



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 22, 2021

8:30	Introduction	Gary Harbin
9	Kentucky Ethics Overview	Beau Barnes
9:30	Actuarial Issues	Ed Koebel Alisa Bennett Cavanaugh Macdonald
10:30	Break	
10:45	Introduction to TRS 4	Beau Barnes
12	Lunch and discussion of retirement issues	
1	Long-term Investing	David Salter Rebecca King Baillie Gifford
2	Update on the Know Your Rx Coalition	Lucy Wells Clinical Director
2:45	Break	
3	Aon's Insights on Investment Climate	P. J. Kelly Aon Investments USA
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>



Teachers' Retirement System of the State of Kentucky

Fiduciary and Ethics Overview

Nov. 22, 2021

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.

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.

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)

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)

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)

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)

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)

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)

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;

- 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 or an individual's family member is directly or indirectly financially impacted, or a decision made by TRS in which the individual or an individual's family member has a financial interest.
- 3) Individuals and their family members should not be involved in any agency doing business with TRS for financial or other reasons, without full disclosure and satisfactory approval of interest in accordance with the Executive Branch Ethics provisions of KRS 11A.
- 4) Individuals should not be involved in the decision-making process of TRS as a member of their family as defined by the Executive Branch Ethics provisions of KRS 11A.
- 5) Individuals should not conduct business or participate in any agency in which the individual or family member has a financial interest.
- 6) Individuals should not accept campaign contributions, services or other compensation unless it can reasonably be inferred that a major purpose of the transaction is in the performance of their duties for TRS.
- 7) Individuals must avoid all conduct that in any way creates a conflict of interest or that the individual is using his or her position for political or private interest.
- 8) Individuals not covered by the conflict of interest statute must not violate any conflict of interest statute or other law that applies to them in the performance of their duties for TRS.

C. Standards of Conduct Regarding Confidentiality

- 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 shall also recognize that confidential member information is protected under KRS 161.585.

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 also 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 interests as set forth in KRS Chapter 11A and this policy. Individuals as set forth above shall conform to the confidentiality requirements of KRS 161.585.

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 agree to 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
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 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.



Our Members Come First!

800-618-1687

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

info@trs.ky.gov
<https://trs.ky.gov>

Protecting & Preserving Teachers' Retirement Benefits



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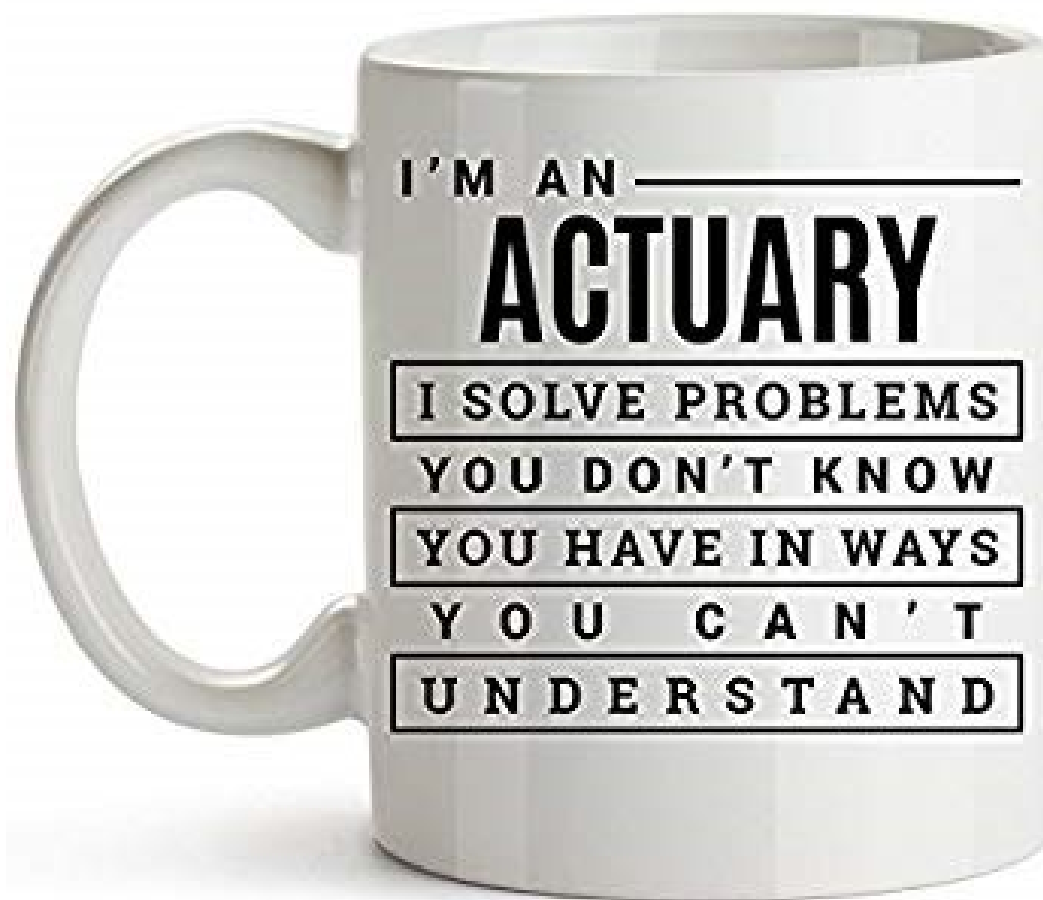
Board Workshop 2021

Teachers' Retirement System of the State of Kentucky

Ed Koebel, CEO

November 22, 2021





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Key Concept: Present Value

- Actuarial calculations typically involve determining a “present value”
- Present value: equivalent value, in today’s dollars, of a stream of future payments
- In other words, how much money would you need today **(based on your assumptions)** to make the expected payments in the future?
 - Time value of money is dependent on the assumed investment return/interest rate
 - Inverse relationship: Higher interest rate = lower present value
 - Expected payments involve probability of certain events occurring

Present Value

- Example: You owe \$1,000 to 100 people one year from now. Each person is 70 years old. You expect an investment return of 7% and chance each person will be alive in one year is 98%.
- What is the present value of the debt?

$$100 \times \frac{\$1,000}{1.07} \times 98\% = \$91,589$$

- Observation: Under what circumstances will you have exactly enough money to pay the debt?

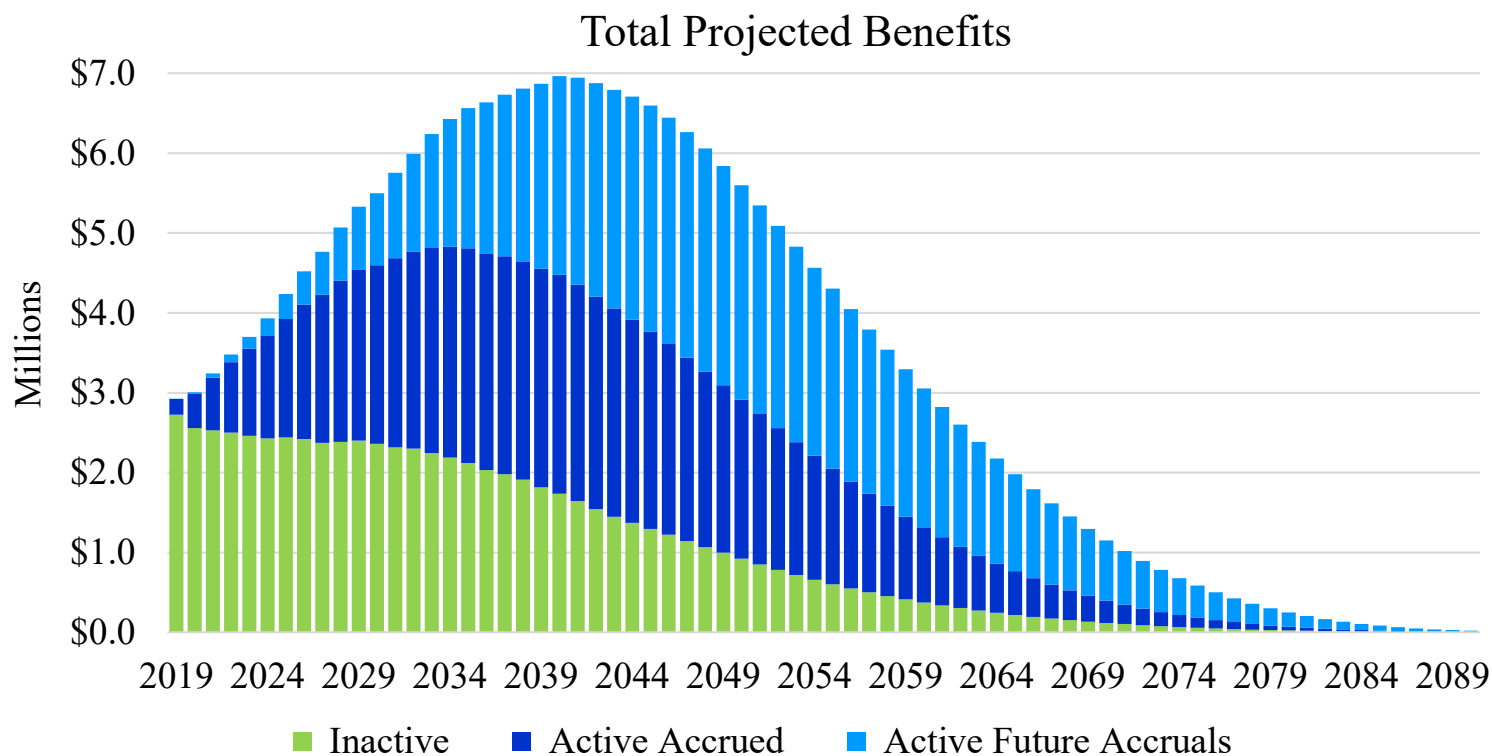
Application to Pensions

Events to Consider in Actuarial Present Value

- Mortality
- Interest Rate
- Retirement
- Withdrawal
- Disability
- Salary Increases
- Cost of Living Adjustments

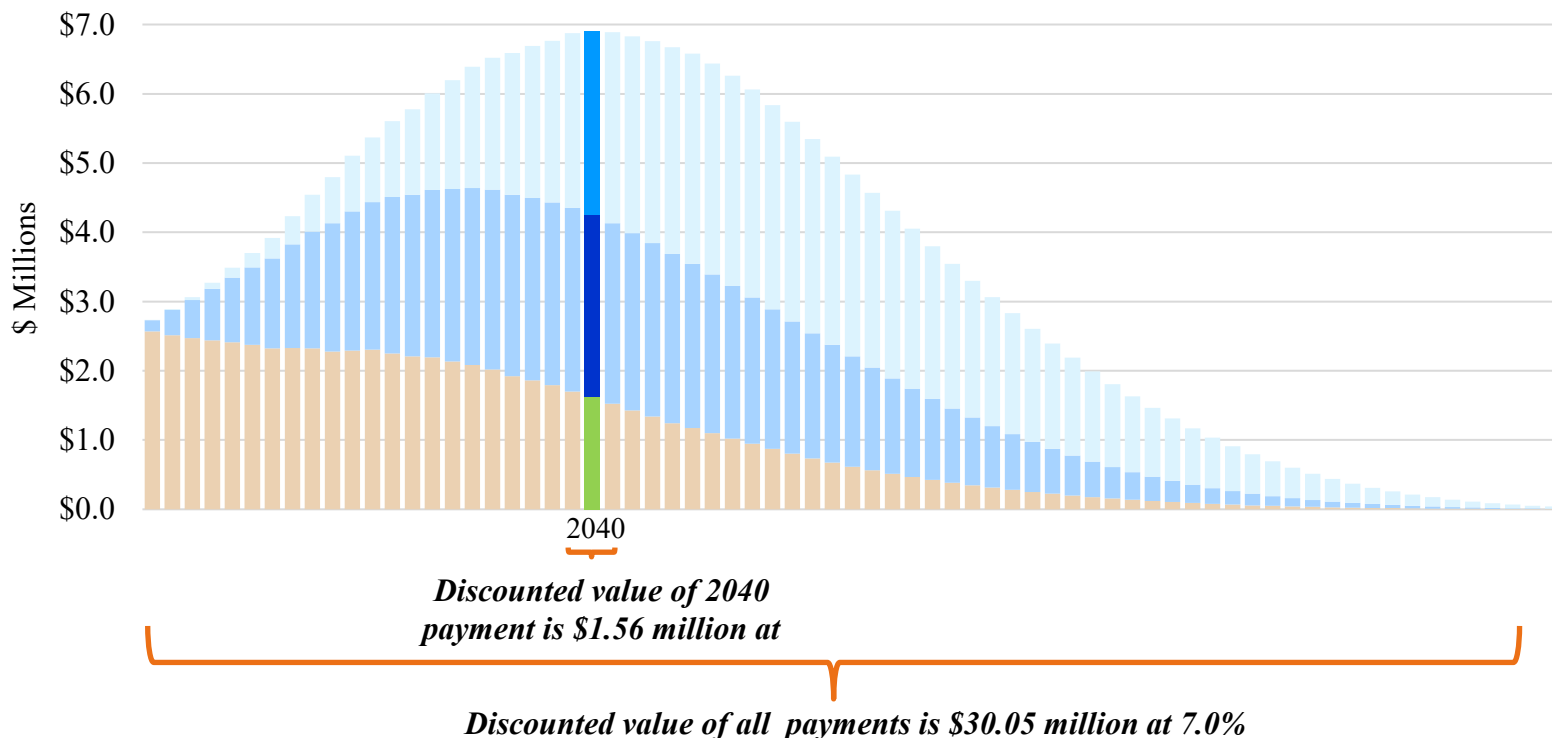
The Actuarial Model

Census Data + Assumptions + Plan Provisions =
Projected Benefit Payments



The Actuarial Model

Projected Benefit Payments + Investment Assumption
= Liabilities



Experience Study Implementation in 2021 Valuation

- Lower the investment return assumption for all plans to 7.10%
- Lower the payroll growth assumption used in the level percentage of payroll amortization methodology from 3.50% to 2.75%
- Generational Mortality and update to new Public Sector Mortality Tables
- **For pension, implement all changes immediately and phase-in contributions over five years to match the current five-year smoothing of investment gains**
- **For healthcare, implement all changes immediately**

Pension Valuation 2021

- TRS received 100% of the Actuarially Determined Employer Contribution for the fiscal year ending June 30, 2021 (100% in 2020 fiscal year)
 - Actuarially recommended amount of \$551.1M was received this year
 - Actuarially recommended amount of \$579.2M is expected for 2022 Fiscal Year
- Net Investment Return on Market Value of 29.6%
 - Trust Fund increased \$5.2 Billion due to investment returns in excess of negative cash flow
 - Negative cash flow for 2021 as a percentage of market value of assets is (3.79)%
 - Last year's percentage was (3.68)%

Pension Valuation 2021

- Actuarial Value of Asset Return of 12.9%
 - Compare to 7.50% investment return assumption for period
 - Smoothing of investment gains and losses over 5-year period
- Increase of 0.19% in State Pension Contribution Requirement from last year
 - Last year was an increase of 0.51%
- Unfunded Accrued Liability (UAL) increased slightly from \$14.8B to \$17.0B
- Funding Ratio decreased from 58.4% to 57.2%

Pension Plan

Review of Funding Policy



- Legacy UAAL in 2014 (\$14.0 billion) amortized over closed 30-year period with level percentage of payroll methodology (23 years remaining)
- Incremental (Gains) and Losses set up each year and amortized over its own closed 20-year period

	<u>ORIGINAL UAAL</u>	<u>CURRENT UAAL</u>	<u>REMAINING AMORTIZATION PERIOD (YEARS)</u>	<u>AMORTIZATION PAYMENT</u>
Legacy	\$14,010,205	\$15,366,216	23	\$1,058,344
New Incremental 6/30/2015	(351,610)	(335,907)	14	(32,292)
New Incremental 6/30/2016*	340,766	330,271	15	30,192
New Incremental 6/30/2017	(428,468)	(420,716)	16	(36,731)
New Incremental 6/30/2018	(192,240)	(190,511)	17	(15,945)
New Incremental 6/30/2019	53,306	53,138	18	4,278
New Incremental 6/30/2020	112,464	112,436	19	8,731
New Incremental 6/30/2021*	2,042,379	<u>2,042,379</u>	20	<u>153,407</u>
Total UAAL		\$16,957,306		\$1,169,984**
Blended amortization period (years)				22.9

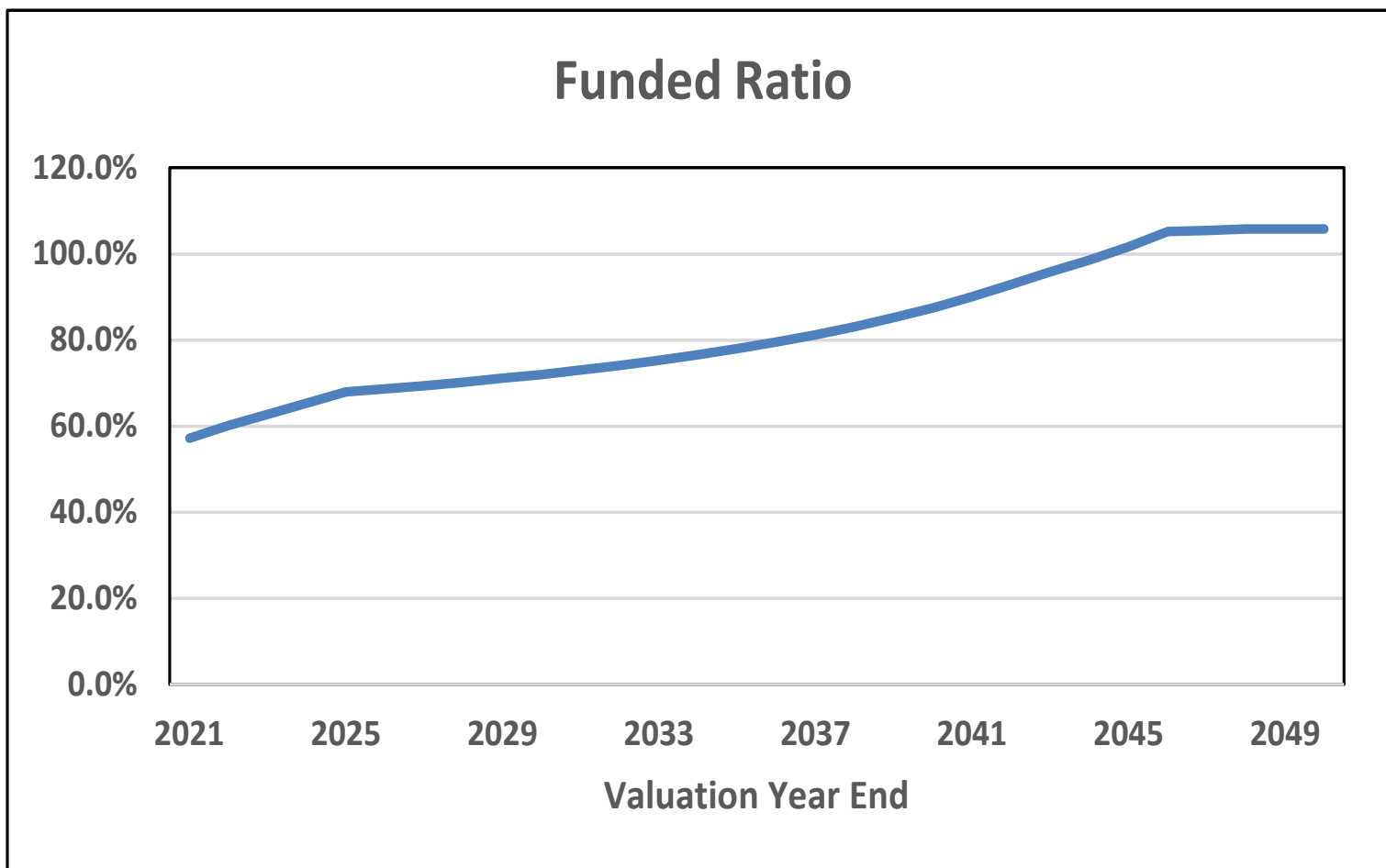
* Includes assumption changes

Pension Plan

Review of Funding Policy

Valuation Year	Remaining Amortization Period	Legacy Unfunded Liability	Amortization Payment
2021	23	15,366,215,618	1,058,344,295
2022	22	15,369,768,164	1,087,448,763
2023	21	15,343,668,100	1,117,353,604
2024	20	15,284,987,707	1,148,080,828
2025	19	15,190,568,783	1,179,653,051
2026	18	15,057,005,657	1,212,093,509
2027	17	14,880,626,978	1,245,426,081
2028	16	14,657,476,195	1,279,675,298
2029	15	14,383,290,636	1,314,866,369
2030	14	14,053,479,077	1,351,025,194
2031	13	13,663,097,705	1,388,178,387
2032	12	13,206,824,349	1,426,353,292
2033	11	12,678,930,870	1,465,578,008
2034	10	12,073,253,559	1,505,881,403
2035	9	11,383,161,420	1,547,293,142
2036	8	10,601,522,177	1,589,843,703
2037	7	9,720,665,847	1,633,564,405
2038	6	8,732,345,696	1,678,487,426
2039	5	7,627,696,410	1,724,645,830
2040	4	6,397,189,265	1,772,073,591
2041	3	5,030,584,088	1,820,805,615
2042	2	3,516,877,789	1,870,877,769
2043	1	1,844,249,204	1,922,326,908
2044	0	0	

Pension Plan – Baseline Projection of Funded Percentage



Assumes 7.10% returns each year and ADC is fully contributed.

Health Valuation 2021

- Funded status has decreased for the Health Insurance Trust.
 - From 61.7% to 60.0%.
- If all assets were used to fund benefits for members over age 65, the funded status for that group alone would be 100%
- Total actuarially determined contribution rate has increased for the health trust
 - From 3.54% to 4.64%.
 - Mainly due to new Experience Study.
- Target Rate of Return for the health trust is 7.10%.
 - Market Value Return of 31.10%.
 - Actuarial Value of Asset Return of 10.67%.
 - Reflects smoothing of investment gains and losses over 5-year period.

Health Valuation 2021

Valuation Year	Normal	Accrued Liability	Total	Member ¹	Employer, State, and Statutorily Required Prefunding ²	Total
2015	1.95	4.49	6.44	3.69	2.75	6.44
2016	1.95	4.64	6.59	3.69	2.90	6.59
2017	1.94	5.07	7.01	3.69	3.32	7.01
2018	1.78	4.04	5.82	3.69	2.13	5.82
2019	1.62	3.27	4.89	3.69	1.20	4.89
2020	1.48	2.06	3.54	3.70	(0.16)	3.54
2021	1.92	2.72	4.64	3.70	0.94	4.64

¹ Expected level of active employee contributions for the subsequent fiscal year (after 10RS HB540)

Discount Rate for 2011 through 2020 Medical Plan Valuations = 8.0% (after 10RS HB540); 2021 Medical Plan Valuations = 7.1%

² This represents funding by active members, local school districts, universities and other employers toward the unfunded liability of the health trust. See KRS 161.540(1)(c)(3) & 161.550(5).

Impact of COVID-19

- 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 and 2022 due to pent up demand.
 - Direct COVID-19 treatment and prevention costs – still an ongoing situation
 - Changes in contribution and budget projections
 - Potential for long term effects on both health costs and disabilities

Life Insurance Valuation 2021

- Funded status has increased for the Life Insurance Trust.
 - From 75.5% to 81.9%.
- Total contribution rate for the life trust has decreased.
 - From 0.08% to 0.06%.
- Target Rate of Return for the life trust is 7.10%.
 - Market Value Return of 28.17%.
 - Actuarial Value of Asset Return of 8.06%.
 - Reflects smoothing of investment gains and losses over 5-year period.

New Tier 1/1/2022

- For all new active members hired on or after January 1, 2022, there are new plan provisions

	Current Tier	New Tier
Normal Retirement Eligibility	27 YOS or 60&5	57&30 or 65&5
Final Average Salary	55&27 – 3 years Else – 5 years	5 years
Defined Benefit Formula	NU: 1.7% graded to 3.0% Univ: 1.5% graded to 2.0%	NU: 1.7% graded to 2.4% Univ: 0.7% graded to 1.4% Supplemental Account with 2% from both EE and ER
Unused Sick Leave	Allowed at Retirement	Not allowed at Retirement
Employee's Contribution	NU: 12.855%; Univ: 10.4%	NU: 14.75%; Univ: 9.775%
Employer's Statutory Rates	NU: 16.105%; Univ: 13.65%	NU: 10.75%; Univ: 9.775% Local School Districts and Other Agencies – Addt'l 3% to Retiree Healthcare

New Tier 1/1/2022

- Lower ultimate employer normal cost due to smaller benefits and longer retirement eligibilities
- Leads to more of the statutory contributions going towards paying down the Unfunded Accrued Liability faster than current timelines
- Ultimate Contribution Savings for State of nearly \$3.6B over a 30-year period for all three plans under TRS

DISCUSSION



Teachers' Retirement System of the State of Kentucky

Overview of TRS 4 House Bill 258 (2021 RS)

Gary L. Harbin, CPA
Executive Secretary

Overview of TRS 4

Outline

- TRS Account Types
- TRS 4
 - Plan Overview
 - Retirement Benefits
 - Other Benefits
 - Other Aspects
 - Components
 - Foundational Benefit
 - Supplemental Benefit
 - Risk Controls
 - Retirement Benefit Examples

TRS Account Types

TRS has four account types delineated by entry date

TRS 1

Entry before
July 1, 2002

TRS 2

Entry on or
between
July 1, 2002, and
June 30, 2008

TRS 3

Entry on or
between
July 1, 2008, and
Dec. 31, 2021

TRS 4

Entry on or after
Jan. 1, 2022

TRS 4 Plan Overview

Retirement Benefits

- Provides retirement security through foundational (defined benefit) and supplemental (defined contribution savings) benefits
 - Social Security replacement plan for non-university members
- Service retirement eligibility:
 - Age 57 with 30 years of service
 - Age 60 with 10 years of service
 - Age 65 with 5 years of service
- Early service retirement allowed with reduced benefit
- No service retirement before age 57
- Plan designed to have no unfunded liability
 - Controls for Board of Trustees to maintain a funded level of at least 90%

TRS 4 Plan Overview

Other Benefits

- Health Insurance
Same structure as members beginning on or after July 1, 2008
- Life Insurance
Active member benefit increased to \$5,000 from \$2,000
Retiree benefit increased to \$10,000 from \$5,000

TRS 4 Plan Overview

Other Aspects

- Inviolable Contract applies to benefits when earned
 - What has been earned cannot be reduced
 - Any reductions, if necessary as a risk control, would apply prospectively
- Board of Trustees invests TRS 4 funds with funds of current tiers.

TRS 4 Plan Components

Foundational Benefit – Non-university members

- Employee contribution of 9%
- Employer contribution of 8%
- Age factor is 1.7% from age 57 to 60, then increases monthly to 1.9% at age 65
- Career factor is 0.25% when total service is from 20–29.99 years, 0.5% when total service is equal to or greater than 30 years
- Final average salary uses high five years
- Provides annual retiree cost-of-living adjustment (COLA) of 1.5%

TRS 4 Plan Components

Supplemental Benefit

- Mandatory employee contribution of 2%
- Mandatory employer contribution of 2%
- Voluntary contributions by employee and employer are allowed
- Lump-sum leave payouts may be contributed
- All contributions earn annual interest based on a rolling average of 30-year Treasury Bond rates
- Benefit may be distributed in various ways (annuity, lump-sum, combinations)

TRS 4 Plan Components

Risk Controls

If funding falls below 90%, board shall use any of these adjustments to maintain funding

- Utilize assets from the stabilization reserve account
- Use future mandatory supplemental benefit contributions for the foundational benefit
- Adjust future annual interest credited to a member's account
- Adjust the age and/or career factors
- Adjust the annual COLA for retired members

Board may use these adjustments at any time to maintain funding

TRS 4 Benefit Comparisons

Entry Age 25

Age	Years of Service	Earnings	Foundational Benefit			Supplemental Benefit			Total		Difference from TRS 3
			Total Multiplier	Annuity	Salary Replacement	Accumulated Balance	Annuity	Salary Replacement	Annuity	Salary Replacement	
57	32	\$64,274	2.20%	\$42,290	65.8%	\$101,455	\$7,902	12.3%	\$50,192	78.1%	-0.2%
58	33	66,524	2.20%	45,138	67.9%	109,047	8,606	12.9%	53,744	80.8%	-0.4%
59	34	68,852	2.20%	48,134	69.9%	117,100	9,370	13.6%	57,504	83.5%	-0.6%
60	35	71,262	2.20%	51,284	72.0%	125,642	10,200	14.3%	61,484	86.3%	-0.7%
61	36	73,756	2.24%	55,588	75.4%	134,698	11,102	15.1%	66,690	90.4%	0.5%
62	37	76,337	2.28%	60,187	78.8%	144,298	12,085	15.8%	72,272	94.7%	1.9%
63	38	79,009	2.32%	65,100	82.4%	154,471	13,156	16.7%	78,256	99.1%	3.4%
64	39	81,774	2.36%	70,344	86.0%	165,250	14,326	17.5%	84,670	103.5%	5.0%
65	40	84,636	2.40%	75,938	89.7%	176,666	15,606	18.4%	91,544	108.2%	6.7%

For supplemental benefit, estimates assume an annuity based on minimum contributions with a cost-of-living adjustment (COLA) not being selected.

TRS 4 Benefit Comparisons

Entry Age 35

Age	Years of Service	Earnings	Foundational Benefit			Supplemental Benefit			Total		Difference from TRS 3
			Total Multiplier	Annuity	Salary Replacement	Accumulated Balance	Annuity	Salary Replacement	Annuity	Salary Replacement	
57	22	\$64,274	1.95%	\$21,131	32.9%	\$65,093	\$5,070	7.9%	\$26,201	40.8%	2.0%
58	23	66,524	1.95%	24,539	36.9%	70,918	5,597	8.4%	30,136	45.3%	1.8%
59	24	68,852	1.95%	28,309	41.1%	77,119	6,171	9.0%	34,480	50.1%	1.6%
60	25	71,262	1.95%	32,468	45.6%	83,717	6,796	9.5%	39,264	55.1%	1.4%
61	26	73,756	1.99%	35,666	48.4%	90,736	7,479	10.1%	43,145	58.5%	2.6%
62	27	76,337	2.03%	39,105	51.2%	98,199	8,224	10.8%	47,329	62.0%	-3.2%
63	28	79,009	2.07%	42,799	54.2%	106,132	9,039	11.4%	51,838	65.6%	-2.1%
64	29	81,774	2.11%	46,766	57.2%	114,561	9,932	12.2%	56,698	69.3%	-0.7%
65	30	84,636	2.40%	56,953	67.3%	123,514	10,911	12.9%	67,864	80.2%	7.7%

For supplemental benefit, estimates assume an annuity based on minimum contributions with a cost-of-living adjustment (COLA) not being selected.

TRS 4 Benefit Comparisons

Entry Age 45

Age	Years of Service	Earnings	Foundational Benefit			Supplemental Benefit			Total		Difference from TRS 3
			Total Multiplier	Annuity	Salary Replacement	Accumulated Balance	Annuity	Salary Replacement	Annuity	Salary Replacement	
57	12	\$64,274	1.70%	\$10,048	15.6%	\$33,182	\$2,584	4.0%	\$12,632	19.7%	1.3%
58	13	66,524	1.70%	12,091	18.2%	37,455	2,956	4.4%	15,047	22.6%	1.2%
59	14	68,852	1.70%	14,396	20.9%	42,030	3,363	4.9%	17,759	25.8%	1.2%
60	15	71,262	1.70%	16,984	23.8%	46,923	3,809	5.4%	20,793	29.2%	1.1%
61	16	73,756	1.74%	19,191	26.0%	52,154	4,299	5.8%	23,490	31.9%	1.9%
62	17	76,337	1.78%	21,589	28.3%	57,742	4,836	6.3%	26,425	34.6%	2.8%
63	18	79,009	1.82%	24,191	30.6%	63,708	5,426	6.9%	29,617	37.5%	3.8%
64	19	81,774	1.86%	27,010	33.0%	70,076	6,075	7.4%	33,085	40.5%	4.9%
65	20	84,636	2.15%	34,014	40.2%	76,867	6,790	8.0%	40,804	48.2%	10.8%

For supplemental benefit, estimates assume an annuity based on minimum contributions with a cost-of-living adjustment (COLA) not being selected.



Our Members Come First!

800-618-1687

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

info@trs.ky.gov
<https://trs.ky.gov>

Protecting & Preserving Teachers' Retirement Benefits

How do we invest over multiple decades?

Teachers' Retirement System of Kentucky

David Salter and Rebecca King, November 2021



Where Baillie Gifford pooled funds are held, please note the fund portfolio information contained within this report is confidential, proprietary information and should be maintained as such and not disseminated. The content is intended for information purposes only and should not be disclosed to other third parties or used for the purposes of market timing or seeking to gain an unfair advantage.

Speakers



David Salter

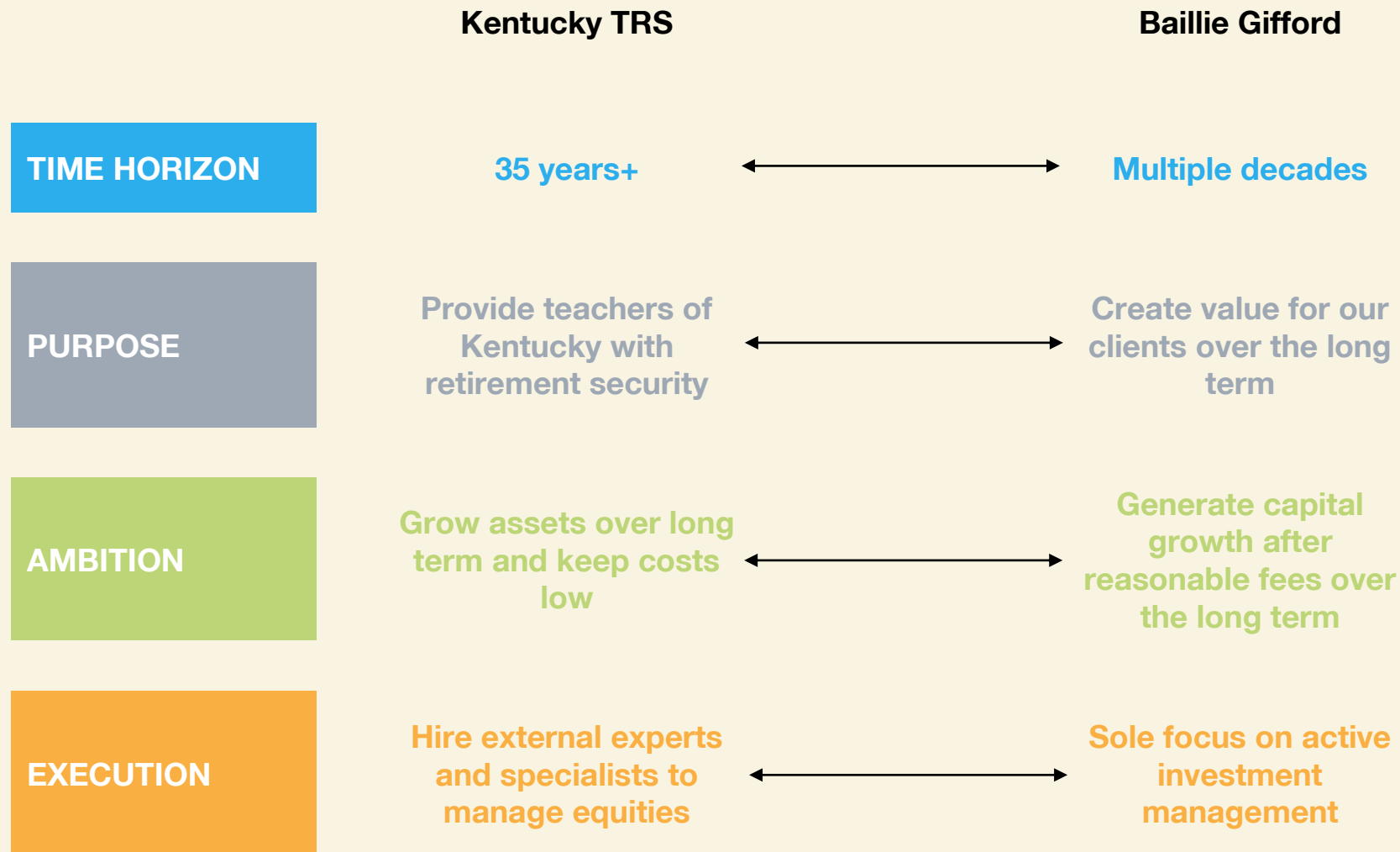
David is a Director in the Clients Department with responsibility for servicing North American clients. He has been a member of the International Growth Portfolio Construction group since 2007. David joined Baillie Gifford in 2001, with four years' investment and finance experience, and became a Partner in 2011. He graduated BA (Hons) in Commerce from Edinburgh Napier University in 1997.



Rebecca King

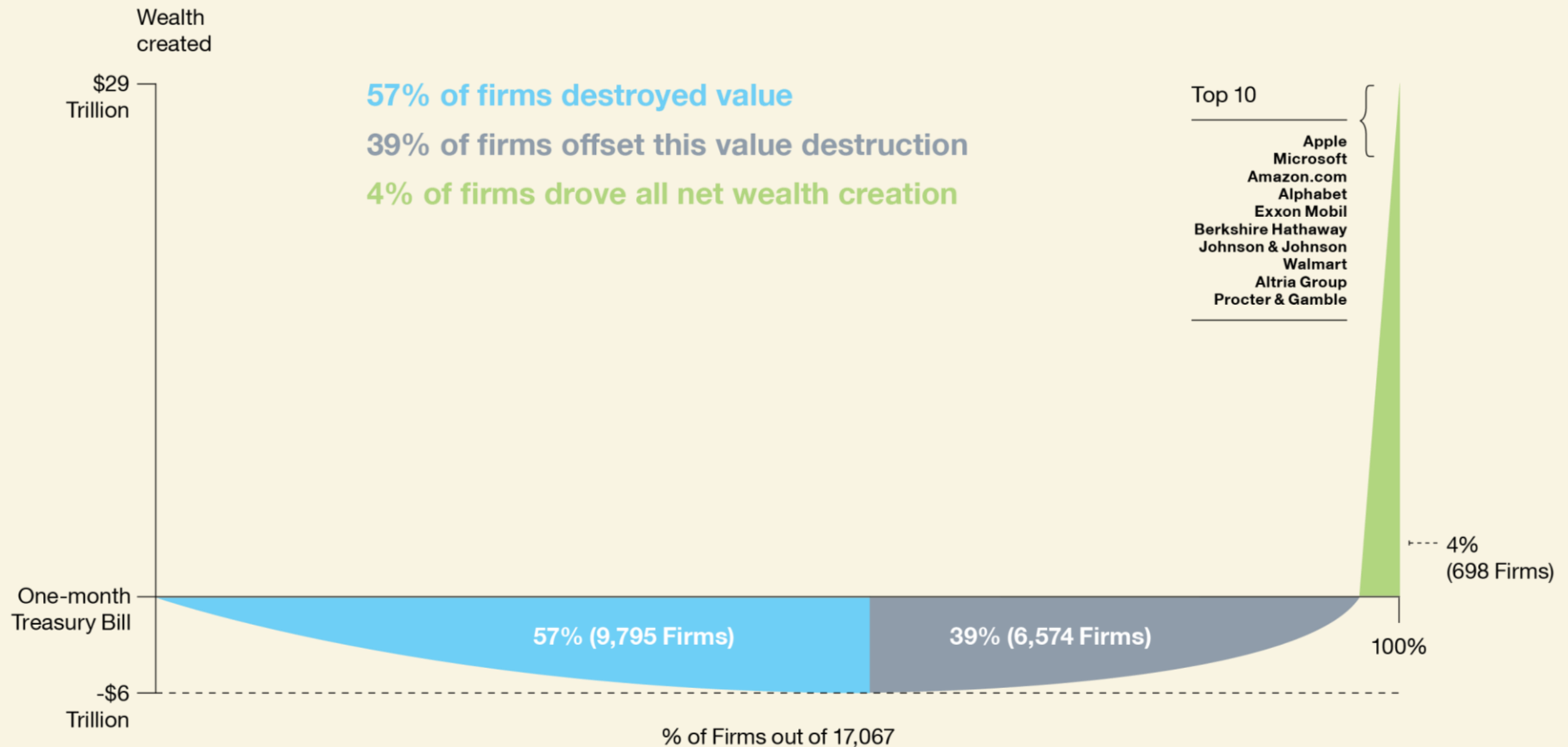
Rebecca is a Manager in the Clients Department with responsibility for servicing North American clients. Before joining Baillie Gifford in 2016, Rebecca worked at Ernst & Young and qualified as a Chartered Accountant in 2014. She graduated BSc in Management and International Business from the University of Tennessee in 2011. Alongside her studies, Rebecca competed on the women's golf team as a scholarship athlete.

Purpose and alignment



Only a handful of companies really matter

Total wealth created by all listed US stocks: 1990-2018



Source: Bessembinder, H., Cheng, T.F., Choi G., John Wei, K.C. Do Global Stocks Outperform Treasury Bills? (July, 2019). The first author acknowledges financial support from Baillie Gifford & Co. The data is a US subset of the global data set used in the above paper and includes 17,067 CRSP common stocks from January 1990 to December 2018. In cases where stocks list or delist within a calendar period the return is computed for the portion of the period where data is available. Due to dual share classes; dollar wealth is assessed at the company level. Beyond the best-performing 698 firms, an additional 6,574 firms (39%) of stocks created positive wealth over their lifetimes. The wealth creation of these stocks was just offset by the wealth destruction of the remaining 9,795 (57% of total) firms, so that the top 698 firms created the same wealth as the overall market. US dollars.

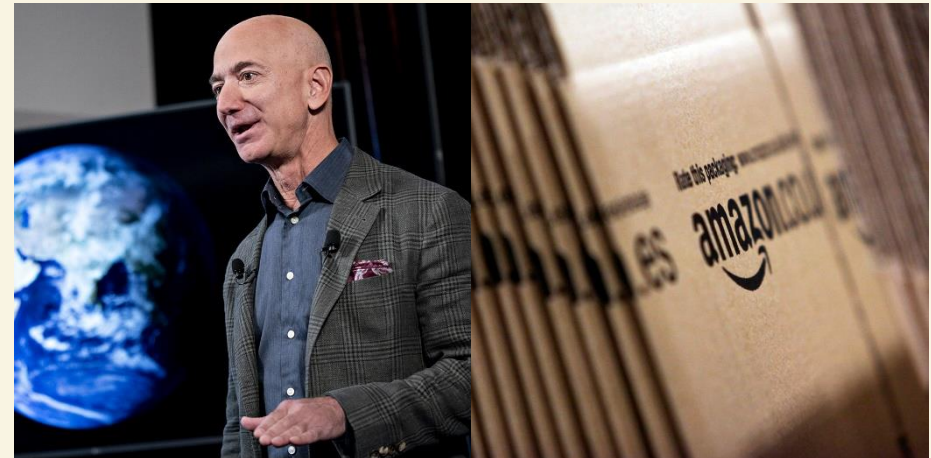
Think about what can go right, not wrong

It's not about how often you are right

...But how much money you make when you are

“Given a 10% chance of a 100 times payoff, you should take that bet every time. But you’re still going to be wrong nine times out of 10.”

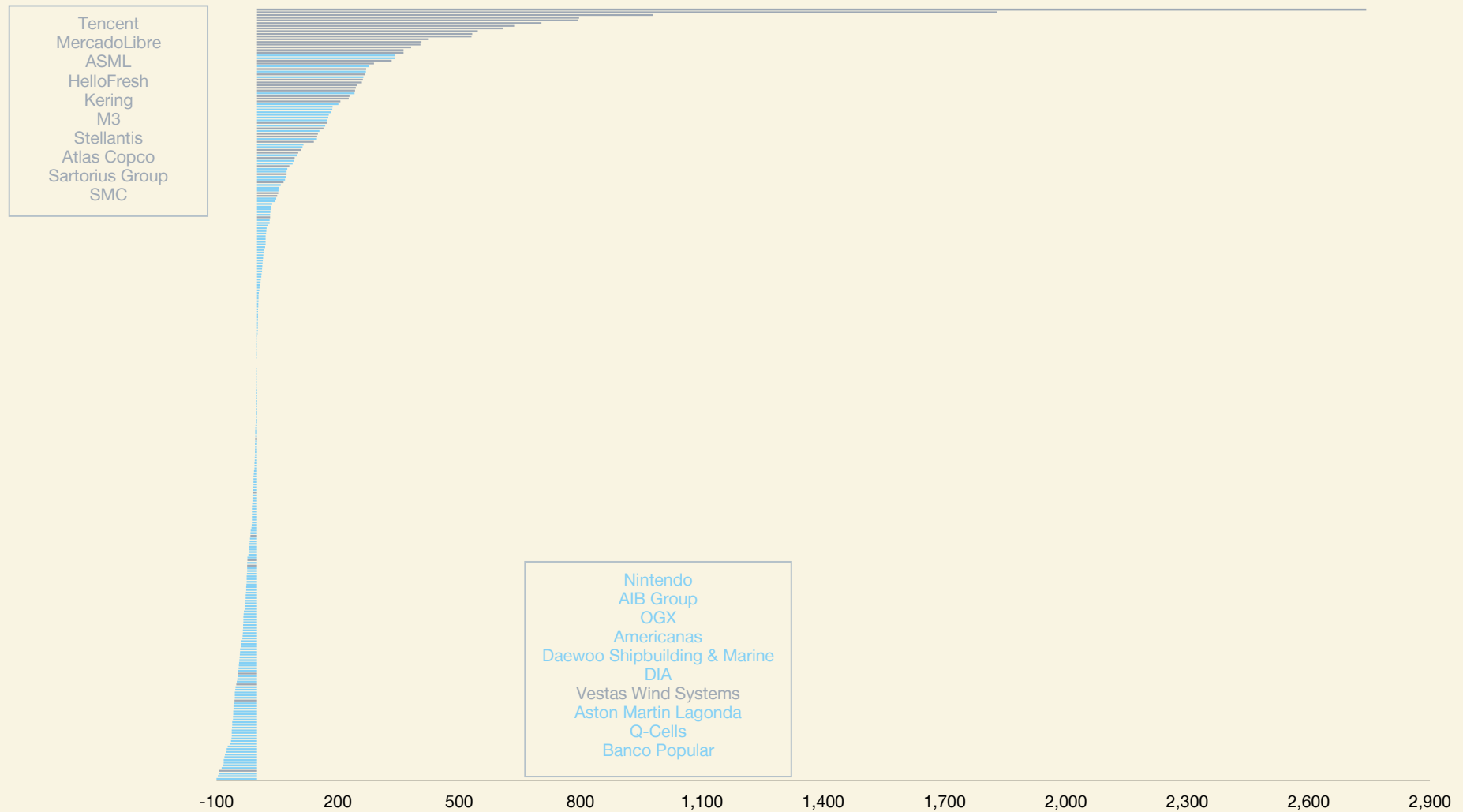
Jeff Bezos



© Bloomberg/Getty Images.

Think creatively and positively about upside

Absolute returns of Baillie Gifford International Growth Fund holdings during their tenure in the portfolio

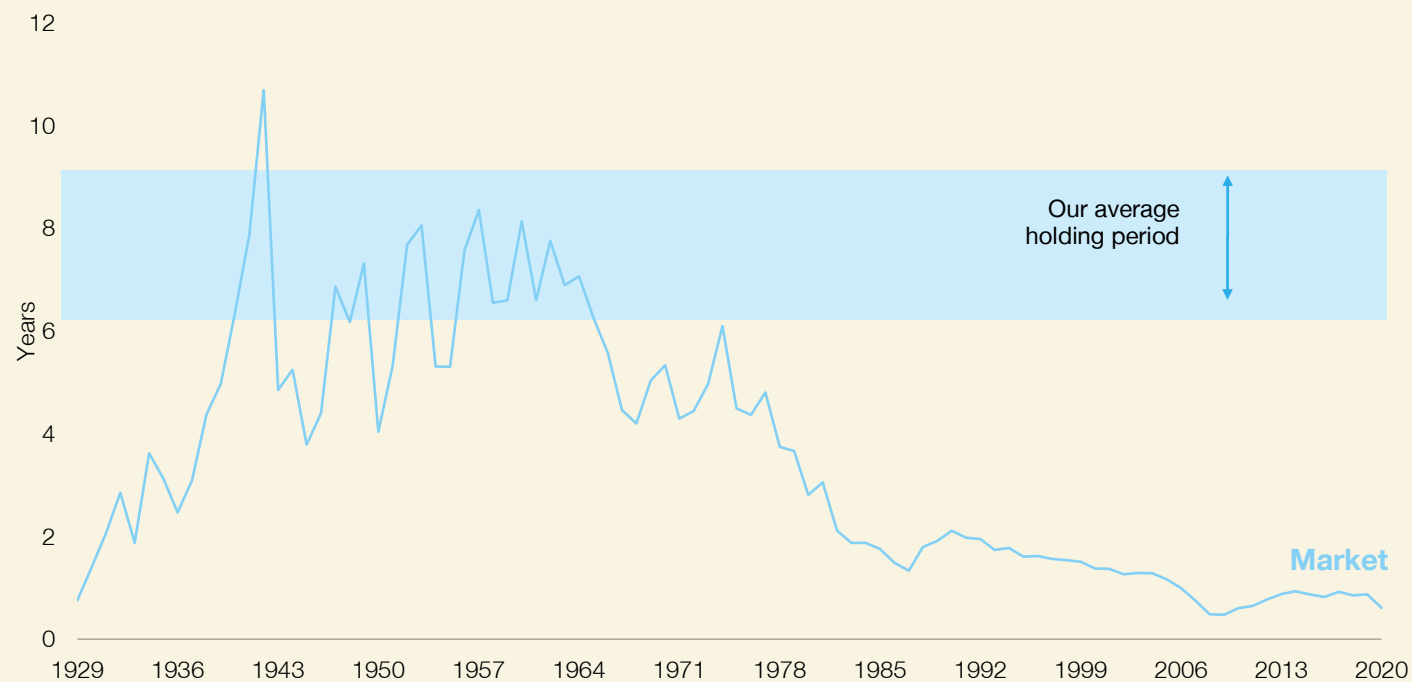


Source: StatPro. US dollars. Stocks in blue have been sold. Between March 5, 2008 and October 31, 2021.

Think in decades, not quarters

Turn time and volatility to your advantage

Holding Period of NYSE Stocks (In Years)



Data provided by: Ned Davis Research Group, 2019. Yearly data from 1929 to 2018. Source: Barron's Newspaper, IDC, New York Stock Exchange. Our average holding period is based on representative Baillie Gifford strategies.

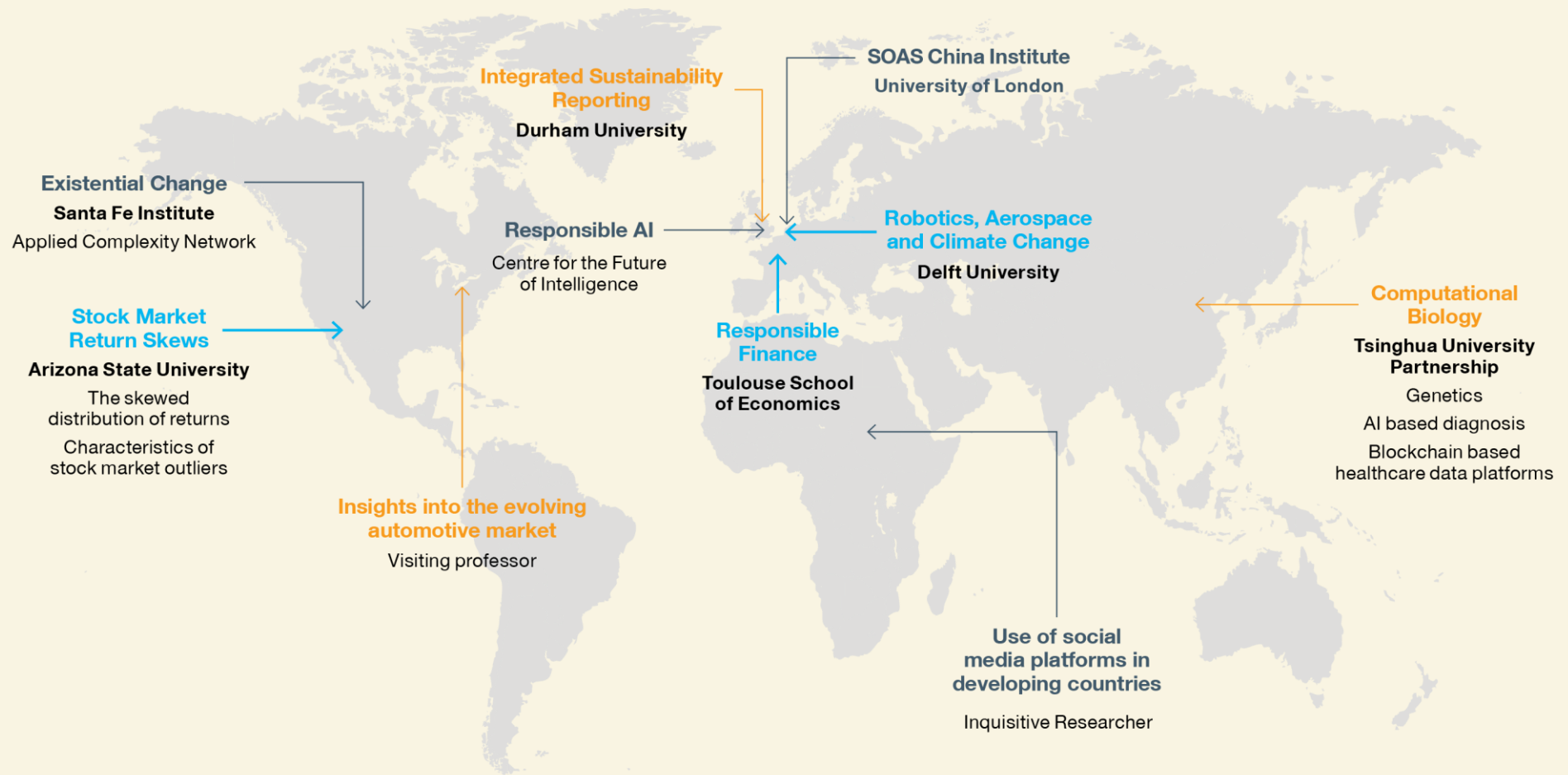
Be curious

In my whole life, I have known no wise people (over a broad subject matter area) who didn't read all the time – none, zero.”

Charlie Munger,
Poor Charlie's Almanack, Third Edition



Seek out different perspectives



Finding exceptional companies is only half the battle

Important implications for portfolio construction?

Running winners

Embracing asymmetry

Tolerating volatility

Valuing creativity

Accepting mistakes and failure

Volatility of ten winners during their tenure

	Upside	Maximum drawdown %
Tencent	28x	-42.3
MercadoLibre	19x	-37.1
ASML	11x	-27.0
HelloFresh	9x	-24.8
Kering	9x	-60.9
M3	8x	-40.8
Stellantis	7x	-65.4
Atlas Copco	7x	-61.4
Sartorius Group	6x	-31.6
NIO	6x	-84.8

Source: StatPro. In USD. Between March 5, 2008 and October 31, 2021.

Holding on is the key

Alignment and governance matters

Portfolio companies

Founder run

- Alibaba, SoftBank

Family run

- Kinnevik, L'Oréal

Strategic ownership

- Kering, ASML

Cultural stewardship

- ASML, Atlas Copco

Baillie Gifford

Strategic ownership and cultural stewardship

- Shareholders with long-term outlook
- Multi-generation long-term focussed culture

Governance categories defined

Founder run	Founder involved in running the business with ownership stake
Family run	Family member with stake involved in running the business
Strategic ownership	Substantial shareholder with long-term outlook
Cultural stewardship	Multi-generational long-term focussed culture



Final thoughts

Seek out and align with long-term asset owners

Historic market returns have been far more concentrated than is realised

Exceptional companies are rare and worthwhile

An unconventional 'mindset' and differentiated research process can identify winners

Embracing volatility and strong governance matters

Long termism is key – from Baillie Gifford, our clients and our portfolio holdings

Stay humble, learn continuously

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Contracting Entity

Baillie Gifford Overseas Limited

MSCI

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Teachers' Retirement System Board of Trustees

Know Your Rx Coalition

November 22, 2021



Mission

The purpose of the Know Your Rx Coalition is to facilitate the cost-effective provision of prescription medications and best practices in prescription benefit plan design, along with improved clinical outcomes.

Vision

- Financial savings for participating entities
- Institution of best pharmacy practices across the country
- Effective clinical management of pharmacy benefit for member groups
- Improved outcomes for covered patients

Know Your Rx Coalition and Teachers' Retirement System of Kentucky

Medicare
Retirees
(MEHP)

- Coalition Member since Jan 2012
- Rx Benefit Support for Medicare Part D plan with Express Scripts



Pre-65
Retirees

- Coalition Member started May 2015
- Rx Benefit Support for KEHP plan thru CVS/Caremark



About Know Your Rx Coalition

October 2021

- 19 Unique Plan Participants
- 157,000 Covered Lives



July 2011 Coalition Founding Institutions

- Eastern Kentucky University
- University of Kentucky
- University of Louisville
- ~45,000 covered lives



Purchasing power of encompassing more than 15 Colleges, Universities (employee and student plans), Retirement Systems, and Hospitals with over 157,000 Covered Lives

Know Your Rx Membership (Jan–Sept 2021)

COVERED LIVES			
Grouping	ESI	CVS	Total
Large and Regional Universities	63,186		63,186
Higher Education - AIKCU		5,704	5,704
Municipalities	1,300		1,300
Healthcare	6,275	1,712	7,987
Student Plans	3,530		3,530
EGWPs	78,325		78,325
Pre-65 Retirees	4,393	50,867	55,260
TOTAL	157,010	58,282	215,292

AIKCU and Healthcare groups thru CVS relationship ended Sept 30, 2021 – These were ARC managed plans

Pharmacogenomics

- Pharmacogenomics (PGx) is the study of how an individual's gene makeup (DNA) affects their response to medication.
- Gene Panel Test is **FREE** for TRS MEHP members!

- ✓ This new benefit will test your DNA to make sure your medications will be safe and effective for you.
- ✓ The analysis and test results will only be used by pharmacists and your doctor. Your information will not be shared with TRS



Know Your Rx Coalition *Pharm-Assist* Offering

MONDAY-FRIDAY 8AM –6 PM E.T.

KYRx@uky.edu

Free counseling service via live pharmacists

- **Contact members with lower cost prescription alternatives**
- **Contact Prescribers and Pharmacies on your behalf**
- **Guide you to lowest cost medication options (\$4 generic lists, copay cards, etc.)**
- **Contact PBM (Express Scripts or CVS/Caremark) on your behalf as needed**
- **Provide medication information and prescription coverage information specific to your plan**

www.KYRx.org

Know Your Rx Coalition

855-218-5979

Lucy Wells - Clinical Director

Travis Albrecht – Assoc. Dir.

Marissa Boelhauf – Assoc Dir.

Dedicated Clinical Pharmacists

**Gina Beanland
Megan Clements
Whitney Deal
Amy Griesser
Matt McMahan
Stacy Poskin
April Prather
Allison Russell
Lauren Vickers
Patricia Walker
Zach Wilkerson**

Know Your Rx Key Stats EGWP (Jan – Sept 2021)

Medicare Plans		TRS EGWP	UK EGWP	SERS EGWP
78,325	Medicare Lives			
Average Members per Month		37,158	4,284	36,884
Number of Unique Patients		36,482	4,266	36,685
% of Members Utilizing		98.18%	99.58%	99.46%
Plan Cost		\$141,111,237	\$14,220,819	\$107,495,729
Days		48,982,771	5,333,785	46,559,185
Rxs		858,589	120,510	833,037
Average Member Age		76.3	77.0	80.7
Plan Cost PMPM		\$421.96	\$368.85	\$323.83
Plan Cost per Day		\$2.88	\$2.67	\$2.31
Plan Cost per Rx		\$164.35	\$118.01	\$129.04
Rxs PMPM		2.57	3.13	2.51
Generic Fill Rate		89.09%	91.73%	90.87%
Home Delivery Utilization		36.75%	12.12%	27.38%
Member Cost Share %		8.33%	8.19%	10.86%
Specialty % of Plan Cost		40.96%	47.43%	44.51%
Specialty Plan Cost PMPM		\$172.85	\$174.96	\$144.12
Non-Specialty Plan Cost PMPM		\$249.11	\$193.90	\$179.71
Formulary Compliance Rate		96.73%	98.92%	98.47%

- Reports are GROSS of Rebates
- GFR high for all plans, UK and SERS slightly higher due to closed formulary use
- Home Delivery by day supply
- TRS = 54.5%
- SERS = 42.6%
- UK Medicare = 22.8%

Know Your Rx Comparison EGWP (Jan – Sept 2021)

	TRS EGWP	UK EGWP	SERS EGWP
Average Members per Month	37,158	4,284	36,884
Plan Cost	\$141,111,237	\$14,220,819	\$107,495,729
<i>Rebate estimate</i>	<i>\$39,346,790</i>	<i>\$2,938,107</i>	<i>\$22,143,981</i>
<i>Federal Reinsurance</i>	<i>\$19,592,817</i>	<i>\$2,677,698</i>	<i>\$19,260,581</i>
<i>Coverage Gap</i>	<i>\$21,559,393</i>	<i>\$1,900,983</i>	<i>\$13,435,548</i>
<i>Direct Subsidy</i>	<i>\$1,546,932</i>	<i>\$227,282</i>	<i>\$1,862,795</i>
<i>LICS Subsidy</i>	<i>\$1,720,511</i>	<i>\$175,520</i>	<i>\$2,424,683</i>
Plan Cost PMPM	\$421.96	\$368.85	\$323.83
<i>Plan Cost PMPM (net of rebates)</i>	<i>\$304.30</i>	<i>\$292.63</i>	<i>\$257.12</i>
<i>Plan Cost PMPM Net of all subsidy and rebates</i>	<i>\$171.47</i>	<i>\$163.43</i>	<i>\$145.71</i>

- Rebates estimates using Trend Central Rebate Reports
- Federal Reinsurance, Coverage Gap, Direct Subsidy, LICS Subsidy from ESI provided EGWP Financial Reporting Packages

KYM and SERS – ESI Medicare High Performance Closed Formulary
 TRS – ESI Medicare Premier Access Open Formulary – rebate potential much higher with access to more branded products
 SERS – larger LICS population
 Federal Reinsurance – More than double from prior quarter. Non-linear increase as more members reach Catastrophic Phase of coverage as year progresses

Know Your Rx *Pharm-Assist* Activity & Savings Results

Entity	Unique Patients	% of Patients with Rx	Contacts	Actions	Annual patient savings	Annual plan savings	Total Annual Savings
Carrier 6444*	4	3.7%	12	18	\$0	\$23	\$23
ARC - CVS	129	4.1%	281	420	\$3,120	\$151,949	\$155,069
EKU	152	7.5%	381	578	\$8,414	\$30,924	\$39,338
TRS	4,795	13.1%	15,791	26,850	\$1,089,873	\$1,336,549	\$2,426,421
Morehead State	53	5.4%	147	374	\$434	\$12,876	\$13,310
Murray State	73	4.9%	209	374	\$14,869	\$48,296	\$63,165
Carrier 6992**	52	9.9%	127	251	\$37,914	\$21,168	\$59,082
Pre-65 KEHP	1840	6.1%	4283	6445	\$53,788	\$279,008	\$332,797
U of Louisville	579	7.0%	1682	2434	\$27,182	\$219,916	\$247,098
University of Kentucky	2,660	8.5%	6,502	11,259	\$197,267	\$237,082	\$434,349
UK Medicare	774	18.1%	1965	2932	\$47,923	\$168,073	\$215,996
WKU	87	3.5%	219	370	\$5,366	\$1,007	\$6,373
NKU	97	5.2%	296	481	\$7,936	\$15,696	\$23,633
Scott Co Courts	11	2.5%	36	69	\$965	\$14,665	\$15,630
SERS	1203	2.9%	3244	4737	\$73,848	\$399,356	\$473,205
Owensboro Health	921	19.9%	3007	4763	\$73,274	\$628,698	\$701,972
KSU	50	13.2%	150	205	\$4,876	\$9,380	\$14,256
UK Student Plan	148	9.9%	282	418	\$9,654	\$90,276	\$99,930
Marshall Co	36	16.5%	139	221	\$2,249	\$4,126	\$6,375
	13,664	7.98%	38,753	63,199	\$1,658,953	\$3,669,068	\$5,328,021

Contact Types

- Inbound from Patient, Plan, MD, PBM, Pharmacy
- Outbound from Patient, Plan, MD, PBM, Pharmacy
- Live Contact

Actions

- Fax
- Phone
- Email
- Mail
- Review

**\$5.3M Savings to
Members and Plans**

Know Your Rx Cumulative Savings (December 2015- Sept 2021)

	Cumulative Savings (2015- 2021 YTD)							
Entity	Patient savings	Plan savings	Total Savings	Custom Exclusion List 2017-Present	Dispensing Podiatrist Exclusions	Estimated Coalition Fees	Net Total Savings	Net Plan Savings
Carrier 6444*	\$109,124	\$1,193,864	\$1,302,989	\$721,419	\$0	\$204,794	\$1,819,613	\$1,710,489
ARC - CVS	\$48,460	\$724,658	\$773,118	\$0	\$0	\$278,680	\$494,439	\$445,979
EKU	\$73,289	\$313,479	\$386,768	\$1,183,827	\$0	\$105,553	\$1,465,043	\$1,391,754
TRS	\$7,579,540	\$7,572,826	\$15,152,366	\$0	\$0	\$3,550,611	\$11,601,755	\$4,022,215
Morehead State	\$66,207	\$121,689	\$187,896	\$216,061	\$0	\$57,371	\$346,586	\$280,379
Murray State	\$103,451	\$184,221	\$287,672	\$422,368	\$0	\$84,178	\$625,862	\$522,410
Carrier 6992**	\$126,884	\$254,704	\$381,588	\$82,366	\$0	\$35,414	\$428,540	\$301,656
Pre-65 KEHP	\$629,010	\$8,618,681	\$9,247,691	\$0	\$0	\$2,292,323	\$6,955,368	\$6,326,358
U of Louisville	\$283,322	\$887,840	\$1,171,162	\$4,960,036	\$0	\$324,159	\$5,807,040	\$5,523,718
University of Kentucky	\$1,831,697	\$3,584,347	\$5,416,044	\$15,447,128	\$246	\$1,455,350	\$19,407,822	\$17,576,125
UK Medicare	\$569,310	\$1,252,000	\$1,821,310	\$0	\$0	\$393,584	\$1,427,727	\$858,417
WKU	\$86,915	\$130,543	\$217,458	\$832,777	\$0	\$109,336	\$940,899	\$853,984
NKU	\$51,182	\$135,629	\$186,811	\$259,523	\$0	\$21,383	\$424,951	\$373,769
Scott Co Courts	\$3,531	\$19,334	\$22,865	\$60,559	\$0	\$4,794	\$78,631	\$75,100
SERS	\$205,664	\$1,818,648	\$2,024,313	\$664,045	\$710,051	\$590,625	\$2,097,732	\$1,892,068
Owensboro Health	\$91,131	\$843,539	\$934,670	\$371,596	\$0	\$93,562	\$1,212,704	\$1,121,573
KSU	\$5,194	\$16,661	\$21,855	\$21,083	\$0	\$4,198	\$38,740	\$33,546
UK Student	\$9,654	\$90,276	\$99,930	\$62,817	\$246	\$6,085	\$156,662	\$147,008
Marshall Co	\$2,249	\$4,126	\$6,375	\$5,285	\$0	\$1,398	\$10,263	\$8,013
Transylvania	\$19,889	\$22,756	\$42,644	\$60,286	\$0	\$12,065	\$90,866	\$70,977
U of L Physicians	\$37,305	\$40,180	\$77,485	\$565,344	\$0	\$27,085	\$615,744	\$578,439
UMC	\$257,247	\$291,654	\$548,902	\$1,312,342	\$0	\$56,490	\$1,804,754	\$1,547,507
	\$12,190,256	\$28,121,657	\$40,311,913	\$27,248,862	\$710,542	\$9,709,034	\$57,851,741	\$45,661,485

\$57.8 million in savings in overall savings (members and plans)

\$45.6 million in savings to PLANS NET of Fees

ROI 7 : 1

Passing the Torch – Succession Plan

Lucy Wells – Know Your Rx Clinical and Operations Director
– Retirement January 2022

Kim Wilson – Know Your Rx Board Chair
– Retirement February 2022

New Directors

Know Your Rx Coalition – Clinical Director

Marissa Boelhauf, PharmD. joined Know Your Rx (KYRx) Coalition in 2015 and was promoted to Associate Clinical Director in 2019. Marissa is a 2011 graduate of University of Kentucky's College of Pharmacy. Prior to joining the Coalition, Marissa worked in retail pharmacy at Rite Aid for 9 years. At the Know Your Rx Pharmacy Coalition, Marissa enjoys being able to provide medication information to patients to help manage their medical conditions effectively. Know Your Rx provides the opportunity to provide patient-centered care to members focusing on disease-state management with the most cost-effective medication therapies. Marissa has also become very active in ferreting out cost abusive dispensing practices to help control plan spend.



New Directors

Know Your Rx Coalition –Director of Operations

Travis Albrecht received his Doctor of Pharmacy from the University of Kentucky in May of 2013. Prior to graduation he spent four years as an intern at the Kentucky Clinic Outpatient Pharmacy. After graduation, he worked as a staff pharmacist with the same pharmacy before moving to the Coalition in early 2015.

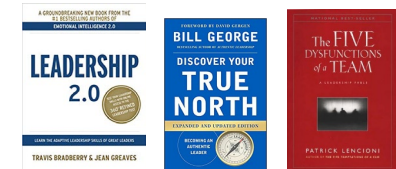
His experience within the high-volume retail setting at the Kentucky Clinic has prepared him for the myriad questions the coalition handles with regards to patients and their pharmacies.

He enjoys working with patients and helping them understand their medications and coverage. Exploring both the pharmaceutical logic behind each prescription as well as how the patient could save money by switching to a safe, effective, cheaper alternative. These challenges prompted him to be more involved with plan design and the operational workings of the prescription benefits world. While working in the granular aspects of patient care he capitalized on these experiences and turned them into opportunities to work on a more global level with the plans. Moving into the Operations Director has presented him with new and exciting challenges to provide more benefits to the plans.



Succession Planning

- Three-year process with intentional training by UK Training and Development
 - Travis and Marissa completed 15-month long program (July 2017-October 2018) in Talent Management Leadership Development
 - Included relevant readings (leadership books, excerpts, articles), Written response and journal assignments, Speaking and Interview assignments, Leadership coaching sessions, Capstone project
- Real life experience with Know Your Rx Coalition operations and clinical programming with clients and PBM
- Active presenter in Know Your Rx Board meetings, participation in client-PBM meetings, regional/national association meetings (SALGBA, KHC, Kentucky Insurance Board, Public Sector Healthcare Roundtable)
- Promotion to Associate Directors April 2019



Playbook for Co-Directors

- Intentional planning to:
 - Specifically define responsibilities for KYRx Coalition activities with ability to cross cover
 - Division of KYRx Clients for primary point of contact
 - For TRS based on size of membership, both Travis and Marissa will participate in Express Scripts –TRS monthly meetings
 - Division of legal responsibilities to Boards of Pharmacy (KY and OH)
 - Division of staff supervision responsibilities
- Both have taken a primary role in weekly calls with Express Scripts and were instrumental in 2022 planning

Know Your Rx Coalition Board Chair

- Agenda item for December 2021 Know Your Rx Board Meeting
 - Primary responsibility is running the quarterly board meeting
 - Responsibility for Know Your Rx operations and activities remains with Directors (Travis and Marissa) with Executive Director (Richard Amos) participation.



Teachers' Retirement System of Kentucky

Trustee Educational Workshop

Identifying and Addressing Portfolio Risks

November 22, 2021



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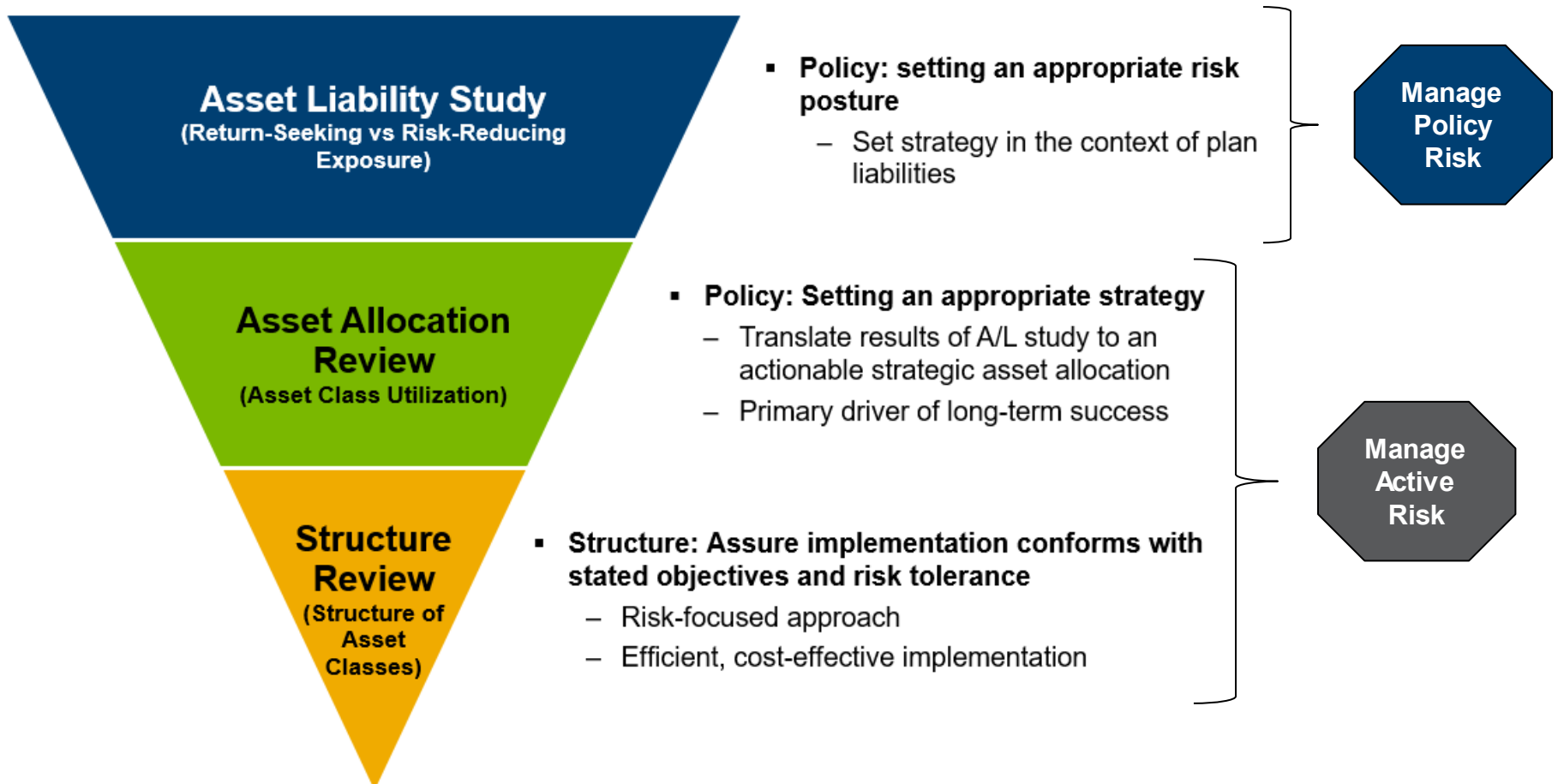
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3 Main Risks

- **Policy Risk (Shortfall)**
 - The Strategic Asset Allocation not meeting its goals and objectives
- **Active Risk (Tracking Error)**
 - Implementation undermines long term goals of the plan
 - Examples include poor structure, manager underperformance, high fees, etc.
- **Operational Risk (Non-Investment Risk)**
 - Examples include fraud, cyber, poor controls, etc.

Key Steps in the Investment Policy Process and Priorities



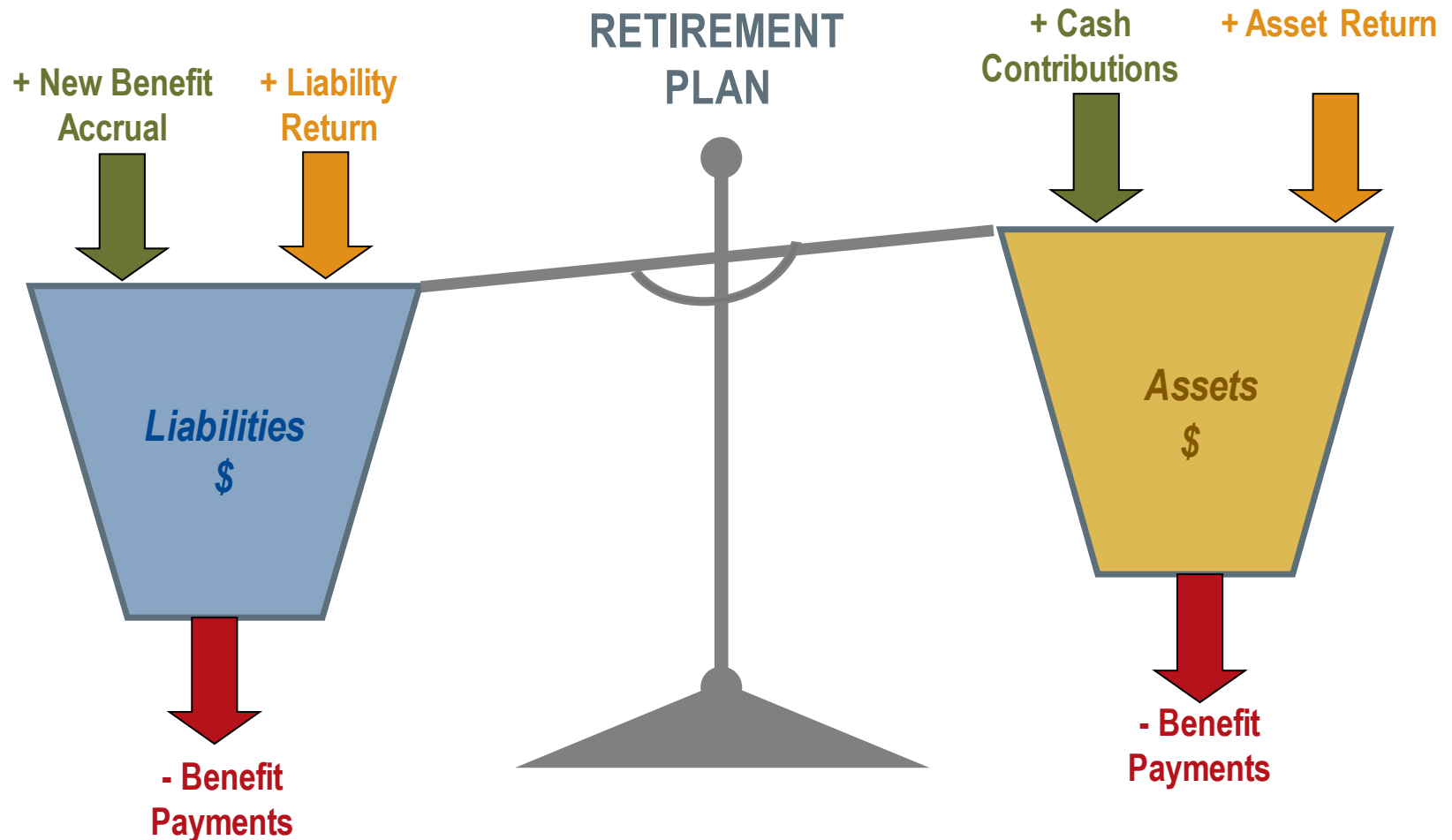
Asset-Liability Study (Stress Testing)

- Provides an understanding of the relationship between assets and liabilities over time
- Illustrates the impact of various asset allocations on key financial metrics (required contributions and funded ratio) under a range of scenarios
- Identifies future trends in the financial health of the Fund that may not be evident from the snap-shot of an actuarial valuation
- Helps determine the level of risk that is appropriate in the context of the Fund's liabilities
- Stress tests the plan to determine “worse-case” scenarios and how to prepare

*An asset-liability study is a **comprehensive toolkit** for **making decisions** on the Fund's **asset allocation** and investment risk **that align with the liabilities** those funds support.*

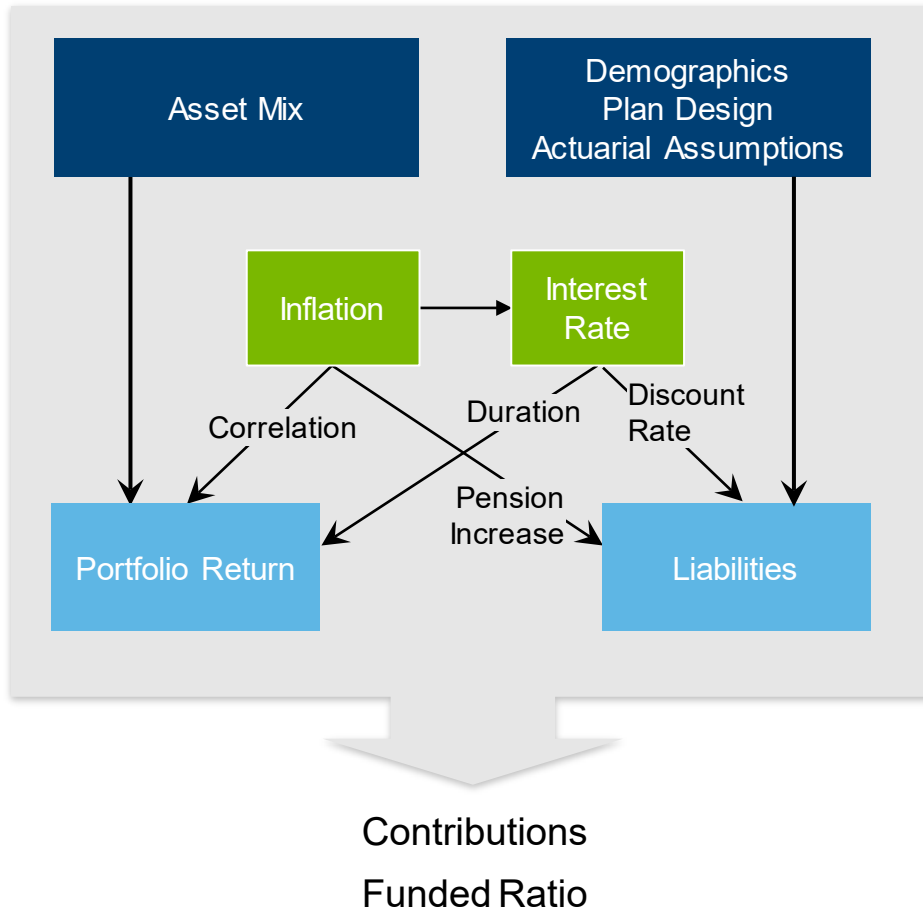
Asset-Liability Study Process & Methodology

Proper Balance of Liabilities and Assets



Asset-Liability Study Process & Methodology

Modeling Mechanics



Asset and liability modeling integrated in single platform

- *Integrates impact of key economic variables*

Flexibility in modeling parameters and output to client preferences

Stochastic and deterministic modeling performed

Overall Risk Posture

- For asset allocation and asset liability study, we break investments into two general categories to determine the overall risk posture of the plan:
 - **Safe or Risk Reducing**
 - Provide downside protection
 - Liquid
 - High credit quality
 - Low correlation to risky assets during financial crises
 - May not have a high expected return, but diversification plays an integral role in achieving long-term objectives
 - Likely subject to interim interest rate risk
 - **Return Seeking**
 - Helps plan achieve long-term growth needs
 - May be far more volatile than risk-reducing assets
 - May be far less liquid than risk-reducing assets
 - Provide diversification to other return-seeking assets during normal times

Addressing Policy Risk – TRS

Best Practice	TRS
Conduct asset liability study every 3-5 years or when circumstances change	✓
Review and establish asset allocation targets and ranges annually	✓
Tweak exposures based on current and near-term market opportunities (mid-term views)	✓
Review and model future liquidity needs to determine appropriate amount of illiquid investments	✓
Rebalance the portfolio when ranges are breached and take advantage of short-term opportunities	✓
Diversify between and within asset classes, avoid any unwanted style biases	✓

- TRS has a comprehensive and methodical approach to asset allocation and addressing policy risk

Investment Policy Statement (and equivalents)

- Articulates the fund's long-term investment objectives and the policies and procedures in place to help meet them
- Provides guidance around the risk tolerance and investment beliefs of the Fund and governing bodies
- Outlines how to evaluate the investment program against the stated objectives
- Can help new staff, board and investment/finance committee members get up to speed on the investment program
- Allows the investor to maintain focus on important strategic issues
- Serve as a road map for the fiduciaries and provide guidance through all phases of a market cycle
- Establish roles, responsibilities and procedures

Compliance With Policies

- Board is ultimately responsible for adherence to policies (monitoring) but prudent delegation is the key to success
 - Committees
 - Investment and operations staff
 - Custodian
 - Other service providers
- Having clear and thorough documentation of processes (and delegation) can remove the emotion from decision-making in challenging periods
- Helpful tools for monitoring portfolio policy and guideline compliance
 - ◆ Custodian and third-party monitoring services
 - Requires exhaustive feed of holdings and exposures
 - » When “look-through” not available, governing fund documents are key to managing risk
- Regular monitoring by staff and consultants

Asset Allocation Target and Ranges – A Key Risk Control

TRS of Kentucky - Retirement Annuity Trust as of 9/30/2021

Asset Class	Target	Actual	Low End of Range	Top End of Range	Difference (Sample Dashboard)
Domestic Equity	40%	42%	34%	48%	+2%
Real Estate	7%	6%	4%	10%	-1%
Alternative Investments	7%	7%	4%	10%	0%
International Equities	22%	20%	18%	25%	-2%
Fixed Income	15%	15%	8%	22%	0%
Additional Categories	7%	8%	4%	15%	+1%
Cash	2%	2%	1%	5%	0%

- Strategic asset allocation is the most important determinant of long-term performance
- Maintaining the strategic allocations close to targets is a key risk control
- Rebalancing should be rules based (removing emotion to the extent possible), consistent and well documented, but flexible to accommodate differing liquidity levels and market environments

For illustrative purposes only.

Investment Policy Statement – Other Risk Controls

Asset Classes:

- Clear purpose and benchmark
- Ensure appropriate diversification
- Structure is consistent with strategic purpose and goals established by the asset allocation
- Avoid unwanted/unintended risk and biases
- Measure contributions to relative and total risk
 - Risk modelling
 - Absolute (total risk) and relative risk (active risk)

Individual Portfolios/Managers:

- Have guidelines for each investment manager that includes
 - Clear purpose and benchmark
 - Permissible investments
 - Position and other diversification limits (absolute or vs. benchmark)
 - Leverage limits

Two Schools of Thought on Portfolio Risk

Quantitative Measurements:

- Total Risk Measurements- Standard Deviation, Sharpe Ratio, Value at Risk, etc.
- Relative Risk Measurements – Tracking Error, Information Ratio, Contribution to Risk, etc.

Absolute and Relative Limitations

- Focus on percentage of market value/book relative to a benchmark or on an absolute basis

*Using both **quantitative** and **absolute/relative limits** is the best approach when controlling and measuring portfolio risk in most instances*

Active Risk vs. Absolute Limits Example

Sample Guideline Language:

- A. Manager may not hold more than 5% of the portfolio in single company's common stock as a percentage of market value
- B. Manager may not hold more than 2 times the weight of the specified benchmark in an individual company's common stock as a percentage of market value

Benchmark: Russell 1000 Growth Index (As of 7/31/2021)

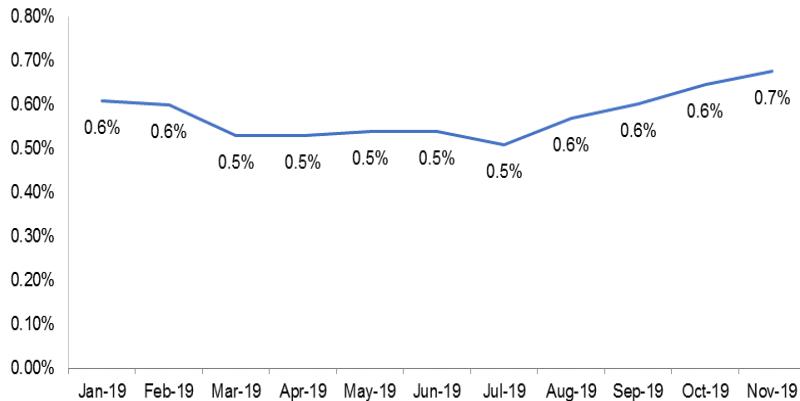
Security	Benchmark Weighting	Guideline Limit A	Guideline Limit B	Delta A - B
Apple	10.5%	5%	21.0%	-16%
Microsoft	9.8%	5%	19.6%	-14.6%
Amazon	6.6%	5%	13.2%	-8.2%
Alphabet	6.2%	5%	12.4%	-7.4%
Facebook	3.9%	5%	7.8%	-2.8%
Total	37%	25%	74%	-49.0%

Guideline language can have a major impact on portfolio diversification and relative vs. absolute risk

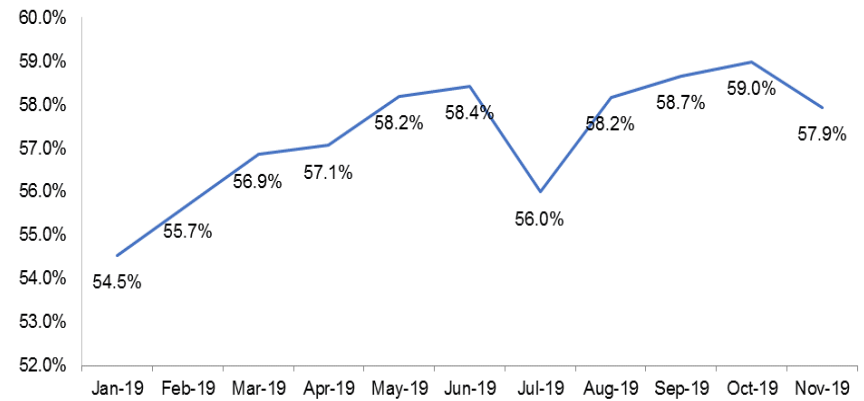
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Track Changes Over Time, Examples

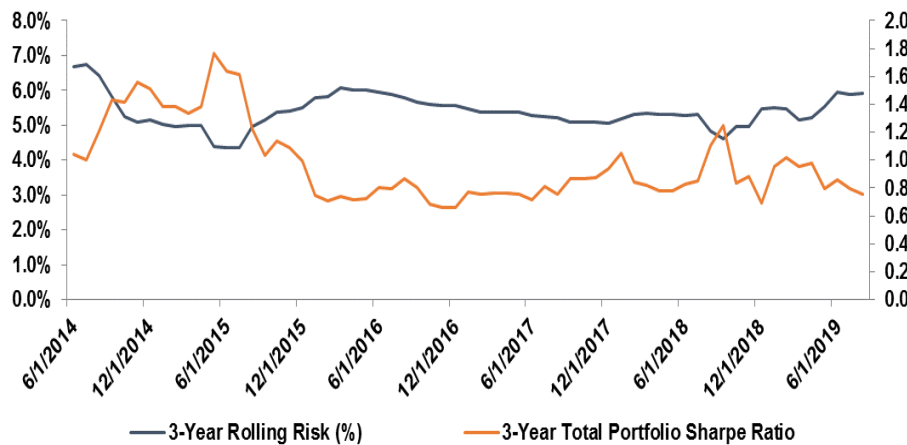
Annualized Predicted Tracking Error - Total Fund



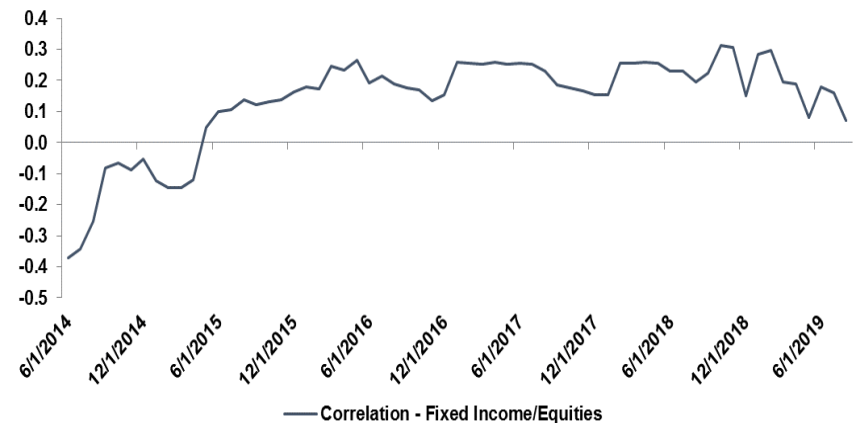
Contribution to Absolute VaR - US Equity



Total Portfolio Risk and Sharpe Ratio



3-Year Correlation



For illustrative purposes only.

Four Key Areas of Operational (Non-Investment) Risk

Fraud

- Purposeful misappropriation
- Collusion
- Employee theft

Blow-Up

- Counterparty risk
- Asset – Liability mis-match
- Inappropriate or poor understanding of leverage
- Potential for style drift

Reputational

- Headline risk
- Costs or losses associated with business deterioration

Alpha Degeneration

- Lower level risks that contribute to slippage
- Trade errors
- Sub-optimal implementation of core or ancillary processes

Operational Due Diligence



Operational Due Diligence

Key Areas



Organizational Structure

- Governance Structure – control, decision making, and oversight
- Organizational Structure – segregation of duties and staffing adequacy/competency
- Key person exposure and succession planning
- Employee Retention and Turnover
- Background checks

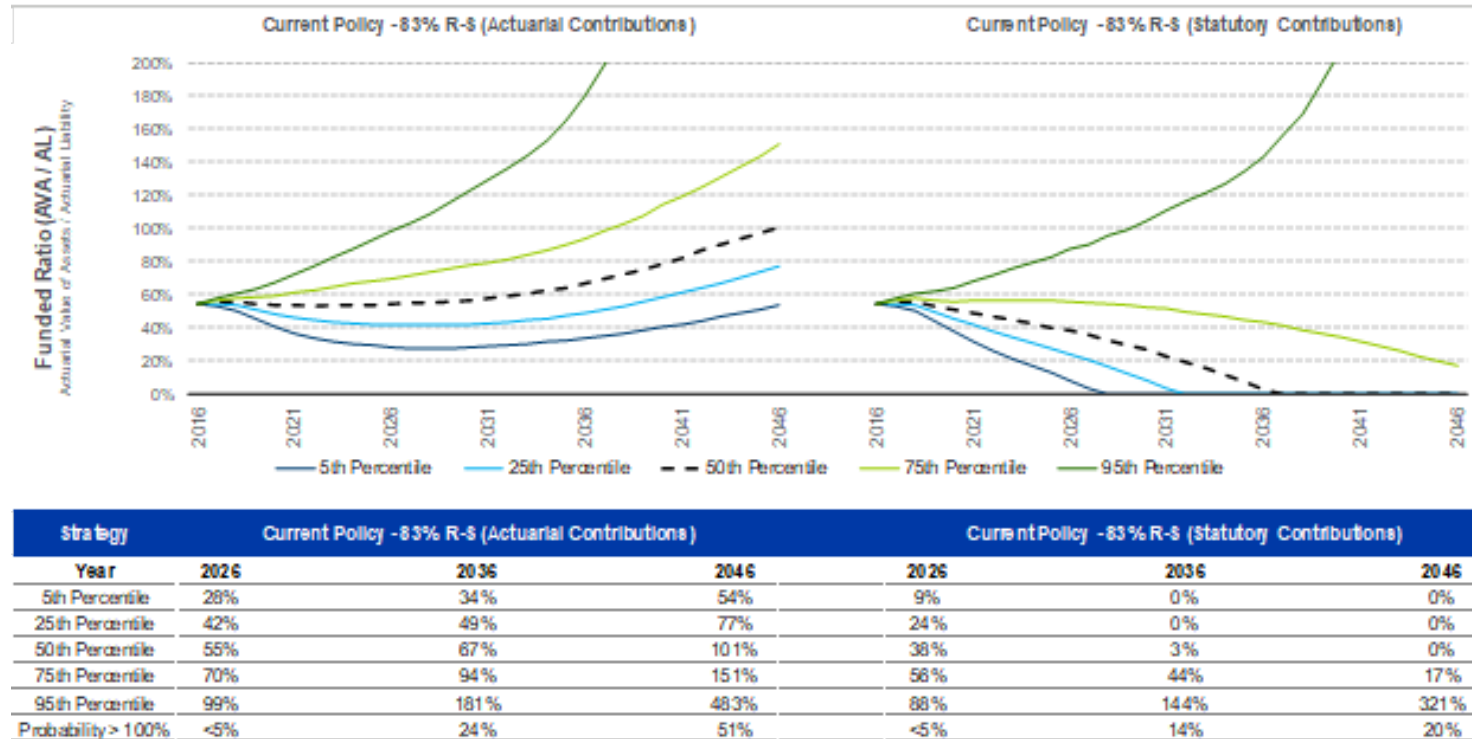
Closing Remarks

- Asset-liability modeling is a key tool in setting long-term strategy and addressing policy risk
- Strategic asset allocation targets, along with rebalancing guidelines, are the most important determinant of long-term performance and achieving fund objectives
- The Investment Policy Statement and portfolio guidelines are an important risk control tool to keep all parties focused on the high-level investment strategy and appropriate risk controls
- A combination of quantitative risk measurement along with percentage risk exposure/limitations is the best overall approach
 - Relative risk to the investment strategy is important to not undermine long-term goals
- Operational risk (non-investment risk) is unrewarded risk that should not be accepted or neglected monitoring and controlling overall risk
 - TRS staff, consultants and legal counsel due diligence and procurement policies and monitoring address operational risk

Appendix

- AL Study output and findings
- Active Risk Model Description and Examples

Asset Liability Study Analysis and Findings for TRS of Kentucky (2017)

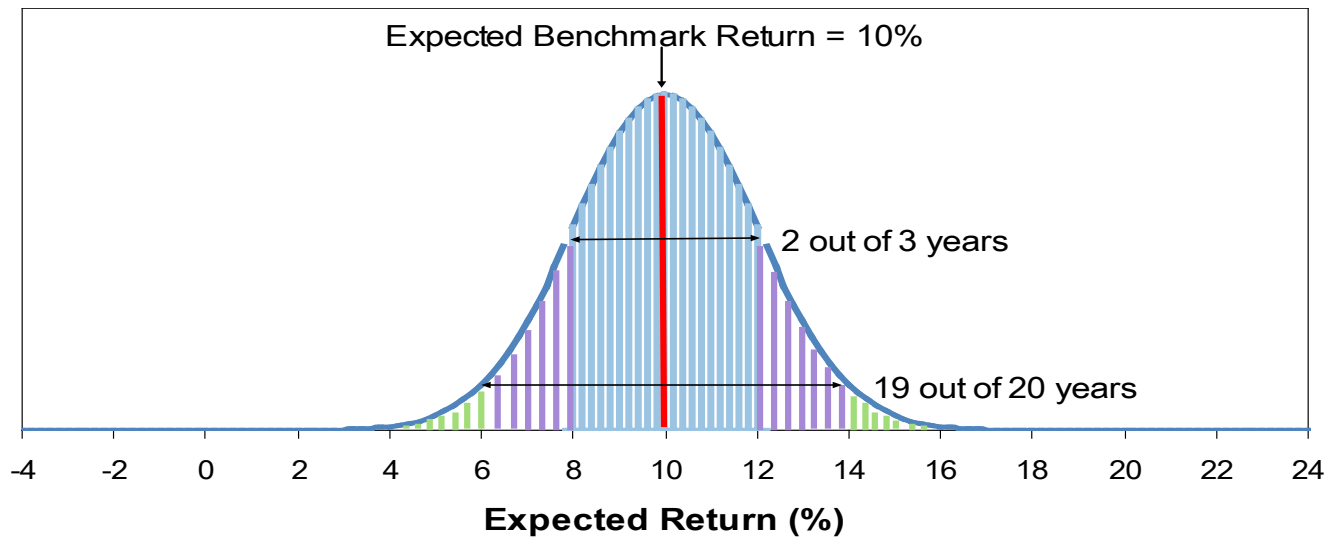


- The 2017 study reconfirmed the level of investment risk TRS was assuming was appropriate given its long-term goals
- The study further emphasized the need to provide for appropriate contributions beyond what was required by statute to meet obligations over time

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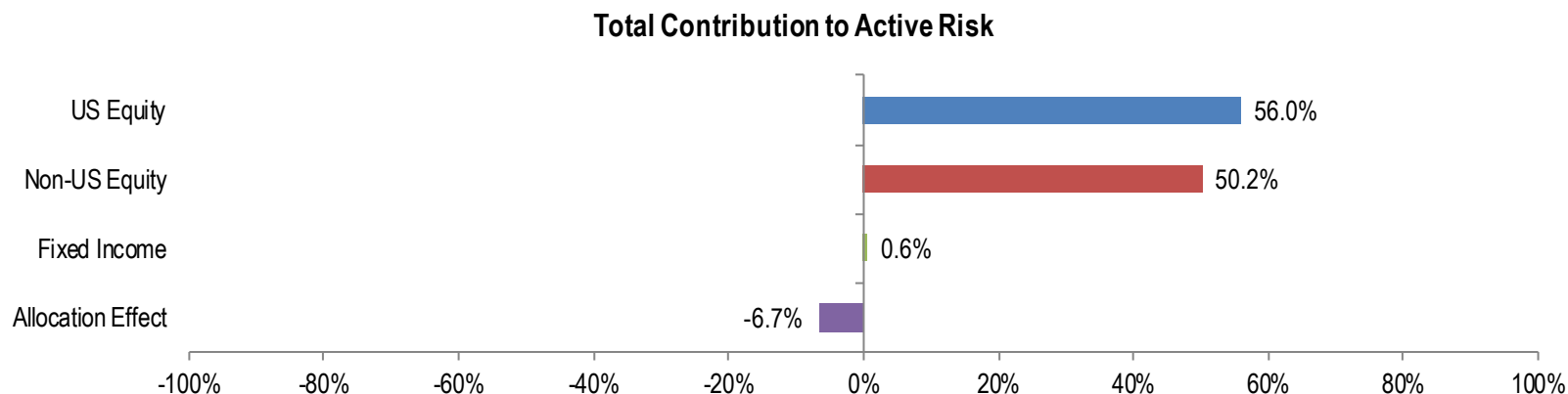
Example of Active Risk

- Example of Active Risk
 - Expressed as potential return range around the benchmark return – example $\pm 2.0\%$
 - Active risk of 2.0% means:
 - If the benchmark is expected to return $+10\%$, the portfolio return is expected to be between $8-12\%$ in 2 out of 3 years (67% of the time)
 - Similarly, the portfolio return is expected to be between $6-14\%$ in 19 out of 20 years (95% of the time)



For illustrative purposes only.

TRS of Kentucky – Total Fund Active Risk Analysis



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%
Total Fund	\$ 13,578	100.0%	100.0%	1.60%	106.7%	-6.7%	100.0%

For illustrative purposes only.

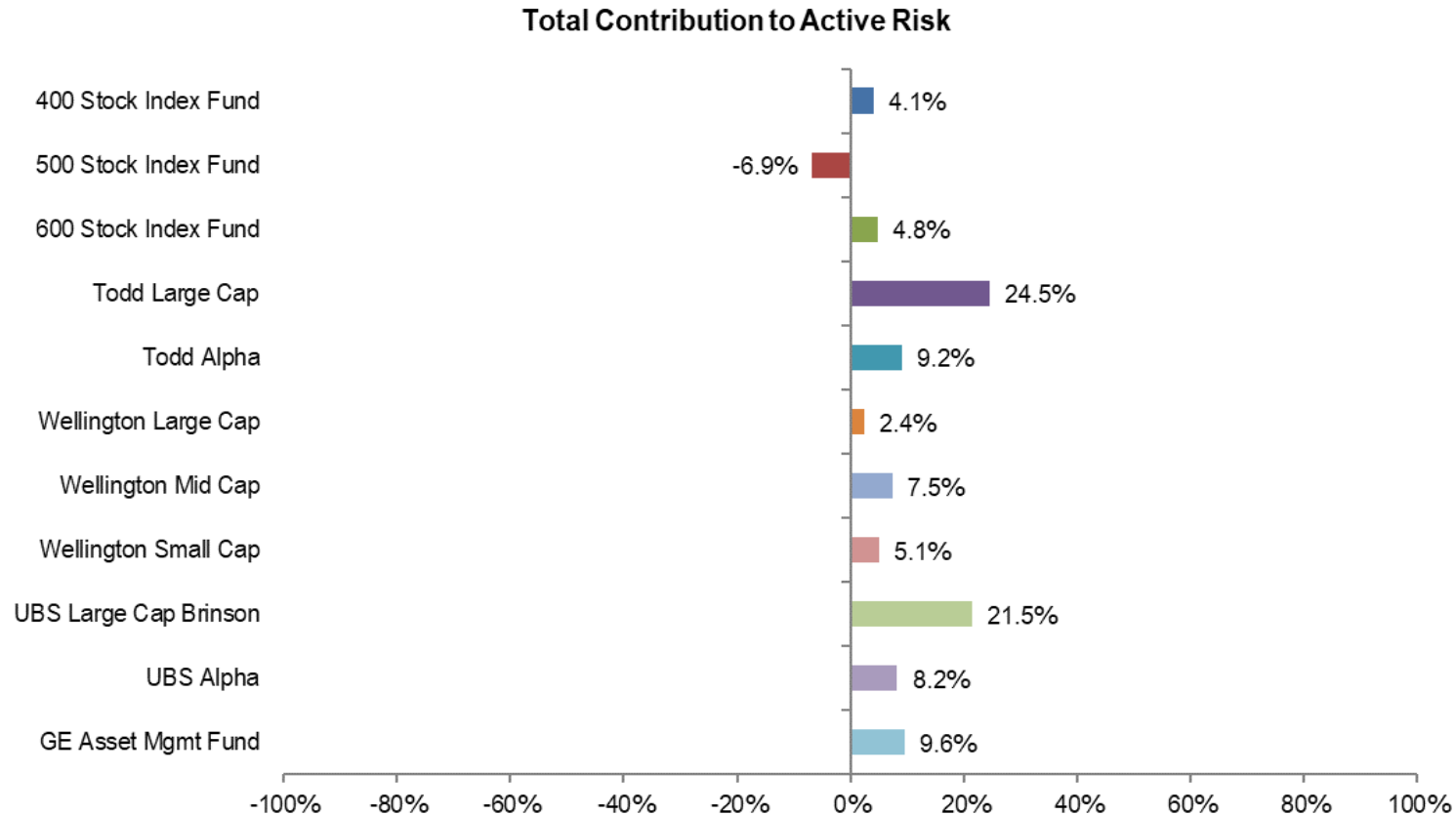
TRS of Kentucky – U.S. Equity Asset Class Example

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

- Todd Large Cap Value and UBS Large Cap contribute the highest percentage to active risk (46%)
- Style bias (misfit risk) is modest and accounts for approximately 20% of active risk

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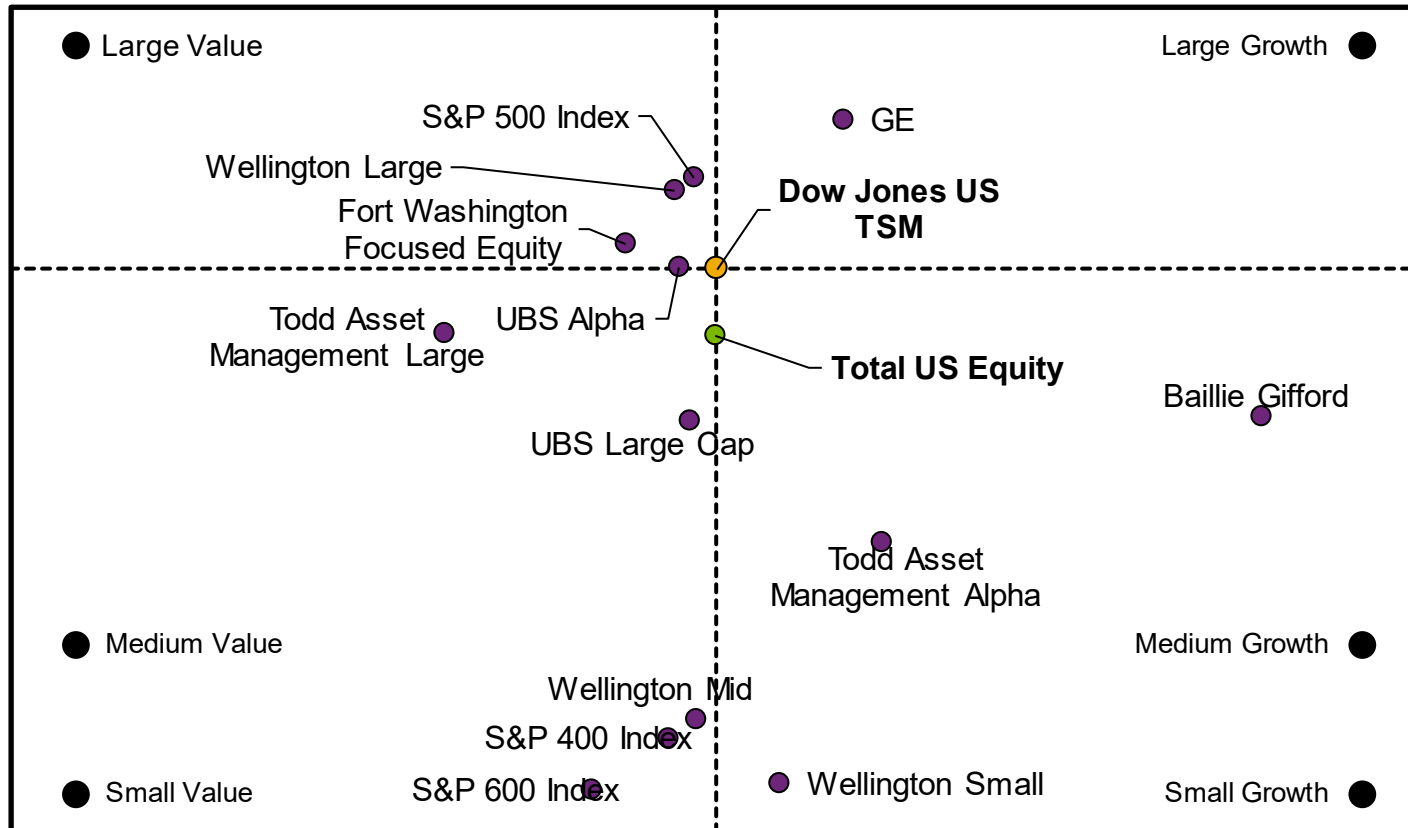
TRS of Kentucky - Asset Class Risk Model Example



- The graph above shows each managers percentage contribution to the asset class active risk of 2%

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TRS – Holdings Based Style Analysis (as of 9/30/2021)

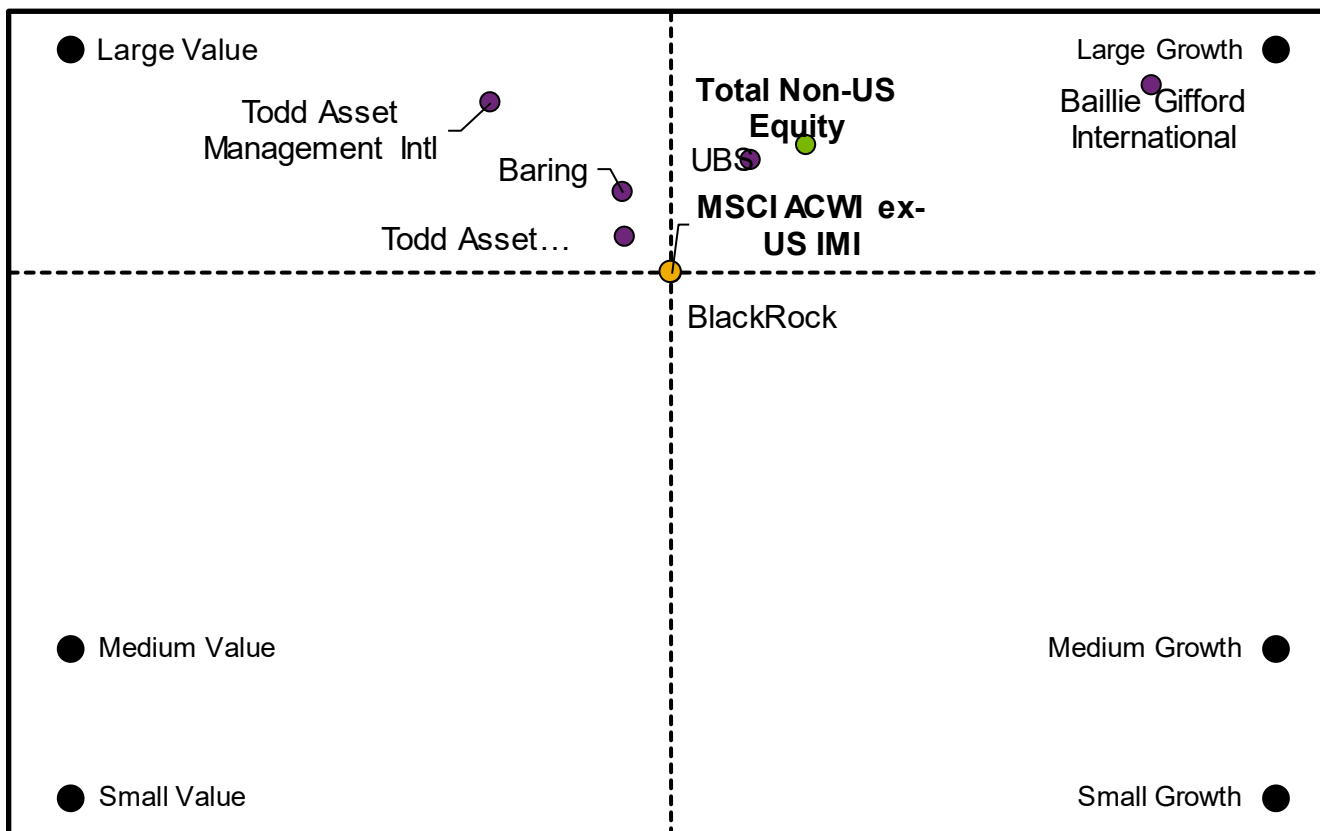


- The graph above shows each managers percentage contribution to the asset class active risk of 2%

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TRS – Holdings Based Style Analysis (as of 9/30/2021)



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