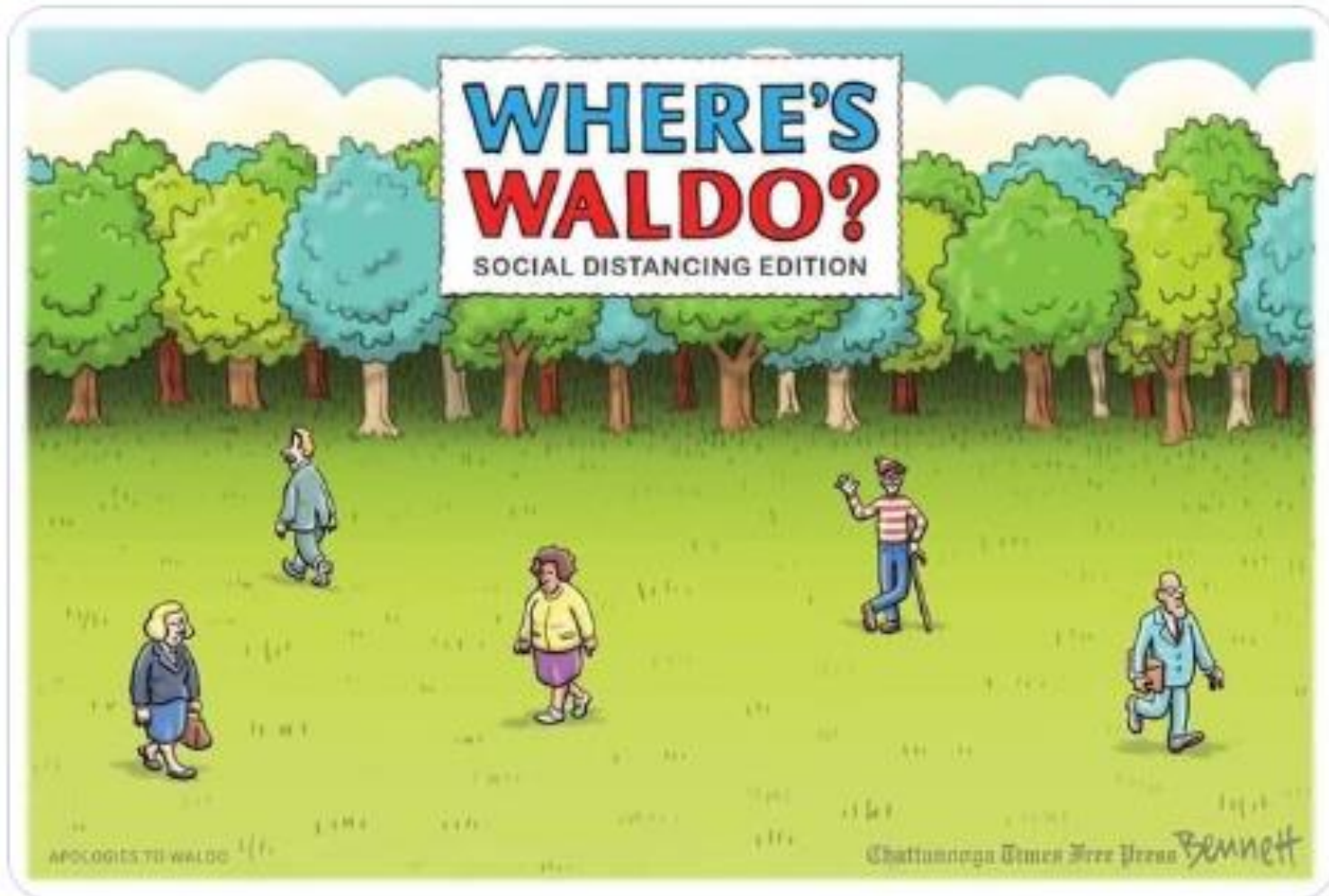
- State and Local Government Benefits Association (SALGBA)
- National Council on Teacher Retirement (NCTR)
  - Including: Webinar “New Healthcare Delivery Paradigms During COVID-19 and Beyond” with Mr. Harbin and CMO of Quest Diagnostics
- Public Sector Healthcare Roundtable
- Pharmacy Benefit Management Institute (PBMI)
- NIH, National Human Genome Research Institute
- Get the Mediations Right Institute (GTMRx)
- Standardizing Laboratory Practices in PGx (STRIPE) Collaborative
- Personalized Medicine Coalition
- International Society of Certified Employee Benefit Specialists
- Precision Medicine Leaders Summit (PMLS)
- Twentieth Anniversary Population Health Colloquium: Thomas Jefferson Public Health
- American Public Health Association
- Advances in Genome Biology and Technology (AGBT) Precision Health
- Applied Biosystems Genetic Analysis Virtual Conference
- Genomic Summit Geneone, Brazil “The Kentucky Case: Turning Six Decades of Science into Reality” (Dasa)



## Teachers' Retirement System

Board of Trustees  
November 23, 2020

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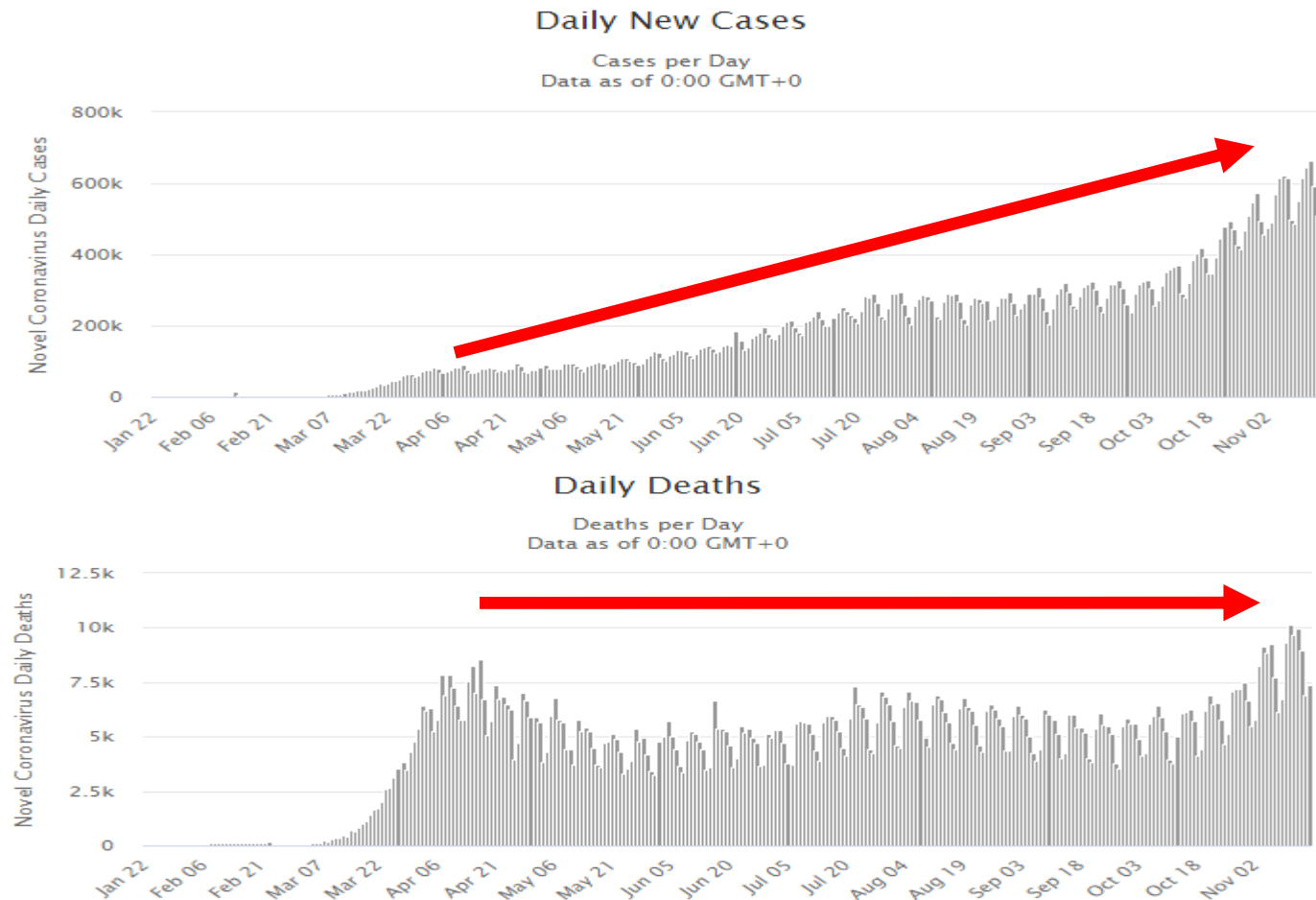
# Where We Are...

## Top of the 1st Inning: Starting a New Expansion

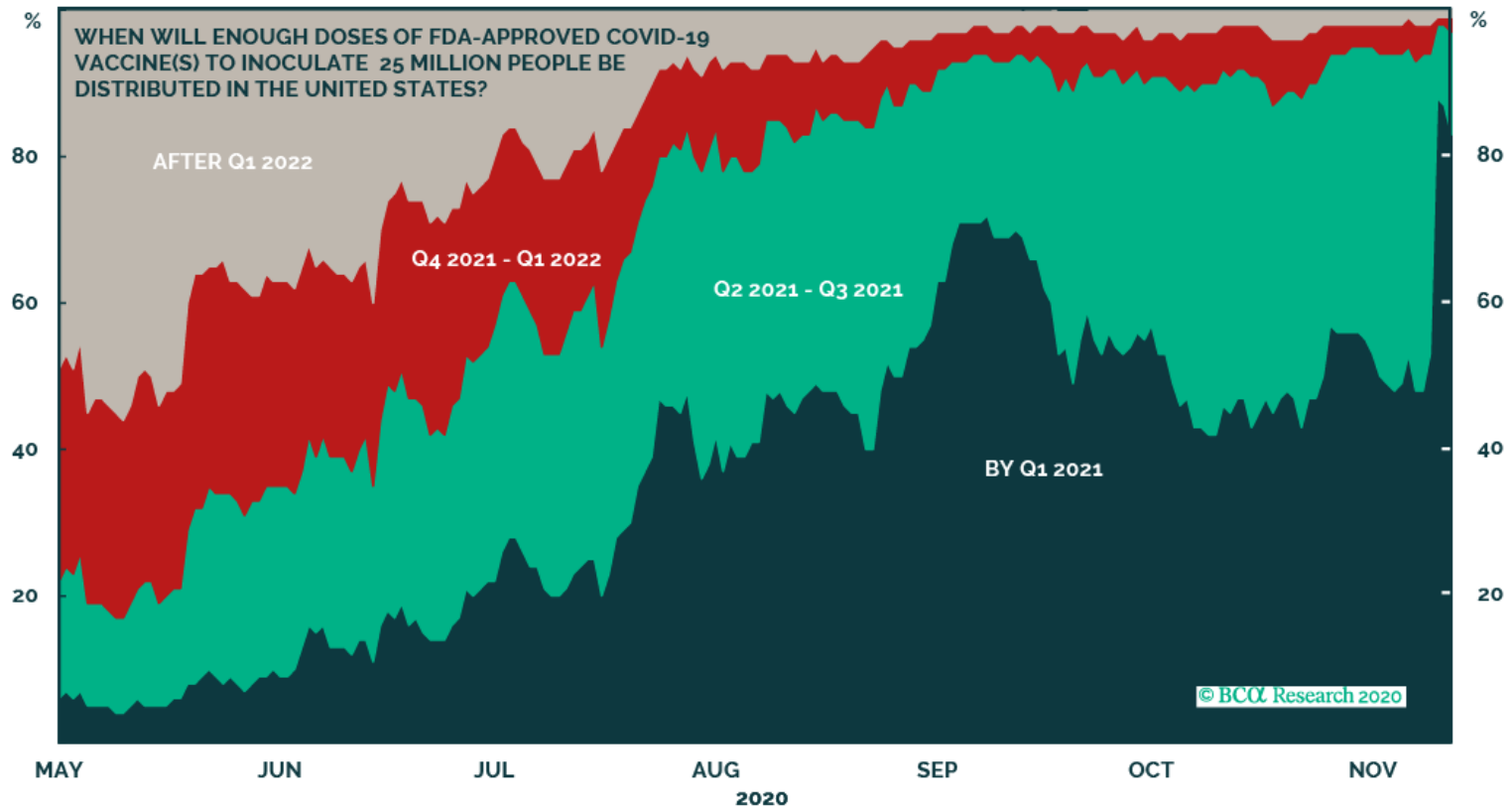


# How We Got Here The Coronavirus... Sharply Higher Cases, Stable Casualties

## Global Coronavirus Cases and Fatalities

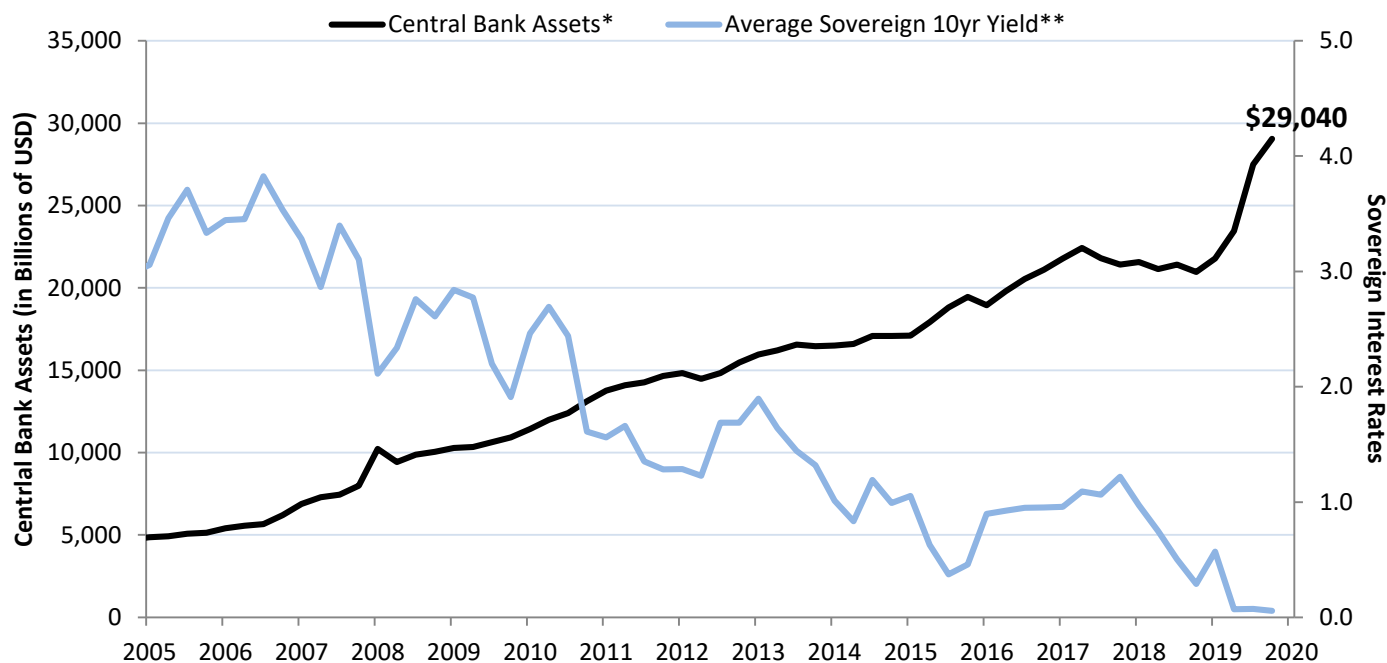


# Cause for Optimism... Effective Vaccines Expected Soon



SOURCE: GOOD JUDGMENT INC. FORECASTS FROM GOOD JUDGMENT'S PROFESSIONAL SUPERFORECASTERS. DATA ACCESSED NOV 12, 2020.

## Global Central Bank Assets and Interest Rates



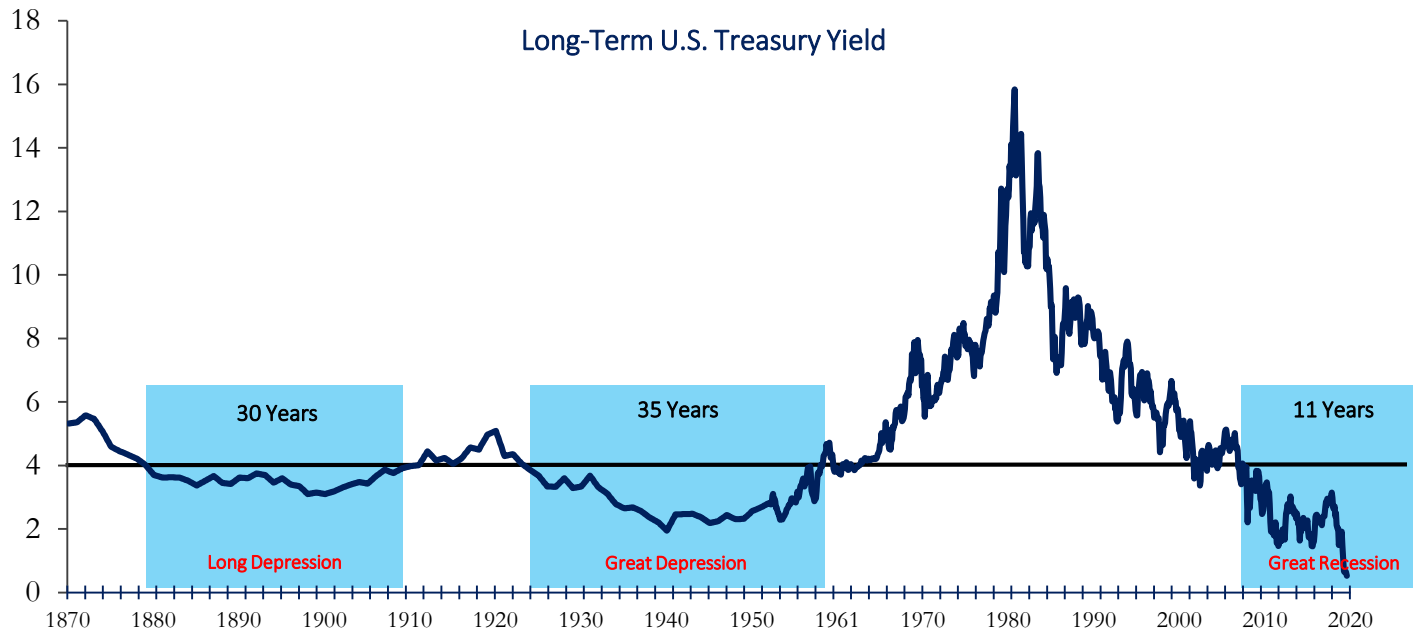
\*Aggregate Assets of the US Fed, Bank of Canada, ECB, BOE, BOJ, SNB, People's Bank of China and Reserve Bank of Australia  
BOE stopped reporting Total Assets in September of 2014. We have kept the BOE Total Asset figure static from that point on.

\*\*Average 10yr yield of the US, Japan and Germany.

Data as of 9/30/2020

# Pandemic Response

## Lowering Generational Rate Expectations



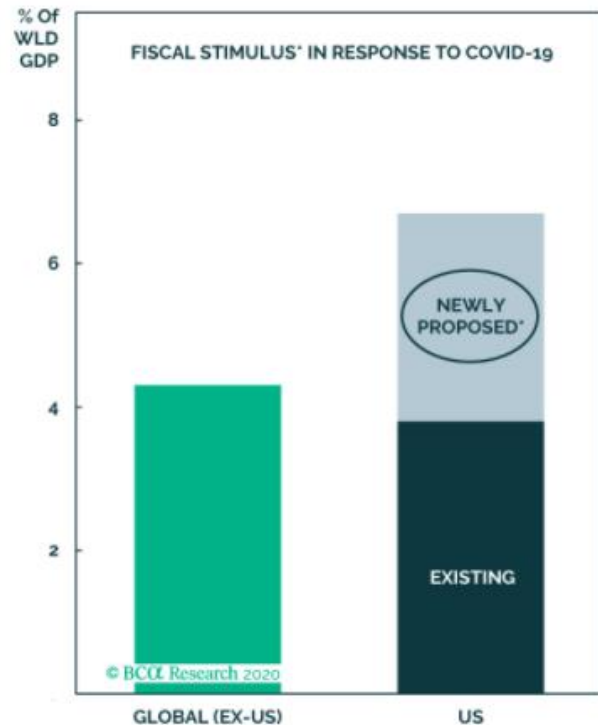
- ◆ Rates stayed below 4% between 1880-1910 (30 yrs.) and between 1925-1960 (35 yrs.)
- ◆ Rates fell below 4% in 2007 and could stay at these levels for another 20-25 years.
- ◆ Compared to these prior periods, the current experience seems short.
- ◆ In today's low interest rate environment, investors may look to equities for increased income.



# Pandemic Response

## Tremendous Fiscal Stimulus... More to Come

### US and International Fiscal Stimulus



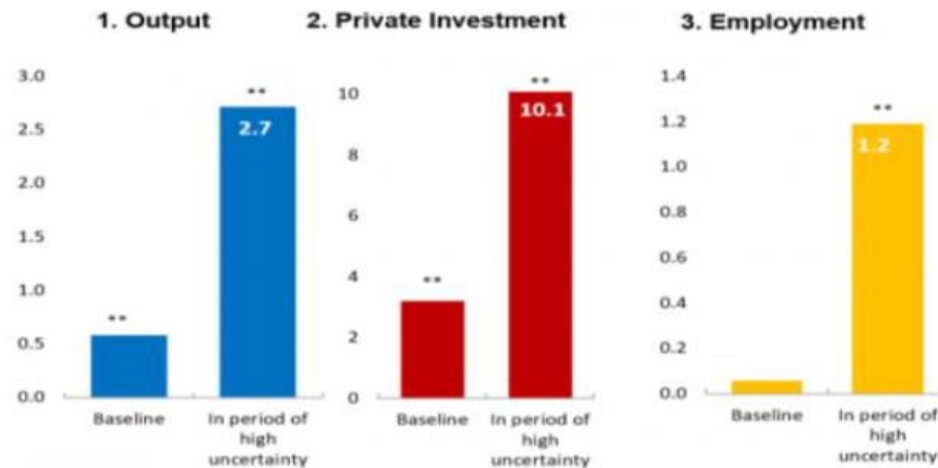
NOTE: LOAN GUARANTEES ARE EXCLUDED IF THERE IS A SPECIFIC AMOUNT IN THE NEWS.  
\* SOURCE: VARIOUS NEWS AND GOVERNMENT AGENCIES, THE IMF, THE WORLD BANK AND BCA CALCULATIONS.  
\*\* AS MUCH AS \$2.2TN IN NEW STIMULUS LIKELY TO BE PASSED BY MID-OCT.

Combined Fiscal Stimulus thus far amounts to 8% of global GDP.

Most investors expect more stimulus.

# Stimulus Works for Years With A Multiplier Effect

## Multiplier Effect Impact of 1% of GDP Fiscal Stimulus to the following 2 years performance



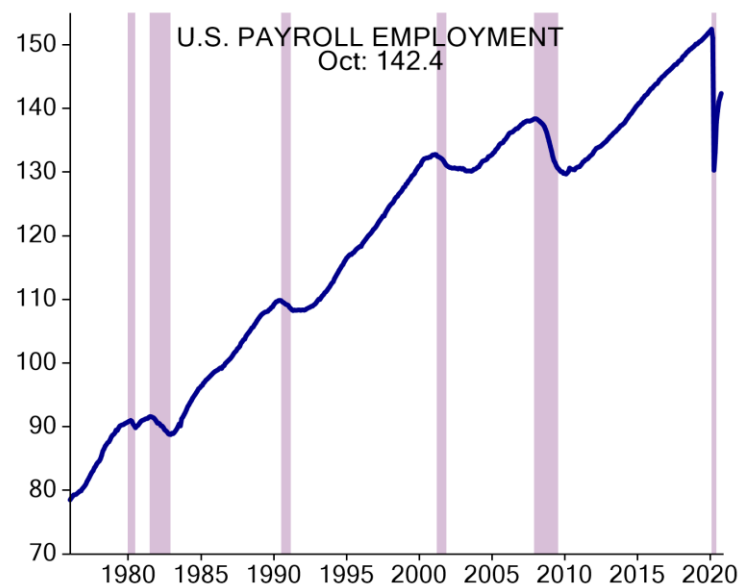
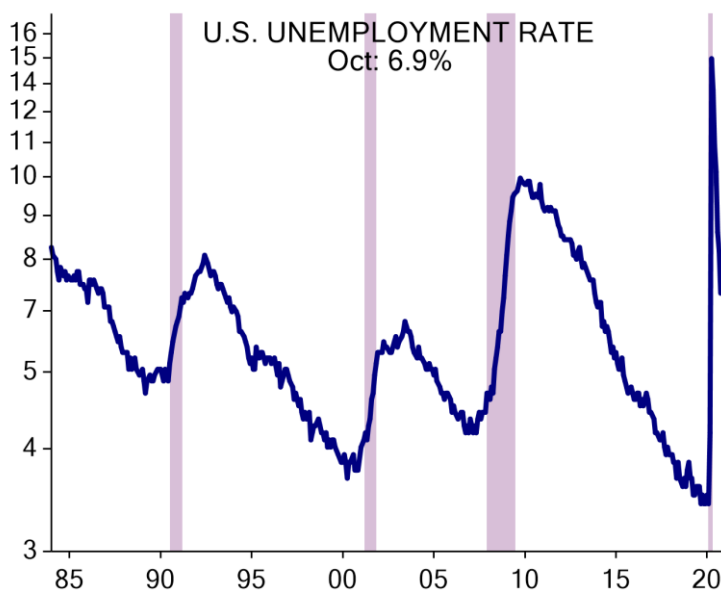
Source: IMF staff estimates.

Note \*\* denotes statistically significant coefficients at the two standard deviation confidence interval.

Increasing government spending by 1% of GDP increases Output Growth by 2.7%, Private Investment by over 10% and Employment by 1% over the following 2 years.

# Employment Recovering, Though Still Very Depressed

## Reopening is occurring in labor markets



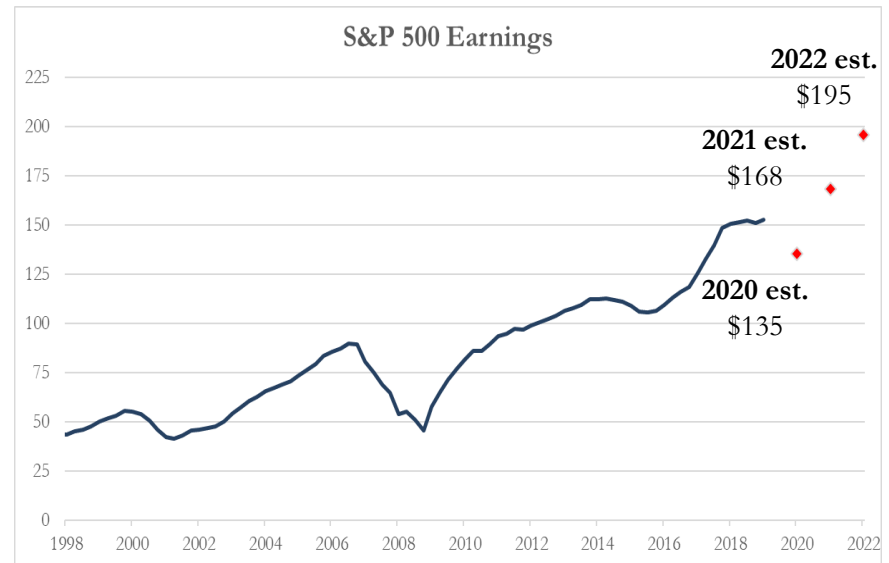
# Global Rebound Unfolding



OECD's widely-followed global LEI increased again in October and has recovered 90% of its pandemic plunge.

# Analysts Expect Durable V-Shaped Earnings Recoveries

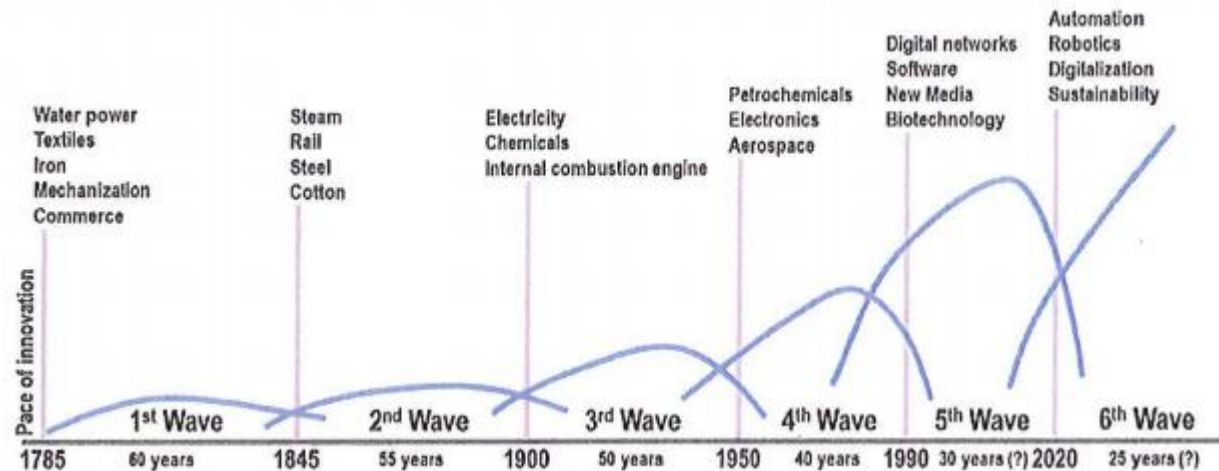
As Of 10/19/2020



Source: Bloomberg, S&P and MSCI

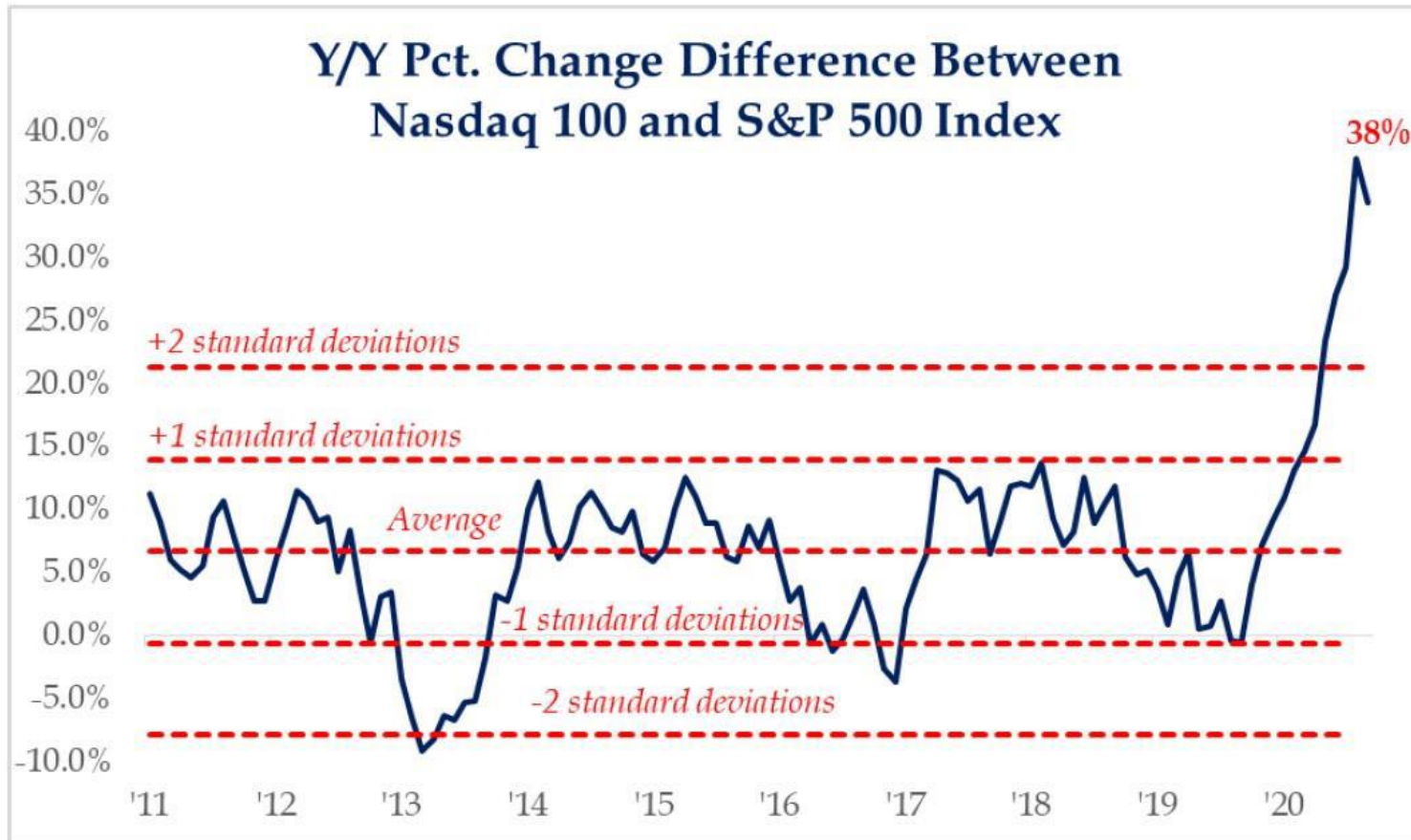
# Bright Spot

## Pandemic Speeds Up Long Wave Cycles of Innovation

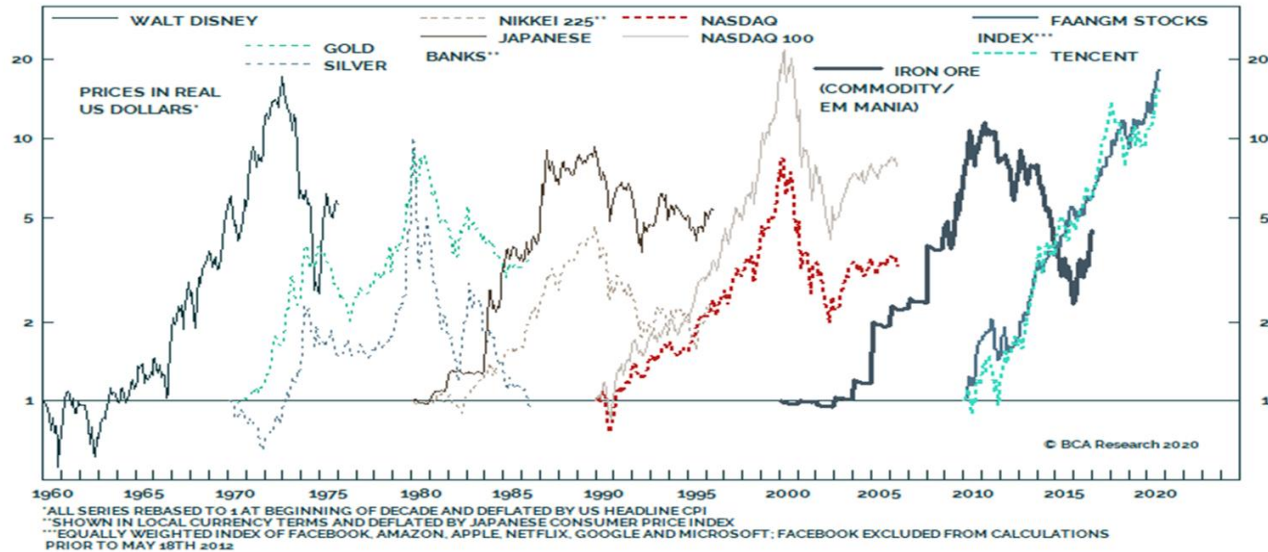


- Since the beginning of the Industrial Revolution in the late 18<sup>th</sup> century, six waves have been identified.
- Technological innovation and economic growth are closely related and can be articulated within concept of cycles or waves.
- The Pandemic has hastened adoption of new communications and collaboration products

# Concern Growth Bubble Because of Pandemic?



# Aftermaths of Manias: There's A Hangover Waiting Out There

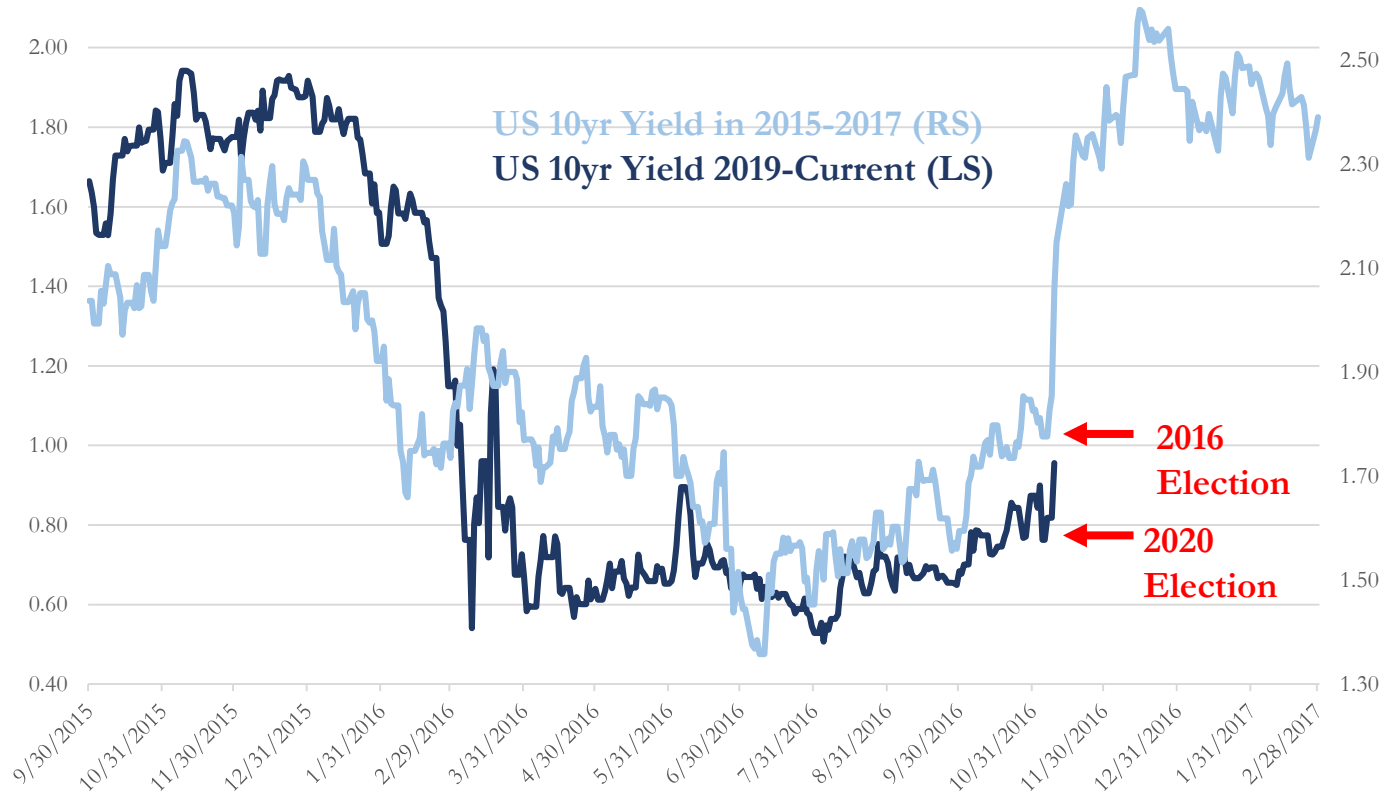


Forward Returns from Peak	5yr Forward Return	10yr Forward Return
1960's: Nifty 50	-11% ( S&P 500)	-12%
1970's: Stagflation	-64% (Gold)	-51%
1980's: Japanese Banks	-49% (Nikkei 225)	-50%
1990's: Tech Bubble	-65% (Nasdaq 100)	-55%
2000's: Commodities/China	-26% (GSCI)	-44%
2010's: New Economy/FAANGM	??	??
Average	-43%	-42%

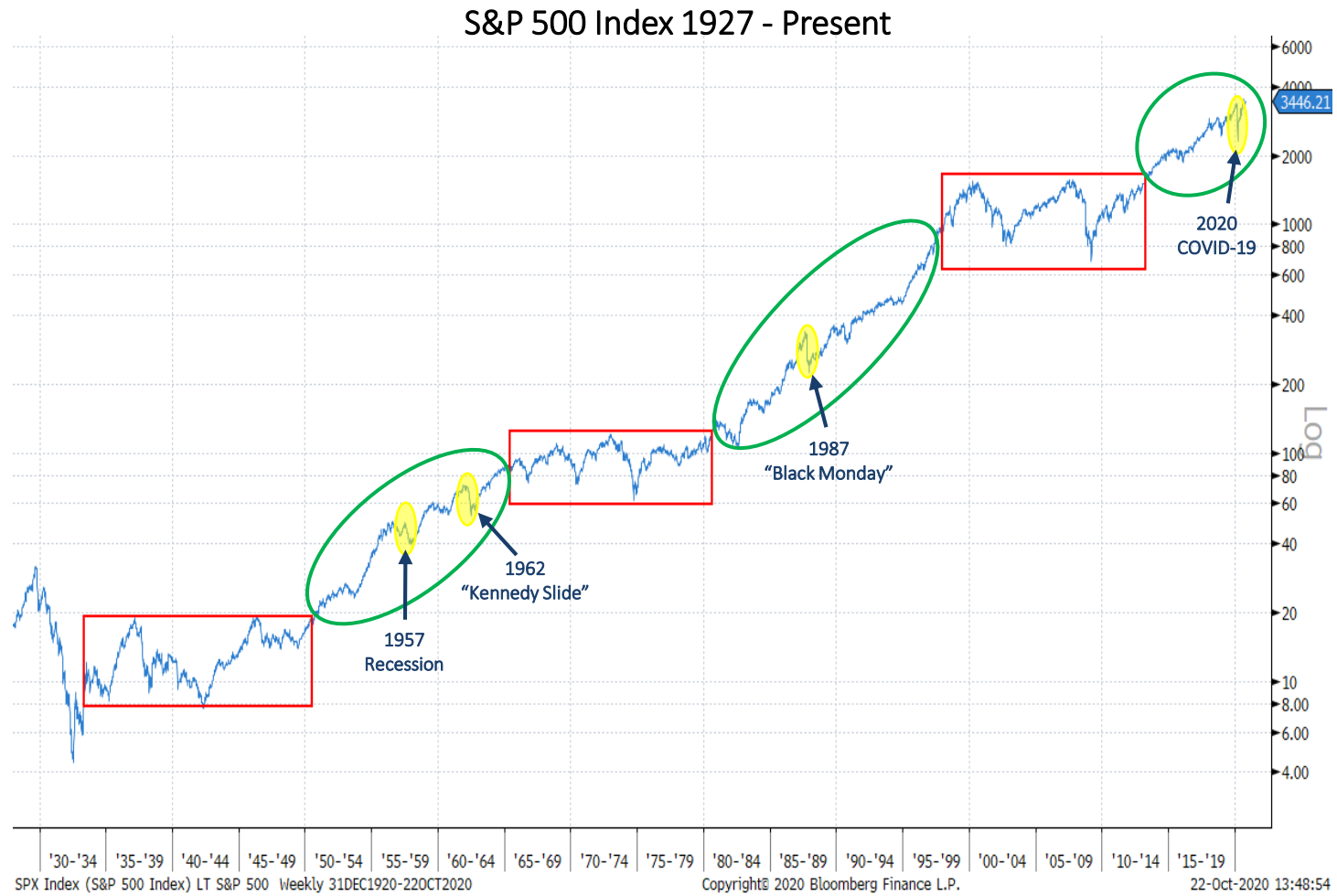
Source: BCA Research, TAM



## 10 Year Yields Tracking Like 2016- Probably Rise Post Election



# Market Cycles – Cyclical Bears Are Common Within Secular Bulls



Source: Bloomberg, S&P and Todd Asset Management as of 10/22/2020  
Past performance does not guarantee future results.  
The S&P 500 Index is an unmanaged index and is unavailable for direct investment.

# Disclosures

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