NORTH Dakota
Be Legendary. | State Investment Board
RETIREMENT & INVESTMENT

Investment Committee
Tuesday, November 7, 2023, 9:00 a.m.
Virtual Only
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AGENDA

I.   **CALL TO ORDER AND ACCEPTANCE OF AGENDA -** *(Committee Action)*

II.   **ACCEPTANCE OF MINUTES (October 23, 2023)** – *(Committee Action)*

III.   **BENCHMARK MEMO (45 minutes) –** *(Committee Action)* – *Mr. Anderson and Ms. Neill, Verus*

IV.   **PRIVATE EQUITY AND REAL ESTATE UPDATE (45 minutes) -** *(Information)* – *Mr. Moss and Mr. Ziettlow*

(Break)

V.   **REAL ESTATE STRATEGY UPDATE[1] (30 minutes) -** *(Information)* – *Mr. Moss and Mr. Ziettlow*

VI.   **MACHINE LEARNING & INVESTMENTS (30 minutes) –** *(Information)* - *Mr. Posch*

VII.   **DISCUSSION**

VIII.   **ADJOURNMENT**

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[1] Executive Session pursuant to N.D.C.C. 44-04-19.2, 44-04-18.4 (2)(a) and NDCC 44-04-18.4(2)(d) to review and discuss confidential commercial information and trade secrets.

STATE INVESTMENT BOARD
INVESTMENT COMMITTEE MEETING
MINUTES OF THE
October 23, 2023, MEETING

MEMBERS PRESENT:	Thomas Beadle, State Treasurer, Chair
	Joseph Heringer, Trust Lands Commissioner, Vice Chair
	Scott Anderson, CIO
	Eric Chin, Deputy CIO
	Dr. Prodosh Simlai, External Representative
	Dr. Ruilin Tian, External Representative
STAFF PRESENT:	Derek Dukart, Investment Officer
	Jennifer Ferderer, Fiscal Investment Admin Assistant
	Missy Kopp, Executive Assistant
	George Moss, Sr. Investment Officer
	Jan Murtha, Executive Director
	Chad Roberts, Deputy Executive Director
	Matt Posch, Sr. Investment Officer
	Ryan Skor, CFO/COO
	Nitin Vaidya, Chief Risk Officer
	Jason Yu, Risk Officer
	Lance Ziettlow, Sr. Investment Officer
GUESTS:	Alexander Browning, Callan
	Craig Chaikin, Callan
	Members of the public

CALL TO ORDER:

Treasurer Beadle called the State Investment Board (SIB) Investment Committee (IC) meeting to order at 9:02 a.m. on Monday, October 23, 2023. The meeting was held virtually.

The following Investment Committee members were present representing a quorum, Mr. Anderson, Treasurer Beadle, Mr. Chin, Commissioner Heringer, Dr. Simlai, and Dr. Tian.

AGENDA:

The agenda was considered for the October 23, 2023, meeting.

IT WAS MOVED BY MR. CHIN AND SECONDED BY DR. SIMLAI AND CARRIED BY A VOICE VOTE TO APPROVE THE AGENDA FOR THE OCTOBER 23, 2023, MEETING AS DISTRIBUTED.

AYES: COMMISSIONER HERINGER, MR. ANDERSON, MR. CHIN, DR. TIAN DR. SIMLAI, AND TREASURER BEADLE
NAYS: NONE
MOTION CARRIED

MINUTES:

The minutes were considered for the September 8, 2023, meeting.

IT WAS MOVED BY COMMISIONER HERINGER AND SECONDED BY MR. ANDERSON AND CARRIED BY A VOICE VOTE TO APPROVE THE MINUTES FOR THE SEPTEMBER 8, 2023, MEETING AS DISTRIBUTED.

AYES: DR. SIMLAI, COMMISSIONER HERINGER, MR. CHIN, DR. TIAN MR. ANDERSON, AND TREASURER BEADLE
NAYS: NONE
MOTION CARRIED

PUBLIC MARKETS FUNDS MANAGEMENT

Mr. Chin reviewed information on the public equity portfolio for the U.S. and internationally. In 2022, both the U.S. and international markets suffered but rebounded in 2023, noting companies in the technology and communication sectors have done well. Mr. Chin reviewed equity manager performance, noting LA Capital's outstanding performance and continued excellence.

Mr. Dukart provided an overview of fixed income markets, noting Bloomberg U.S High Yield has recovered from 2022, unlike Bloomberg U.S. Aggregate Index, which is still trending downward. The U.S Treasury Yield Curve has continued to shift up since January 2022. Mr. Dukart reviewed manager performance, noting plans to bring an in-depth attribution of manager performance to the Investment Committee in the future.

Mr. Posch provided an overview on an internally generated analytics tool ("the tool,") that analyzes and conducts initial screens on investment managers, calculates returns-based statistics across multiple time frames, and can customize groupings to allow for comparison of groups against individual managers.

The Committee recessed at 9:52 a.m. and reconvened at 10:00 a.m.

INTERNAL DIRECT INVESTMENT STRATEGY INTRO

Mr. Anderson reviewed the Internal Direct Investment Strategy, which would give RIO staff the ability to manage assets while lowering cost, increasing returns, and decreasing risk. The strategies to implement are Optimal Implementation, Exposure Management, Enhanced Rebalancing, Enhanced Liquidity, and Enhanced Indexing. Mr. Anderson outlined the need to enhance fund after cost return for risk at a prudent level of risk for the funds in the care of RIO and outlined the strategies to achieve the goal. Mr. Anderson shared information for the sequence of capability which consists of overlaying cash, rebalancing internally, offsetting exposures, internal indexing, and enhanced indexing. Lastly, Mr. Anderson shared the talent management necessary to implement the strategies shared in the presentation, noting the strategy and structure would evolve with the size of the program.

PRIVATE MARKETS POOL HARMONIZATION

IT WAS MOVED BY COMMISIONER HERINGER AND SECONDED BY DR. SIMLAI AND CARRIED BY A ROLL CALL VOTE TO ENTER INTO EXECUTIVE SESSION TO DISCUSS CONFIDENTIAL COMMERCIAL INFORMATION AND CONTRACT NEGOTIATING STRATEGY PURSUANT TO NDCC 44-04-19.2, AND 44-04-18.4 (1), AND 44-04-19.1.

AYES: COMMISSIONER HERINGER, MR. ANDERSON, DR. SIMLAI, MR. CHIN, AND TREASURER BEADLE
NAYS: NONE
ABSENT: DR. TIAN
MOTION CARRIED

The executive session started at 11:05 a.m. and ended at 11:38 a.m. and was attended by Committee members, Mr. Dukart, Ms. Ferderer, Ms. Kopp, Mr. Moss, Ms. Murtha, Mr. Posch, Mr. Vaidya, Mr. Yu, and Mr. Ziettlow.

IT WAS MOVED BY COMMISIONER HERINGER AND SECONDED BY DR. SIMLAI FOR AN ISSUANCE OF AN RFP TO HIRE A VALUATION CONSULTANT TO DETERMINE THE FAIR MARKET VALUE OF RELEVANT PRIVATE MARKET ASSETS FOR THE PRIVATE ASSETS HARMONIZATION PROJECT.

AYES: COMMISSIONER HERINGER, MR. ANDERSON, DR. SIMLAI, MR. CHIN, AND TREASURER BEADLE
NAYS: NONE
ABSENT: DR. TIAN
MOTION CARRIED

DISCUSSION

The Committee discussed an active RFP. The investment team was under the assumption that this RFP was following the appropriate exemption rules, but when IT and legal were consulted, the Attorney General's office deemed this RFP as a large IT project, instead of an investment procurement project; therefore, the RFP will go through a normal North Dakota procurement process. Mr. Anderson expects the timeline to be extended months beyond the original schedule, but a definite timeline is not yet available. When more information is available, it will be shared with the Investment Committee.

With no further business to come before the Investment Committee, Treasurer Beadle adjourned the meeting at 11:42 a.m.

Prepared by:

Jennifer Ferderer, Assistant to the Board

Memorandum

To:	Members of the Board North Dakota State Investment Board
From:	Verus
Date:	November 17, 2023
RE:	Strategic Benchmark Recommendations

The purpose of this memorandum is to provide the North Dakota State Investment Board ("SIB") benchmark recommendations for the strategic asset classes which comprise the asset allocation policies for the respective Plans under the SIB's purview.

Summary of Recommendations

Asset Class	Current Benchmark	Recommended Benchmark
Total Fund	Custom asset class weighted policy index	**Custom asset class weighted policy index**
Total Equity	Roll-up of underlying strategy benchmarks	**Roll-up of asset class strategy benchmarks**
Total Public Equity	Roll-up of underlying strategy benchmarks	**MSCI ACWI IMI**
U.S. Equity	Custom weighted policy index (85% Russell 1000/ 15% Russell 2000)	**Russell 3000**
Non-U.S. Equity	MSCI ACWI World ex-US IMI	**MSCI ACWI World ex-US IMI**
Private Equity	Roll-up of underlying strategy benchmarks	**MSCI ACWI IMI + 200 bps**
Total Income	No benchmark	**Roll-up of asset class strategy benchmarks**
Inv. Grade Fixed Income	Bloomberg Aggregate Bond Index	**Bloomberg Aggregate Bond Index**
Non-Inv. Grade Bonds	Bloomberg HY 2% Issuer Constrained	**Bloomberg HY 2% Issuer Constrained**
Private Credit	No benchmark	**Bloomberg HY 2% Issuer Constrained**
Private Credit (Legacy Fund)	No benchmark	**Morningstar LSTA Leveraged Loan Index + 100 bps**
Total Real Assets	No benchmark	**Roll-up of asset class strategy benchmarks**
Core Real Estate	NCREIF NPI Total Index	**NCREIF ODCE**
Timber	NCREIF Timberland Index	**NCREIF Timberland Index**
Infrastructure	50%/50% NCREIF ODCE/CPI-U (lagged 1 Qtr)	**NCREIF ODCE + 100 bps**
TIPS (Workforce Safety and Insurance Fund)	Bloomberg US Government Inflation Linked Bond Index	**Bloomberg US Government Inflation Linked Bond Index**
Short Term Fixed Income	Bloomberg 1-3 Year US G/C Index	**Bloomberg 1-3 Year US G/C Index**
In-State Equity	No benchmark	**Benchmark against itself**
In-State Infrastructure Loan	No benchmark	**Benchmark against itself**
BND CD Match Program	No benchmark	**Benchmark against itself**
Cash	90-day T-Bills	**90-day T-Bills**

Overview

Selecting benchmarks is among the most important decisions the SIB makes behind setting asset allocation policy for the Plans under its purview. Benchmarks provide the mechanism through which to evaluate the success of the respective investment program in meeting its stated policy objectives. They provide the link between expectations and success.

Benchmarks serve essential functions in the realm of investment program oversight for fiduciaries. From a policy viewpoint, they reflect the desired asset class risk, or 'beta' exposures. The overarching goal of SIB's benchmarks should be to provide the SIB a measurement tool in order to evaluate and understand the degree to which the Plans, asset classes and strategies are successful in meeting policy objectives over both the short term (i.e., 3 or less years) and long term (i.e., 5 or more years).

Benchmarks provide insight into how capital markets are performing, in general, and help the Board understand how individual asset classes, sub-asset classes and strategies are contributing to overall results. The qualities that are desirable in benchmarks used to evaluate investment performance are typically[1]:

— Representative of the opportunity set
— Investable and known and set *ex ante* (before the fact)
— Transparent
— Measurable
— Unambiguous

Other desirable qualities are:

— Consistent with the proxies used in asset allocation policy development
— Reflective of risk as well as the return of the asset class
— Available in a timely, cost-efficient manner
— Commonly used by public fund and other institutional investor peers

Asset classes are defined by the asset allocation policy; thus, the benchmarks for asset classes need to be reflective of the benchmarks used in the policy setting process. The goal of the SIB should be to ensure SIB's benchmarks meet industry standards for benchmark quality and that these benchmarks fairly and accurately represent the asset classes and strategies employed in the various Plans. Benchmarks for the most liquid asset classes (Global Public Equities, Public Fixed Income and Cash) tend to meet all of the benchmark quality criteria. For Private Equity, Private Credit, Real Estate and Real Assets, some of the above criteria cannot be fully met and choosing which items to emphasize entails subjective judgement, including the tradeoff between short-term tracking error and long-term compatibility with the desired outcomes.

The recommended strategic asset class benchmarks are summarized in Exhibit 1 below. The main rationale in support of these recommended benchmarks is that the respective benchmarks provide the best representation of capital market "beta" for that market segment as well as reflect the proxies that were employed in the asset allocation policy development process. Additionally, most of the recommended benchmarks are widely utilized by SIB's peers for those same market segments. The recommended public markets benchmarks are all published benchmarks which meet the preferred benchmark quality standards articulated earlier in this memorandum. Lastly, the benchmarks are simple and easy to understand. Exhibit 1 summarizes how the respective recommended benchmarks align with the aforementioned benchmark quality criteria.

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[1] While these characteristics align with benchmark standards published by the CFA Institute, as a public pension plan, SWIB is not, and is not required to be, GIPS compliant.

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Exhibit 1: Summary of Recommended Public Markets Strategic Asset Class Benchmarks

Asset Class	Current Benchmark	Recommended Benchmark	Benchmark Quality Summary of Recommended Benchmarks (Yes/ No/ NA (Not Applicable))					
			Opportunity Set / Investment Guideline Alignment	Investable and Known Ex-Ante	Transparent/ Measurable/ Unambiguous/ Available in a Timely, Cost Efficient Manner	Consistent with Proxies in Asset Allocation Policy	Reflective of Asset Class or Portfolio Risk/Return	Commonly Used by Similar Investors
Total Fund	Custom asset class weighted policy index	Custom asset class weighted policy index	N/A	No	Yes	N/A	N/A	Yes
Total Equity	Roll-up of underlying strategy benchmarks	Roll-up of asset class strategy benchmarks	N/A	No	Yes	N/A	N/A	Yes
Total Public Equity	Roll-up of underlying strategy benchmarks	MSCI ACWI IMI	Yes	Yes	Yes	Yes	Yes	Yes
U.S. Equity	Custom weighted policy index (85% Russell 1000/ 15% Russell 2000)	Russell 3000	Yes	Yes	Yes	Yes	Yes	Yes
Non-U.S. Equity	MSCI ACWI World ex-US IMI	MSCI ACWI World ex-US IMI	Yes	Yes	Yes	Yes	Yes	Yes
Private Equity	Roll-up of underlying strategy benchmarks	MSCI ACWI IMI + 200 bps	No	No	Yes	Yes	No	Yes
Total Income	No benchmark	Roll-up of asset class strategy benchmarks	N/A	No	Yes	N/A	N/A	Yes
Inv. Grade Fixed Income	Bloomberg Aggregate Bond Index	Bloomberg Aggregate Bond Index	Yes	Yes	Yes	Yes	Yes	Yes
Non-Inv. Grade Bonds	Bloomberg HY 2% Issuer Constrained	Bloomberg HY 2% Issuer Constrained	Yes	Yes	Yes	Yes	Yes	Yes
Private Credit	No benchmark	Bloomberg HY 2% Issuer Constrained	Yes	Yes	Yes	N/A	No	Yes
Private Credit (Legacy Fund)	No benchmark	Morningstar LSTA Leveraged Loan Index + 100 bps	No	No	Yes	Yes	No	Yes
Total Real Assets	No benchmark	Roll-up of asset class strategy benchmarks	N/A	No	No	N/A	N/A	Yes
Core Real Estate	NCREIF NPI Total Index	NCREIF ODCE	Yes	No	No	Yes	Yes	Yes
Timber	NCREIF Timberland Index	NCREIF Timberland Index	Yes	No	No	Yes	Yes	Yes
Infrastructure	50%/50% NCREIF ODCE/CPI-U (lagged 1 Qtr)	NCREIF ODCE + 100 bps	No	No	Yes	N/A	No	No
TIPS (Workforce Safety and Insurance Fund)	Bloomberg US Government Inflation Linked Bond Index	Bloomberg US Government Inflation Linked Bond Index	Yes	Yes	Yes	Yes	Yes	Yes
Short Term Fixed Income	Bloomberg 1-3 Year US G/C Index	Bloomberg 1-3 Year US G/C Index	Yes	Yes	Yes	Yes	Yes	Yes
In-State Equity	No benchmark	Benchmark against itself	Yes	No	Yes	N/A	Yes	Yes
In-State Infrastructure Loan	No benchmark	Benchmark against itself	Yes	No	Yes	N/A	Yes	Yes
BND CD Match Program	No benchmark	Benchmark against itself	Yes	No	Yes	N/A	Yes	Yes
Cash	90-day T-Bills	90-day T-Bills	Yes	Yes	Yes	Yes	Yes	Yes

Rationale Supporting Recommended Benchmarks

Public Equity – Three new benchmarks are being proposed for the Equity asset class.

- *Total Equities* – The current benchmark is a roll-up of the individually managed account benchmarks within the Equity asset class. This approach is non-standard in the industry for this asset class. Instead, Verus recommends a benchmark which is a roll-up of the two Equity sub-asset class (i.e., Public Equities and Private Equities) benchmarks. This represents a more industry standard approach to benchmarking an aggregate asset class.
- *Total Public Equity* – The recommended Total Public Equity benchmark is the MSCI ACWI IMI, which is the broadest published global equity benchmark and is widely used by SIB's peers to benchmark their respective global (or total) public equity asset classes.
- *U.S. Equity* – For U.S. Equities, Verus recommends adoption of the Russell 3000, the broadest published U.S. equity benchmark and which is also widely used by SIB's peers to benchmark their respective U.S. equity sub-asset class portfolios.

These two recommended sub-asset class benchmarks represent a best practices consideration under prevailing investment theory that the broad capital market benchmarks represent the best 'portfolio' in terms of return to risk relationship. Additionally, these benchmarks are typical proxies employed for these sub-asset classes within the asset allocation policy setting process, so they provide for good alignment with the Plans' various asset allocation policy targets.

Verus⁷⁷

Private Equity – Verus' recommended benchmark, MSCI ACWI IMI + 2%, represents an industry standard strategic benchmark for Private Equities. The majority of state-level pension plans employ benchmarks using this construct (i.e., a public markets published benchmark plus some premium to capture the additional risks assumed from private markets investing activities). The current benchmark is more reflective of an implementation, or bottom-up, benchmark and is not typically employed by peers. The recommended benchmark reflects the fact that Private Equity is viewed by SIB as an alternative exposure to public equities. Thus, we are recommending the public equities benchmark, plus a premium to capture the financial engineering, leverage and illiquidity risks of the underlying companies, as the Private Equity benchmark which will then enable the Board to evaluate the strategic decision to employ Private Equity versus public market equities. While the recommended benchmark does not capture all the qualities desired in a benchmark, it is consistent with private equity proxy used in the asset allocation policy setting process and is typically employed by a majority of SIB's peers.

Public and Private Markets Fixed Income – Verus recommends three benchmark changes in this asset class.

- *Total Fixed Income* – There is currently no benchmark for the overall asset class. Verus recommends a roll-up of the three asset class strategy benchmarks, similar to the recommended Total Equities benchmark.
- *Private Credit (ex-Legacy Fund)* – Currently, there is no benchmark for this sub-asset class. Verus recommends the Bloomberg HY 2% issuer Constrained index for this sub-asset class. This recommended benchmark reflects the fact that Private Credit is viewed as an alternative exposure to public market non-investment grade bonds. Thus, we are recommending the non-investment grade bonds benchmark as the Private Credit benchmark as the Board should regularly be monitoring and evaluating the decision to strategically employ Private Credit versus public market non-investment grade bonds.
- *Private Credit (Legacy Fund)* – Currently, there is no benchmark for this asset class. However, it is a discreet, strategic exposure within the Legacy Fund asset allocation policy. Thus, Verus is recommending an industry standard benchmark for this asset class, the Morningstar LSTA Leveraged Loan Index + 100 basis points. Similar to the recommended benchmark for Private Equity, this benchmark enables the Board to evaluate the decision to employ a private markets asset class versus a public markets alternative.

Real Assets – Verus recommends no change to the current Timber or TIPS sub-asset class benchmarks. However, we recommend adoption of new benchmarks for the remaining two Real Assets sub-asset classes (Core Real Estate and Infrastructure).

- *Core Real Estate* – The current benchmark is a non-standard benchmark in that it is an aggregation of the returns of individual real estate properties. The recommended benchmark is a pooled benchmark comprised of institutional, managed Real Estate commingled funds similar to the SIB's real estate portfolio. The recommended benchmark, NCREIF ODCE (i.e., Open-end Diversified Core Equity), is a capitalization-weighted, time-weighted return series of open-end, diversified core real estate funds. Thus, it better represents the core real estate universe and performance of the asset class. It is the most widely employed Core Real Estate benchmark by SIB's peers and is the asset class proxy employed in the typical asset allocation policy setting process.
- *Infrastructure* – The current benchmark is a non-standard benchmark that is made complex through the incorporation of a lagged CPI return. The CPI is non-investable and Core Real Estate is not generally used as a proxy for infrastructure by SIB's peers. The difficulty with

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Infrastructure is that it is a relatively nascent sub-asset class and there currently does not exist a widely accepted 'industry standard' benchmark. A public Listed Infrastructure benchmark is often employed as both an asset class proxy in the asset allocation policy setting process as well as an asset class benchmark. However, SIB is unique in that it has a well-developed Infrastructure investment program, which is ahead of most peers. Given the existence of multiple strategies and the fact that the program was developed to be income oriented with a return/risk profile similar to a 75%/25% Core/Value-add Real Estate program. Thus, Verus is recommending the same benchmark as for SIB's Core Real Estate program (NCREIF ODCE) plus a 100 basis points premium to capture both the value-added component and the idiosyncrasies of an infrastructure portfolio. While imperfect, the benchmark does capture the strategic objective of this sub-asset class (real income generation), which is the goal for the strategic benchmarks being recommended to the Board.

In-State Investments – The In-State investment program is relatively new and in the process of being built. Additionally, in-state investments are idiosyncratic in nature and do not lend themselves to traditional benchmarks, particularly at the very immature stage. Thus, Verus recommends to benchmark these investments against themselves in the initial years. Benchmarking idiosyncratic assets against themselves is not uncommon in institutional investments. Benchmarks should be re-visited every 3 years or so as a matter of industry best practice. At the next strategic benchmark review, these three program components will be evaluated to determine what alternative benchmarks may be appropriate to consider based upon the composition of the respective investment portfolios at that time.

While the Board does not currently set asset allocation policy for total asset class exposures (i.e., Total Equities, Total Fixed Income and Total Real Assets), we believe that all measurable asset class exposures should be benchmarked and monitored. Thus, we recommend that benchmarks be adopted at these total asset class levels. The respective benchmarks would simply be roll-ups of the underlying sub-asset class strategy benchmarks. The Total Fund benchmark for each plan would continue to be a custom asset class weighted benchmark based upon the respective Plan's asset allocation policy as articulated in their investment policy statement ("IPS"). This would serve as the policy benchmark against which to measure total fund actual performance and the respective Plan liability discount rate or real return objective, to the extent one exists and is incorporated within the respective IPS.

Verus additionally recommends that each Plan's investment policy statement be amended to reflect the strategic benchmarks for each asset class and sub-asset class as summarized in Exhibit 1. Given the statement earlier that benchmark selection is an important fiduciary decision, it is a best practice to articulate asset class and sub-asset class benchmarks within the investment policy statement. This is because the investment policy statement should provide a transparent 'road map' of the Board's decision-making processes and how it implements its fiduciary duties; in this case, the duty to regularly conduct investment program monitoring and evaluation versus policy objectives.

Private Equity and Real Estate Update

INVESTMENT COMMITTEE
November 7, 2023

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Agenda

Private Markets Overview

- Allocations by pool and Strategy Overview
- Update on recent private equity commitments

Private Equity

- Market commentary
- Allocations by strategy and geography

Real Estate

- Market commentary
- Overview of real estate investment strategies
- Real estate allocations by pool and strategy

Historical performance as of June 30, 2023, unless noted otherwise

Private Markets Overview & Strategy

- Through bottoms up analysis, seek to partner with the best managers globally that we can access.

- Seek consistency while also being cognizant of prevailing conditions.

- Develop valuable investment trade-offs of return, risk and liquidity with buy-versus-sell decisions as drivers.

- Geographic exposures would roughly equate to the opportunity set.

Private Equity
- Primarily middle-market buyout
- <= 25% venture capital

Private Credit
- Primarily senior/direct lending
- <= 25% distressed

Real Assets
- Focus on core/core-plus real estate, consider more value-add/opportunistic
- De-emphasize infrastructure and other real assets

Private Markets Overview by Asset Pool as of June 30, 2023

	Consolidated Pension					Consolidated Insurance					Legacy Fund			
	Market Value	Actual	Policy	+/-		Market Value	Actual	Policy	+/-		Market Value	Actual	Policy	+/-
Private Equity	$ 751	10.30%	8.20%	2.10%		-	-	-	-		$ -	0.00%	7.00%	-7.00%
In-State Private Equity	-	-	-	-		-	-	-	-		$ 22	0.25%	3.00%	-2.75%
Private Credit*	$ 512	7.00%	7.00%	0.00%		$ 51	1.70%	1.70%	0.00%		$ 441	4.90%	10.00%	-5.10%
Real Assets	$ 1,351	18.50%	18.50%	0.00%		$ 204	6.90%	6.60%	0.30%		$ 957	10.63%	10.00%	0.63%
Real Estate	$ 830	11.40%	10.10%	1.30%		$ 112	3.80%	3.50%	0.30%		$ 464	5.47%	5.00%	0.47%
Infrastructure/Other	$ 521	7.10%	8.40%	-1.30%		$ 92	3.10%	3.10%	0.00%		$ 493	5.15%	5.00%	0.15%

* In the Pension and Insurance Pools, private credit is part of the below investment grade credit allocation. Private credit represents 29.9% of the Pension Pool's global fixed income allocation, and private credit represents 3.9% of the Insurance Pool's global fixed income program.

Private Equity Commitments Update

- The initial private equity commitments are in-line with the long-term private equity strategy.

- Altor is a middle market manager focused on the Nordic region (Sweden, Finland, Denmark and Norway) and DACH region (Germany, Austria and Switzerland) of Europe.
  - €50 million commitment (€24 million to Pension Pool and €26 million to Legacy Fund).

- Kelso is a middle market manager focused on North America.
  - $50 million commitment ($24 million to Pension Pool and $26 million to Legacy Fund).

- Target a commitment pace in the Legacy Fund that gets to the 7% target allocation over a five to seven years.

- The Pension Pool is currently over allocated to private equity by approximately 2%. We are working to harmonize the managers across the pools which will reduce the over allocation.
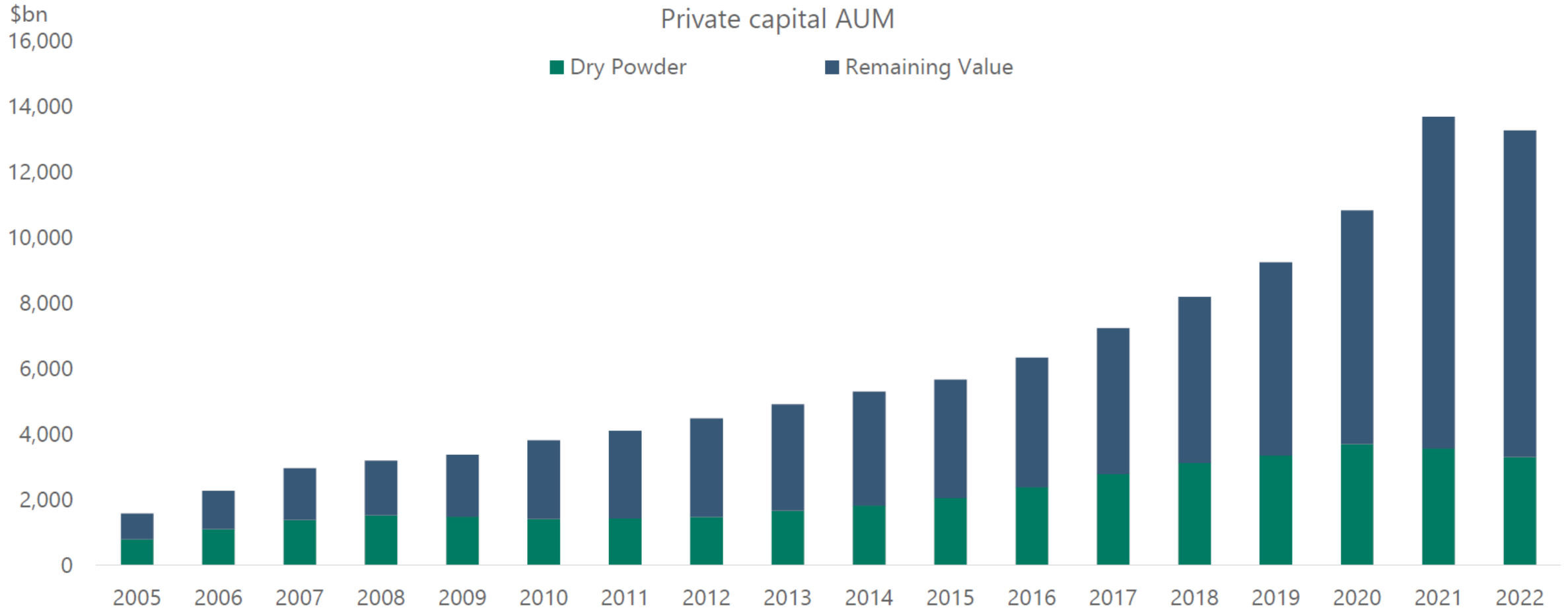
Private Equity Overview

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Private Equity Fund Raising is Down

Private Equity fundraising activity

■ Capital raised — Fund count (RHS)
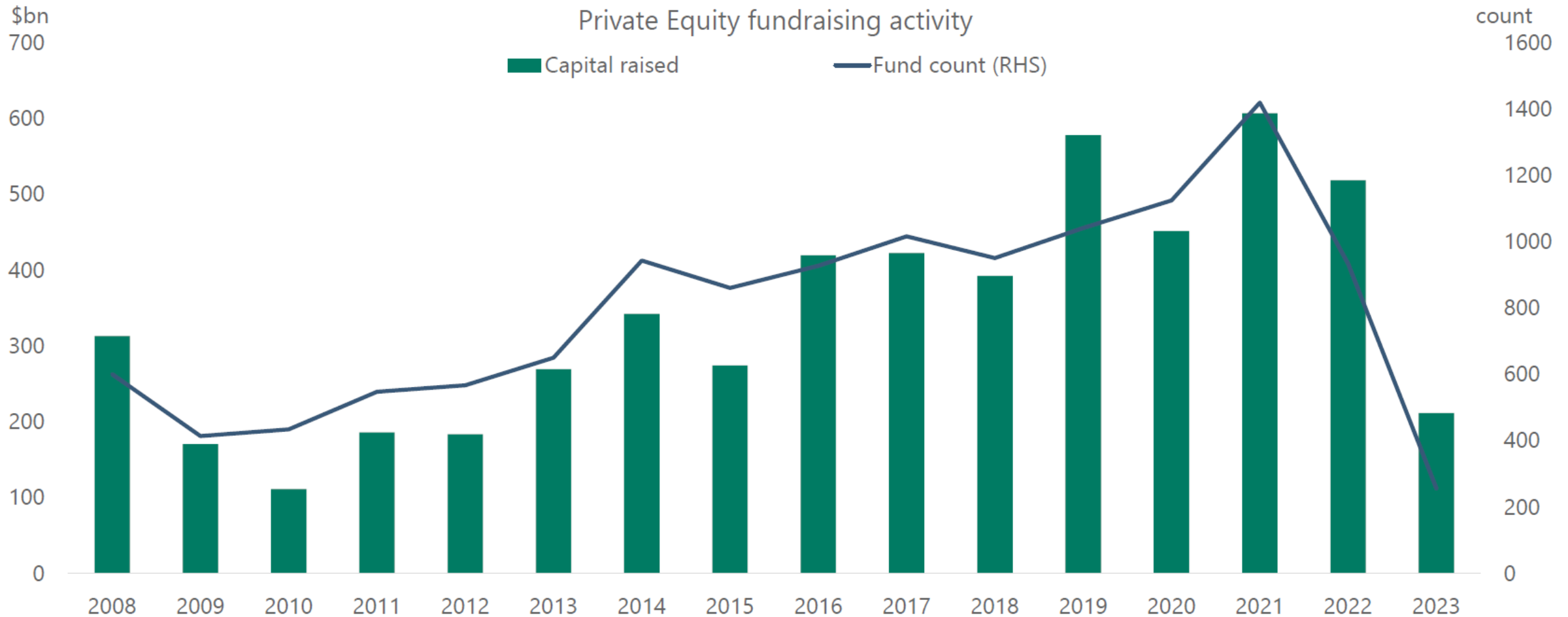
Source: Pitchbook, Apollo Chief Economist. Note: Data as of 30th June 2023

Private Equity Transactions and Exits

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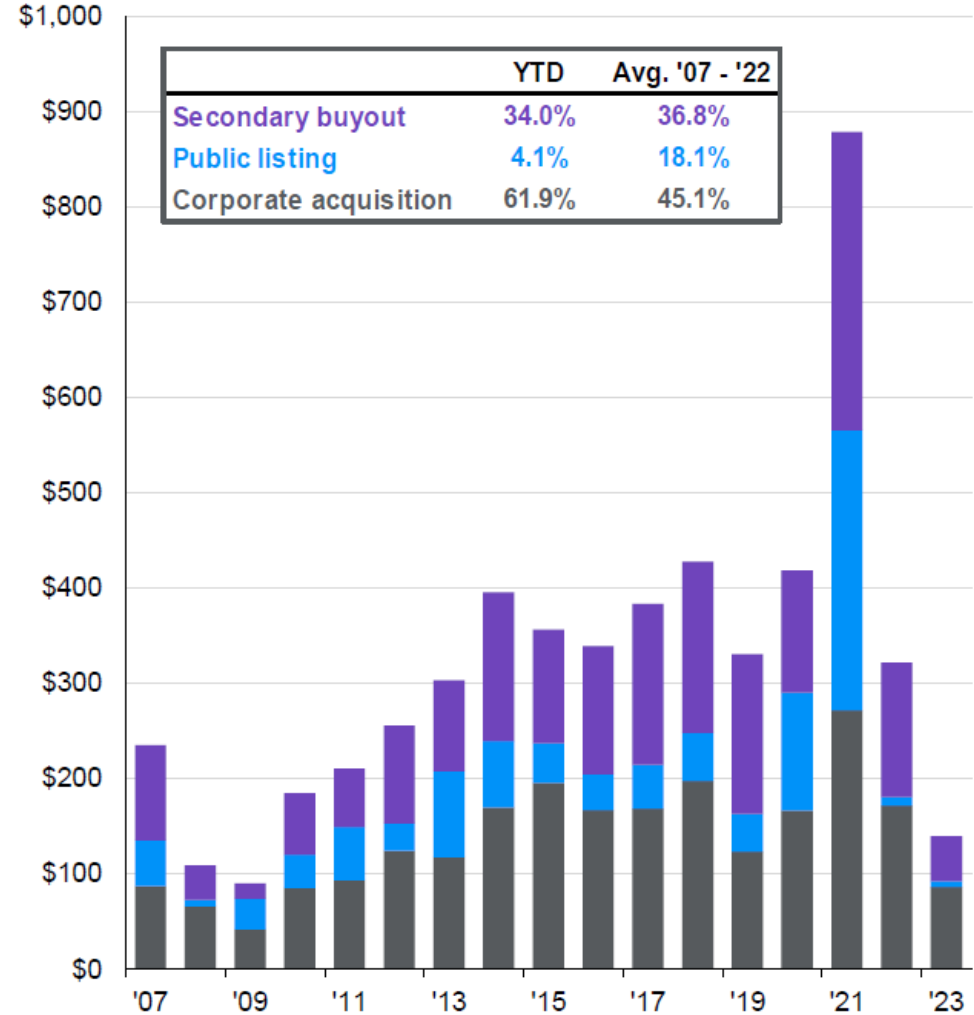
- The higher interest rate environment has slowed private equity investment and exit activity.

U.S. private equity deals
USD billions

	YTD	Avg. '07 - '22
B2B	35.0%	28.6%
B2C	9.7%	18.4%
Natural resources	8.8%	13.7%
Financial services	16.1%	8.6%
Health care	11.2%	12.5%
Technology	19.1%	18.1%
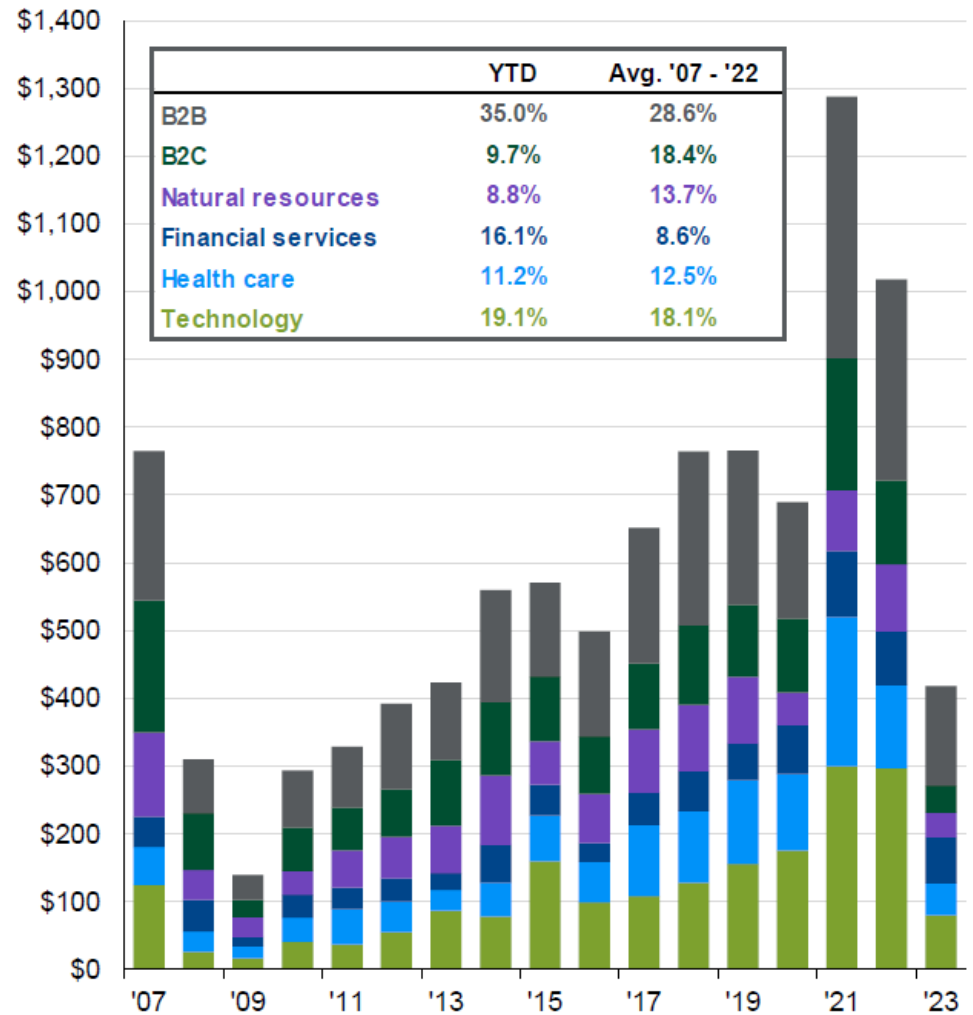
Private equity exits by type
USD billions

|	YTD	Avg. '07 - '22
Secondary buyout	34.0%	36.8%
Public listing	4.1%	18.1%
Corporate acquisition	61.9%	45.1%

Source: Pitchbook and J.P. Morgan Asset Management

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Private Equity Valuations

- U.S. LBO purchase price multiples remain high at > 11x EBITDA.
- The use of leverage is more conservative at 4.9x EBITDA.

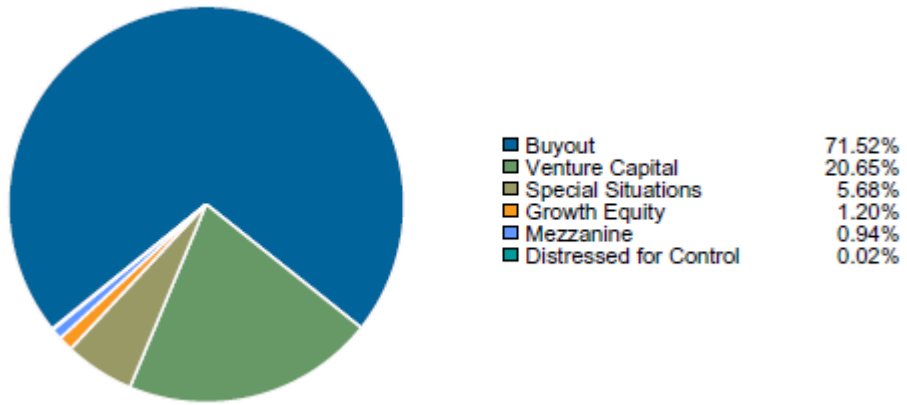**U.S. LBOs: purchase price multiples**
Equity and debt over trailing EBTIDA

Source: Golub Capital, Pitchbook and J.P. Morgan Asset Management
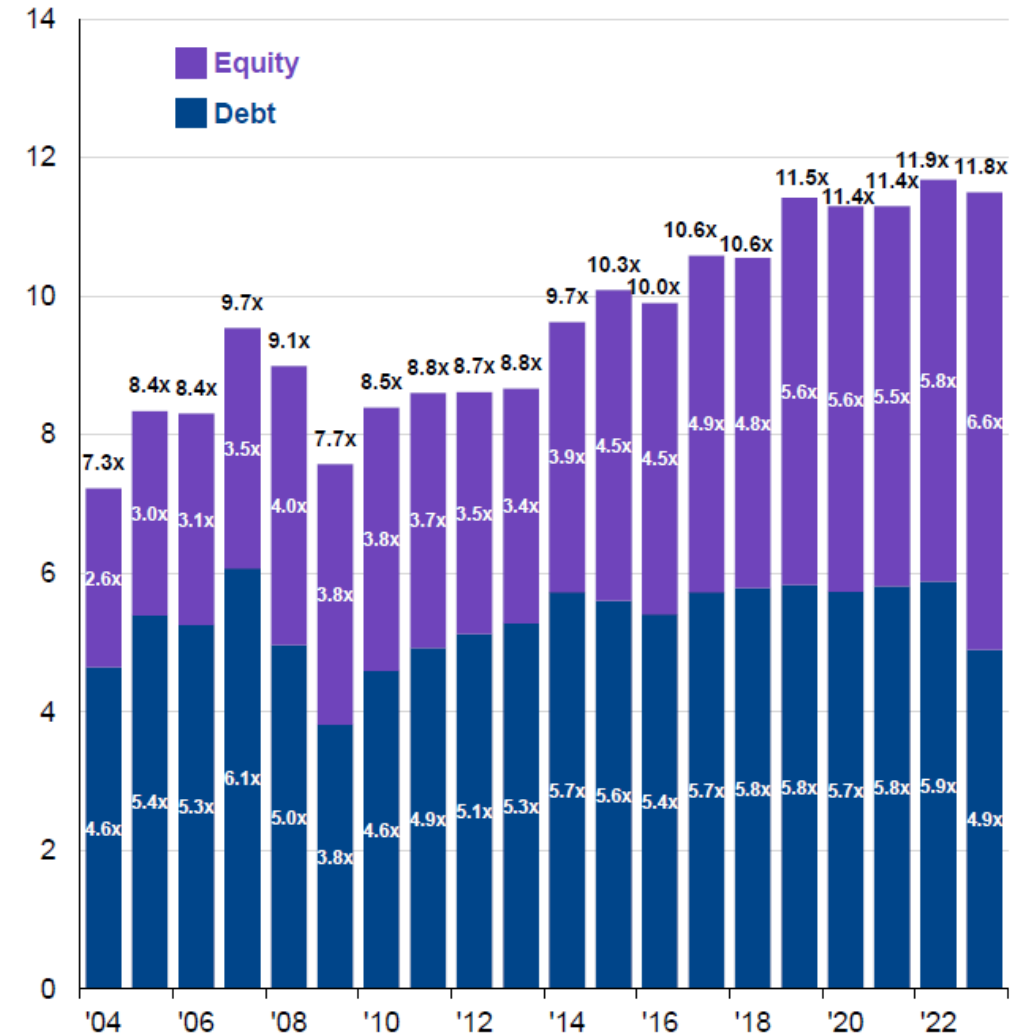
US Venture Capital Valuations Down 50% from Peak

Refinitiv Venture Capital Index
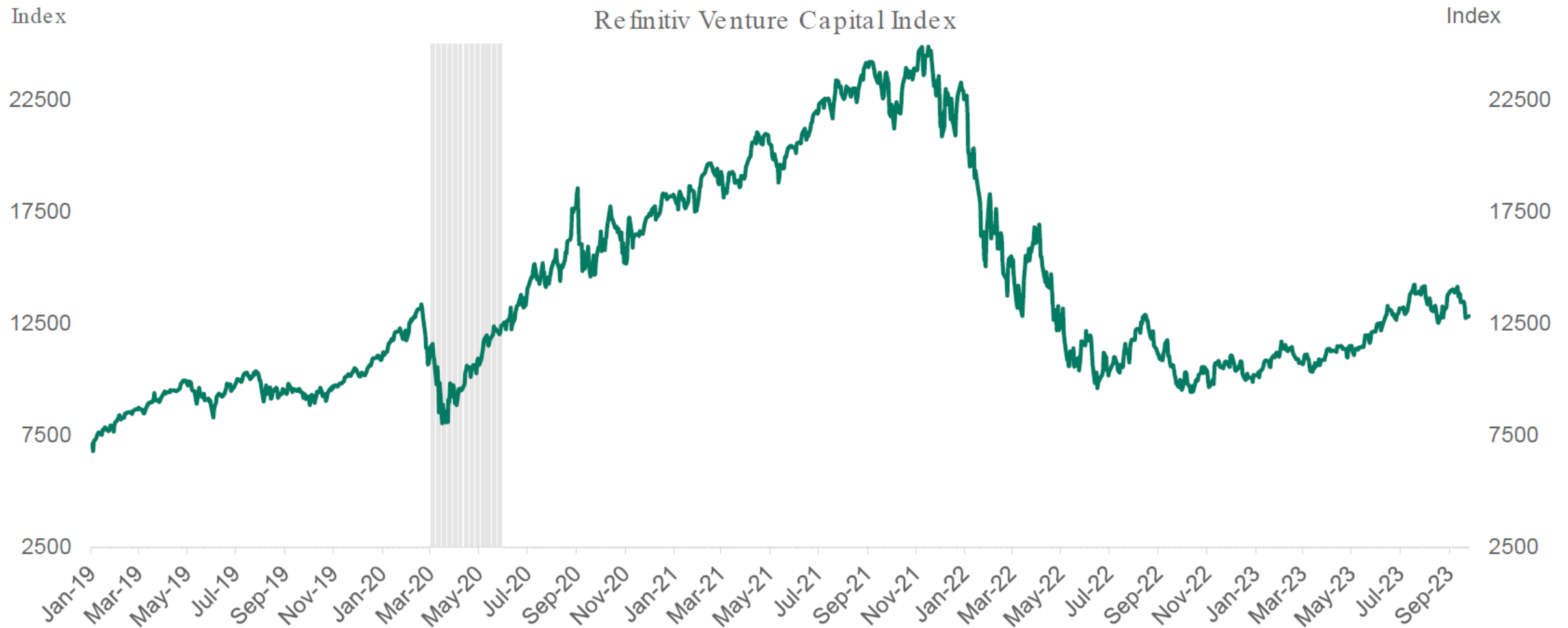
Source: Bloomberg, Apollo Chief Economist. Note: The Thomson Reuters Venture Capital Index is designed to measure the value of the US-based venture capital private company universe in which venture capital funds invest.
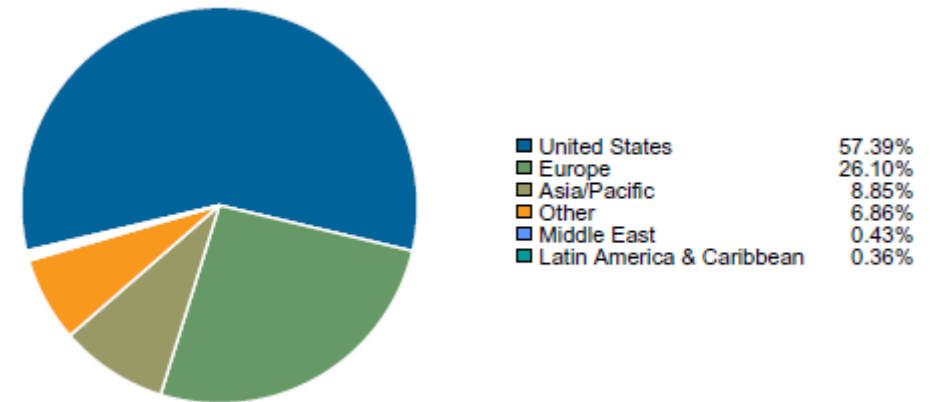
Private Equity Exposure

Strategy Mix by Net Asset Value as of 3/31/2023

■ Buyout	71.52%
■ Venture Capital	20.65%
■ Special Situations	5.68%
■ Growth Equity	1.20%
■ Mezzanine	0.94%
■ Distressed for Control	0.02%

- Adams Street (~52% of NAV) and BlackRock (~44% of NAV) compliment each other. Historically, Adams Street was more exposed to venture whereas BlackRock focuses more on buyouts.

Geographic Mix by Net Asset Value as of 3/31/2023

■ United States	57.39%
■ Europe	26.10%
■ Asia/Pacific	8.85%
■ Other	6.86%
■ Middle East	0.43%
■ Latin America & Caribbean	0.36%

- Geographic exposures were in line with the MSCI ACWI (US – 59.2%, Europe – 18.1%, Asia Pacific - 12.5%, and 6.9% other).
- Limited exposure to China was (0.61% vs. 3.2% for MSCI ACWI).

Source: Callan

Private Equity Performance (Pension)

Manager	Vintage Year	Capital Commitments ($000s)	Paid-In Capital ($000s)	Uncalled Capital ($000s)	% Paid-In	Distributed Capital ($000s)	Net Asset Value ($000s)	DPI	RVPI	TVPI	Net IRR
Adams St BVCF IV Fund	1999	$25,000	25,000	0	100.00%	43,779	0	1.75x	0.00x	1.75x [2nd]	7.08% [2nd]
Adams St Brinson US Funds		$48,192	47,463	762	98.49%	71,421	337	1.50x	0.01x	1.51x [2nd]	6.73% [2nd]
Adams St Brinson Non US Funds		$24,524	24,359	165	99.33%	47,578	180	1.95x	0.01x	1.96x [2nd]	14.34% [2nd]
Adams St 1998 Funds*		$5,230	5,236	27	100.12%	7,840	13	1.50x	0.00x	1.50x [2nd]	7.24% [3rd]
Adams St 1999 Funds*		$37,853	37,428	425	98.88%	62,167	75	1.66x	0.00x	1.66x [1st]	7.01% [2nd]
Adams St 2000 Funds*		$21,733	22,049	-316	101.45%	34,015	110	1.54x	0.00x	1.55x [2nd]	7.32% [2nd]
Adams St 2001 Funds*		$12,884	12,475	410	96.82%	20,915	103	1.68x	0.01x	1.68x [2nd]	8.67% [3rd]
Adams St 2002 Funds*		$11,152	11,207	-55	100.49%	20,960	63	1.87x	0.01x	1.88x [2nd]	13.83% [2nd]
Adams St 2003 Funds*		$6,618	6,288	331	95.00%	13,311	36	2.12x	0.01x	2.12x [1st]	19.50% [1st]
Adams St 2004 Funds*		$2,244	2,139	105	95.33%	3,570	119	1.67x	0.06x	1.72x [2nd]	10.22% [2nd]
Adams St Direct Co-Invest	2006	$20,000	23,591	-3,591	117.96%	32,080	16	1.36x	0.00x	1.36x [4th]	5.10% [4th]
Adams St 2008 Non-US	2008-2012	$10,000	9,133	867	91.33%	13,929	3,980	1.53x	0.44x	1.96x [2nd]	11.13% [2nd]
Adams St 2010 Funds		$15,000	13,336	1,664	88.90%	21,402	8,524	1.60x	0.64x	2.24x [2nd]	14.58% [2nd]
Adams St 2015 Global Fd	2015-2016	$30,000	26,261	3,739	87.54%	19,039	39,345	0.73x	1.50x	2.22x [2nd]	22.97% [2nd]
Adams St 2016 Global Fd	2016-2017	$30,000	24,692	5,308	82.31%	10,503	37,230	0.43x	1.51x	1.93x [2nd]	162.86% [1st]
Adams St 2017 Global Fd	2017-2019	$60,000	48,204	12,080	80.34%	13,644	79,177	0.28x	1.64x	1.93x [1st]	22.58% [2nd]
Adams St 2018 Global Fd	2018-2020	$65,000	50,190	14,898	77.21%	8,354	73,334	0.17x	1.46x	1.63x [2nd]	25.32% [2nd]
Adams St 2019 Global Fd	2019-2021	$65,000	48,069	16,931	73.95%	5,287	62,293	0.11x	1.30x	1.41x [2nd]	32.48% [1st]
Adams St 2020 Global Fd	2020-2022	$60,000	37,416	22,584	62.36%	4,453	40,585	0.12x	1.08x	1.20x [3rd]	25.11% [1st]
Adams St 2021 Global Fd	2021-2022	$60,000	20,952	39,048	34.92%	707	21,815	0.03x	1.04x	1.07x [2nd]	15.93% [1st]
BlackRock 2017	2017-2019	$245,000	151,574	95,368	61.87%	37,097	223,227	0.24x	1.47x	1.72x [2nd]	18.16% [3rd]
BlackRock 2020	2021-2022	$250,000	72,634	177,366	29.05%	0	83,528	0.00x	1.15x	1.15x [1st]	15.00% [1st]
Miscellaneous Funds**		$331,029	390,083	72,129	117.84%	357,873	28,928	0.92x	0.07x	0.99x [4th]	(0.24%) [4th]
Total Private Equity		**$1,650,678**	**1,283,767**	**533,828**	**77.77%**	**905,501**	**788,963**	**0.71x**	**0.61x**	**1.32x** [3rd]	**6.96%** [3rd]

Total Private Equity includes liquidated funds.
Quartile rankings against the All Private Equity, All Regions Refinitiv/Cambridge database.
*Composited by Vintage Offering **Miscellaneous Funds includes Capital International V and VI, CorsAir III, EIG Energy Fund XIV, Hearthstone, Lewis & Clark I and II, Matlin Patterson II and III, and Quantum Energy Partners.

Source: Callan

Real Estate Market Overview

Core Real Estate Performance

- Income returns were positive across sectors and regions.
- All property sectors and regions, except for Hotel, experienced negative appreciation.
- Valuations are reflective of higher interest rates, which have put upward pressure on capitalization rate and discount rate assumptions.
- In September, the Fed noted that interest rate will remain higher for longer. As a result, real estate managers believe it will take another two or three quarters for real estate values to fully adjusts to the rising interest rates.

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
NCREIF ODCE	-2.9%	-10.7%	7.0%	5.6%	7.8%
Income	0.7%	2.5%	2.8%	3.0%	3.4%
Appreciation	-3.6%	-13.0%	4.2%	2.5%	4.3%
NCREIF Property Index	-2.0%	-6.6%	6.8%	5.9%	7.8%
Income	1.0%	4.0%	4.1%	4.2%	4.6%
Appreciation	-3.0%	-10.3%	2.6%	1.6%	3.1%

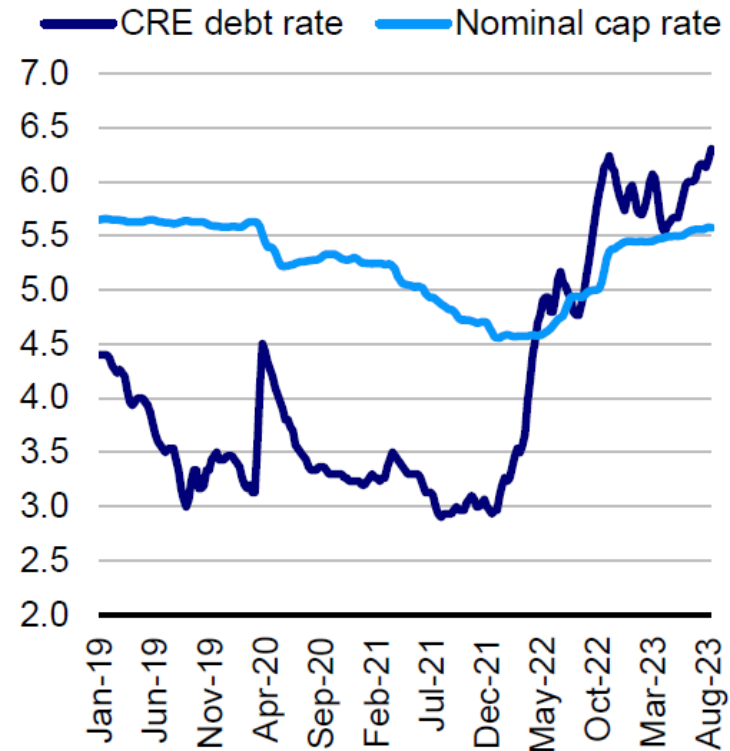## NCREIF Property Index second quarter returns by Region and Property type

Source: Callan, NCRIEF ODCE return is net

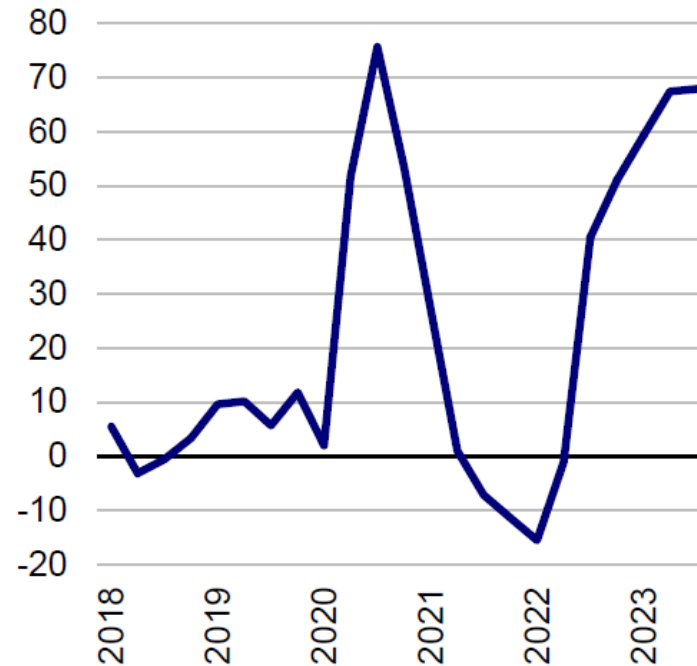14

Real Estate Market is Liquidity Constrained

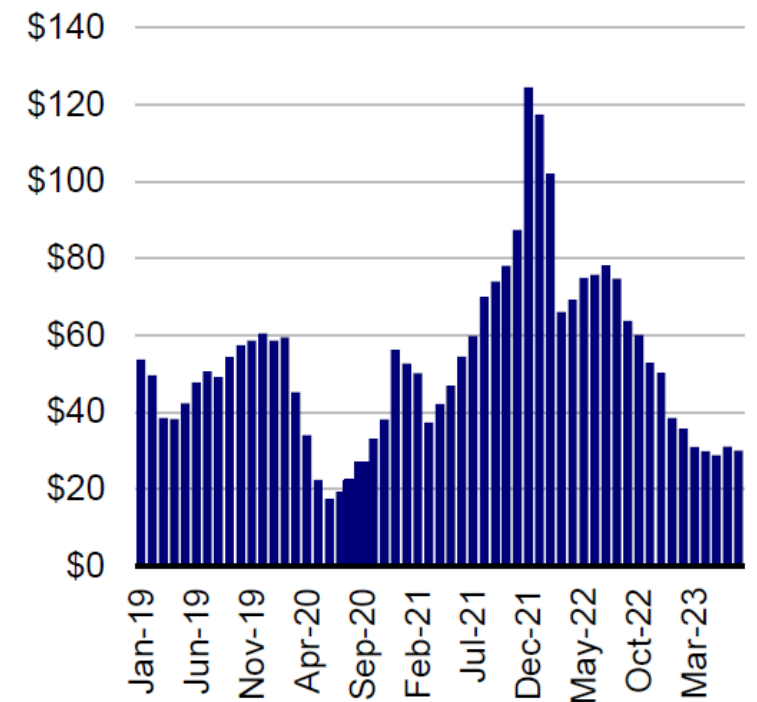**The increased cost of debt and tighter lending standards weigh on transaction volumes.**

Source: Invesco Real Estate using data from Green Street, Moody's Analytics, and MSCI as of September 2023
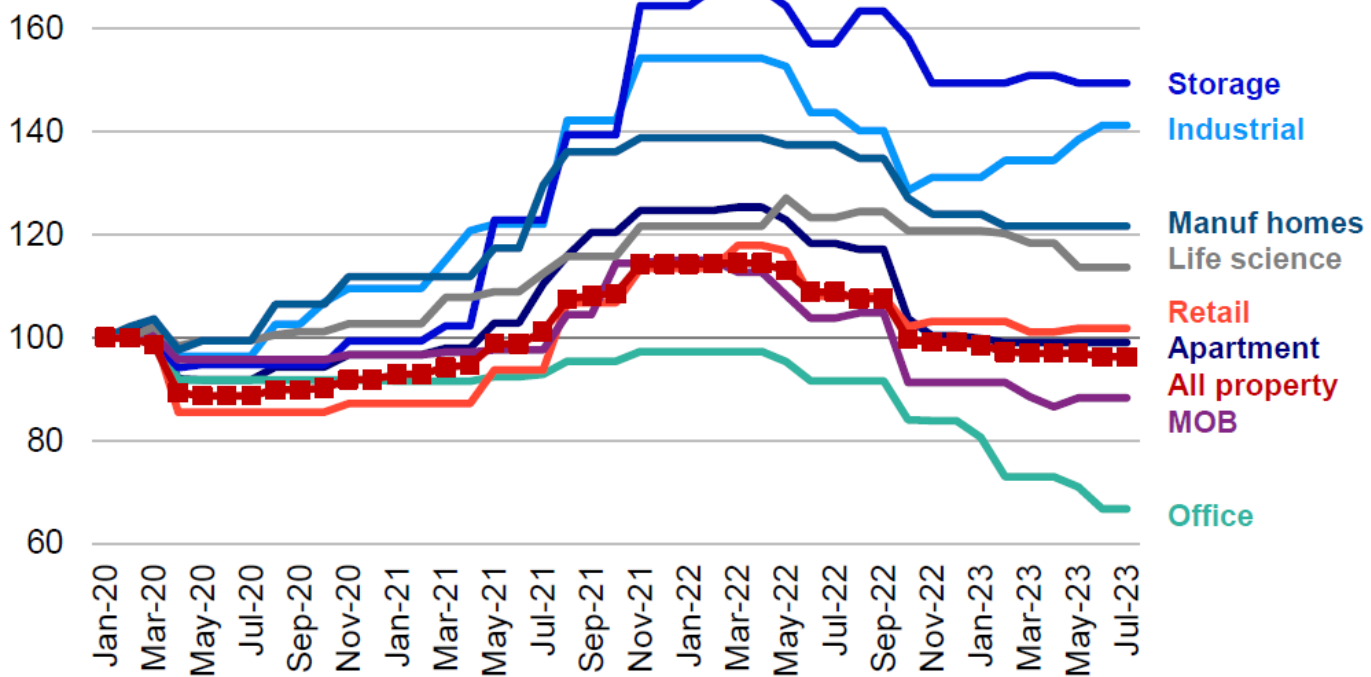
Real Estate Pricing

Rising interest rates have increased financing costs and decreased real estate values. However, there is a wide dispersion among property types.

Green Street Commercial Property Price Index: Jan 2020 = 100

Cumulative price gain/loss

	Market	
	Since Jan-20	Since Jul-22
Storage	49%	-11%
Industrial	41%	-9%
Manuf homes	22%	-12%
Life science	14%	-7%
Retail	2%	-14%
Apartment	-1%	-21%
MOB	-12%	-22%
Office	-31%	-33%
SFR		+1%
Data centers		-13%
All property	**-3%**	**-16%**

For Market, CPPI data for SFR and data centers starts after Jan 2020; data as of August 14, 2023. For ICRE data as of June 30, 2023.

Source: Invesco Real Estate using data from Green Street as of September 2023
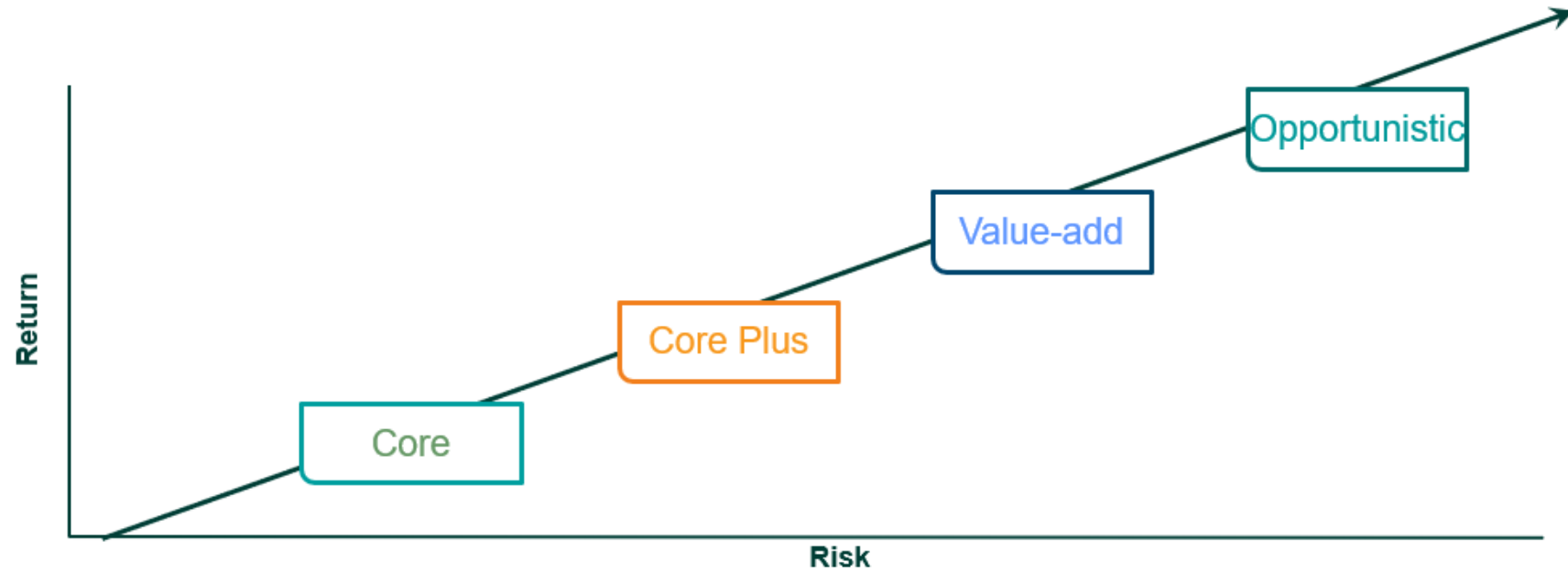
Trailing Performance of Real Estate

- Private real estate performance is in line with REITs YTD. However, REITs are down close to 30% since 2022.

- Private real estate is expected to be down around 20-25% peak to trough.

- REITs tend to be a leading indicator for private real estate but tend to over correct.

Source: CBRE Investment Management. Listed market performance as of 9/30/2023. Private performance as of 6/30/2023. FTSE EPRA NAREIT Index, FTSE NAREIT All Equity Index, MSCI World Equity Index and NFI-ODCE Value Weighted Index.

Trailing performance review
US REITs, broad equities, and private real estate

Chart with categories YTD, 2022, Trailing 5-Year, Trailing 25-Year.

YTD: Global Real Estate -4.1%, US Real Estate -5.6%, Global Equities 11.5%, Private Real Estate -5.8%

2022: Global Real Estate -24.4%, US Real Estate -25.0%, Global Equities -17.7%, Private Real Estate 7.5%

Trailing 5-Year: Global Real Estate -0.3%, US Real Estate 2.8%, Global Equities 7.8%, Private Real Estate 6.5%

Trailing 25-Year: Global Real Estate 7.4%, US Real Estate 8.6%, Global Equities 6.9%, Private Real Estate 8.3%

Legend: Global Real Estate, US Real Estate, Global Equities, Private Real Estate

Private Real Estate Strategies

- Real estate acts as a diversifier and can serve as a hedge to unexpected inflation.

- However, the further you move out on the risk spectrum, the more equity beta is captured.

- Historical drawdowns:
    - US Core: -37%
    - US Core-Plus: -44%
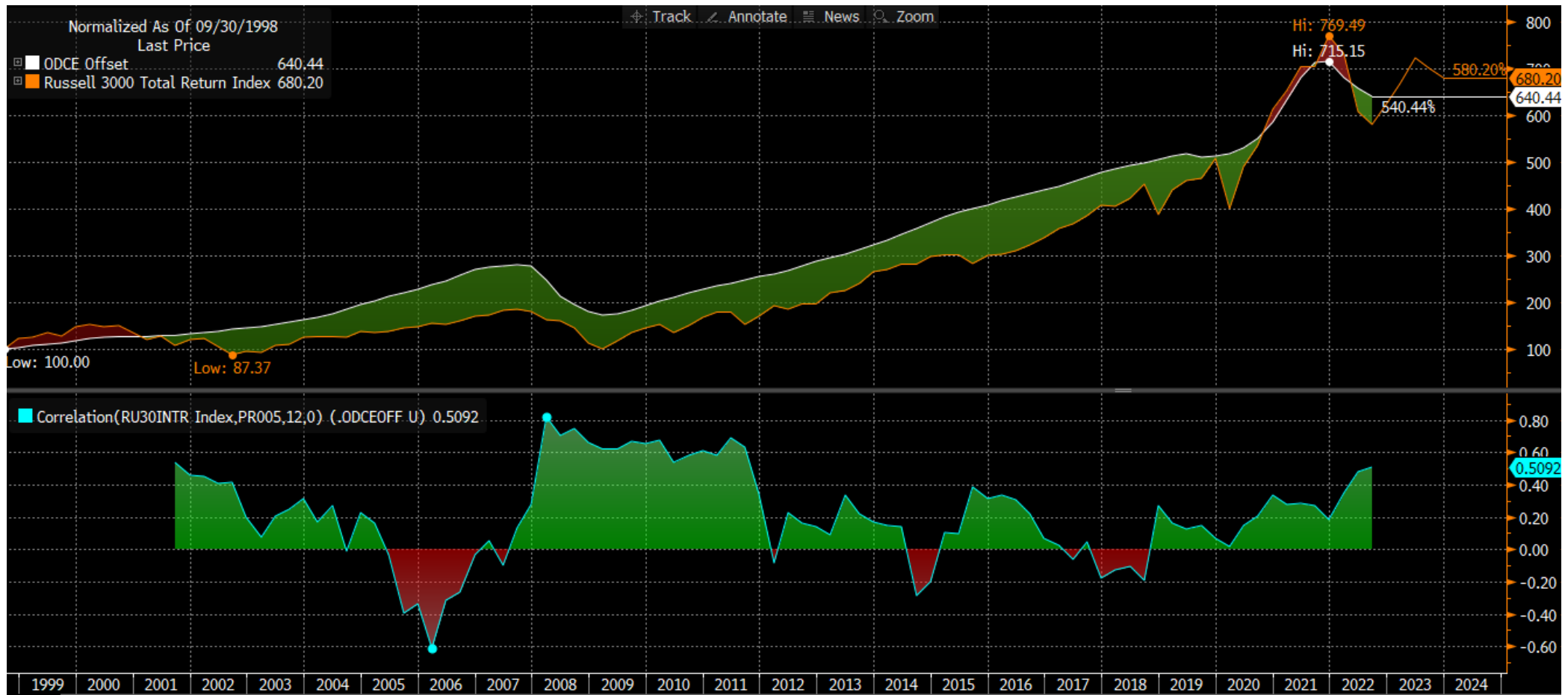   - US Value Add: -49%
    - US Opportunistic: -58%
    - R3000: -56%

	Core	Core Plus	Value-add	Opportunistic
Net Return estimate	Up to 8%	8-10%	10-12%	13%+
Asset	Stable asset Highly occupied	Stable asset Minor improvements may be required to improve occupancy	Enhancement of existing asset Material physical improvements or releasing are common	Development of a new asset and/or significant capital improvement
Expected Income vs Appreciation Return	Mainly Income 75%>	65% / 35%	50% / 50%	<35% / 65%+

Source: Callan

Private RE (lagged) vs. Public Equity

The long-term correlation of core real estate to public equity is low at 0.16. However, the correlation is higher is periods of market stress (e.g., 2008 – 2011).

Real Estate Characteristics by Strategy

	Core	Core-Plus	Value-Add	Opportunistic	REITs
Property Life Cycle	Stabilized income producing assets; Typically, > 80% leased	Very moderate amounts of vacancy, near-term lease rollover or renovation required	Significant vacancy and near-term lease rollover or renovation/re-positioning	All stages including speculative development	A company that owns, operates and finances real estate. Invests across all stages.
Leverage	Up to 35% of gross asset value	Up to 50% of gross asset value	Up to 65% of gross asset value	Up to 75% of gross asset value	< 35% (debt to market assets)
Property Types	Concentrated in primary property types: Office, Residential, Industrial and Retail; Limited exposure in specialty property types	Primary property types as well as exposure to specialty property types (e.g., medical office, self storage, single family rentals)	Primary and specialty property types; May focus on single property type or multiple property types	All property types including land for development. May also include distressed debt	All property types including land. May focus on a single property type or multiple property types.
Investment Structure	Open-end funds Separate accounts	Open-end funds Separate accounts	Open-end funds Closed-end funds Fund-of-Funds	Closed-end funds Fund-of-funds Secondaries	Equity REITs Mortgage REITs Public non-listed REITs Private REITs Held in ETFs, MFs and SAs
10-year Return Assumption (net)	6% – 8% (25% income/ 75% appreciation)	8% – 10% (65% income/ 35% appreciation)	10-12% (50% income/ 50% appreciation)	13% + (driven by appreciation)	7% - 10% (50% income / 50% appreciation)
Total Fee Load	0.80% - 1.2%	1.0% - 1.5%; some incentive fees (all-in fee of 1.5% - 2.5%)??	1.0% – 1.5% + incentive fee (all in fees of 1.5% - 3.5%)	1.0% - 1.5% + incentive fee (all in fees of 1.5% to 4.0%)	Varies by REIT structure: 0.1% - 1% for ETFs; 1.0 – 1.5% for private REITs
Equity Beta	0.02; lagged 3 qtrs. 0.15	0.09	0.10	0.39	0.73

REITs vs. Public Equity

Regression Statistics

Raw BETA	0.727
ALPHA(Intercept)	0.582
R^2(Correlation^2)	0.430
Std Dev of Error	7.151
Std Error of ALPHA	0.688
Std Error of BETA	0.077

The long-term correlation of REITs to public equity is consistently higher at 0.43 and can remain high for long periods of time (e.g., 2009 – 2014 and 2020 to present).

Real Estate Positioning by Strategy

- Plan to harmonize the manager exposures across the three pools of capital.

- Maintain an allocation to Core/Core-Plus of 70-80% and to Non-Core of 20-30%.

	Fund Structure	Pension	% of Total Real Estate	Insurance	% of Total Real Estate	Legacy	% of Total Real Estate
Core/Core-Plus Exposure: 70 - 80%							
Core/Core-Plus							
Invesco Core	OE	$ 400.1	48%	$ 60.4	54%	$ 211.5	46%
JPM Strategic Property Fund (SPF)	OE	$ 194.6	23%	$ -	0%	$ -	0%
JPM Income & Growth	OE	$ -	0%	$ 52.0	46%	$ 209.8	45%
Total Core/Core-Plus		$ 594.7	72%	$ 112.4	100%	$ 421.3	91%
Non-Core Exposure: 20 - 30%							
Non-Core							
JPM Special Situations Property Fund (SSPF)	OE	$ 102.8	12%	$ -	0%	$ -	0%
Invesco Value-Add IV	CE	$ 1.4	0%	$ -	0%	$ -	0%
Invesco Value-Add V	CE	$ 71.5	9%	$ -	0%	$ -	0%
Invesco Value-Add VI	CE	$ 42.7	5%	$ -	0%	$ 42.7	9%
Invesco Asia III	CE	$ 16.5	2%	$ -	0%	$ -	0%
JPM Europe Opportunistic Fund	CE	$ 0.6	0%	$ -	0%	$ -	0%
Total Non-Core		$ 235.5	28%	$ -	0%	$ 42.7	9%
Total Real Estate		$ 830.2		$ 112.4		$ 464.0	

OE: Open end fund
CE: Closed end fund

Real Estate Performance (Absolute)

- The recent performance (1-year) was impacted by the valuation adjustments occurring in the private real estate but was in-line with the NCREIF ODCE.

- The Pension Pool underperformed the Insurance Pool and the Legacy Fund over the 1-year and 3-year periods due to its exposure higher exposure to non-core strategies (e.g., JPM SSPF).

- Over the longer-term periods (5yr and 10yr periods), the Pension Pool outperformed the Insurance Pool and Legacy Fund given its exposure higher exposure to non-core strategies (e.g., JPM SSPF). Note, the Legacy Fund does not have 10yrs of performance history.

Real Estate Total Returns by Pool (Gross)
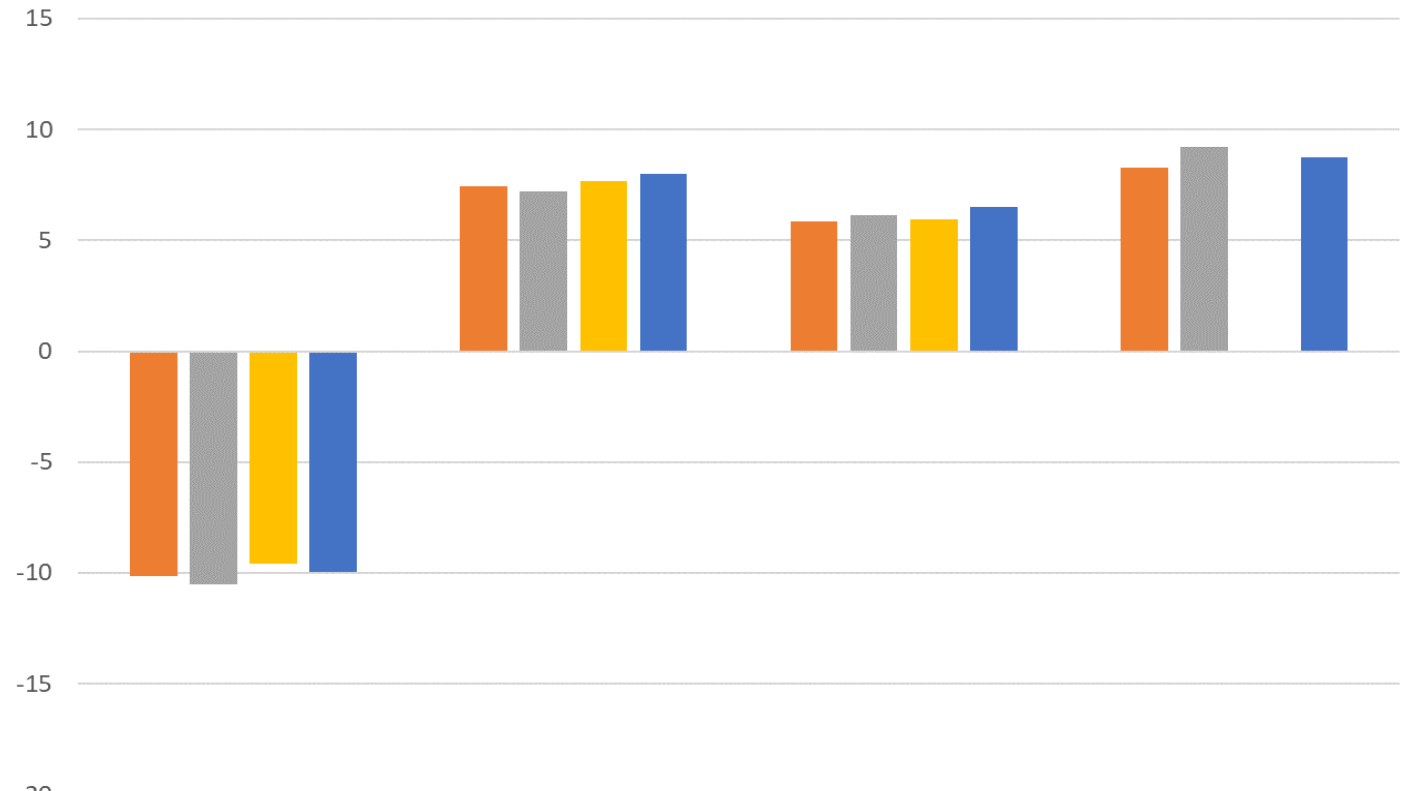
	1 Yr	3 Yr	5 Yr	10 Yr
Insurance	-10.14	7.44	5.87	8.28
Pension	-10.50	7.19	6.14	9.22
Legacy	-9.57	7.68	5.97	
NCREIF ODCE	-9.98	7.99	6.50	8.74

Confidential Materials will be sent separately to Committee Members via secure link.

MACHINE LEARNING & INVESTMENTS

Matt Posch, CFA

November 7th, 2023

NORTH Dakota Be Legendary.

AI'S EVOLUTION & IMPLICATIONS FOR RIO

Historical Context of AI

- **Roots in the 1950s:** Beginnings with theoretical foundations

- **Revolution in the 2010s:** Advanced algorithms coupled with a surge in data and powerful computing make AI a staple in many industries

- **Emergence of Generative AI:** State-of-the-art developments that can generate new content, aiding innovation in diverse sectors

Implications for RIO

- **Operational Efficiency:** Streamlining processes, organizing information, and automating workflows

- **Informed Decision-Making:** Utilizing AI to enhance information flow, enabling better strategic choices, and risk management

- **Future Potential:** Anticipating advancements in AI that RIO can harness for continued improvements and efficiencies

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ND GENER8TOR COHORT

- **AI Skills Accelerator:** State employees teamed up with gener8tor for a 4-week AI training

- **About gener8tor:** The Fargo-based team manages a startup accelerator as part of the 50 South in-state investment program

- **Proposals:** 13 groups of state employees unveiled AI proposals tailored to solve problems identified in North Dakota government

- **Road Ahead:** North Dakota leadership and IT will strategize and seek to turn proposals into actionable outcomes

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KEY AI TECHNOLOGIES

AI (Artificial Intelligence)

- Technology enabling machines to simulate human intelligence
- Key components include learning, reasoning, problem-solving, perception

ML (Machine Learning)

- Subset of AI involving algorithms learning from data to make decisions
- Focuses on pattern recognition and predictive modeling

NLP (Natural Language Processing)

- Subset of ML
- Understanding, interpreting, and manipulating human language by machines

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Matt Posch, CFA – November 7, 2023
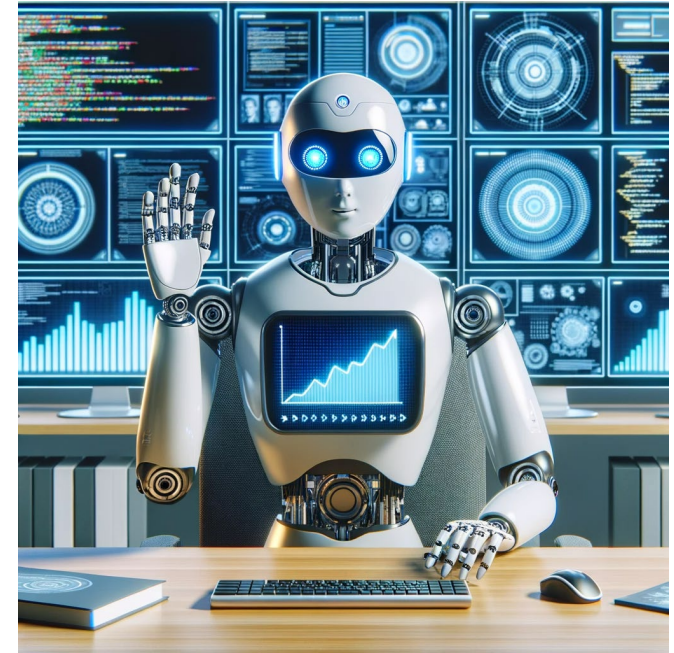
GENERATIVE AI

Generative AI models:

- Based on neural networks that are trained on vast amounts of data
- Large Language Models (LLM) can generate coherent and contextually relevant content across multiple domains
- Versatility allows them to be applied in various fields

OpenAI's ChatGPT (Nov 30, 2022):

- Advanced conversational AI model
- Gained 100 million active users in two months

Emergence of Competitors:

- Google's Bard and Meta's Llama 2
- Microsoft's copilot should be available to North Dakota employees in 2024

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MARKET REACTION TO AI ADVANCEMENTS

- Equity markets have rewarded the near-term beneficiaries of AI such as US Big Tech firms

- Near-term beneficiaries are makers of semiconductors and mega-cap companies with extensive cloud computing infrastructure

- Long-term beneficiaries may see the most benefit as different integrations across industries lead to innovative solutions and broader applications

- Generative AI startups account for 60% of new "unicorns" or startups valued at $1 billion[1]

Price performance of near-term vs. long-term AI beneficiaries
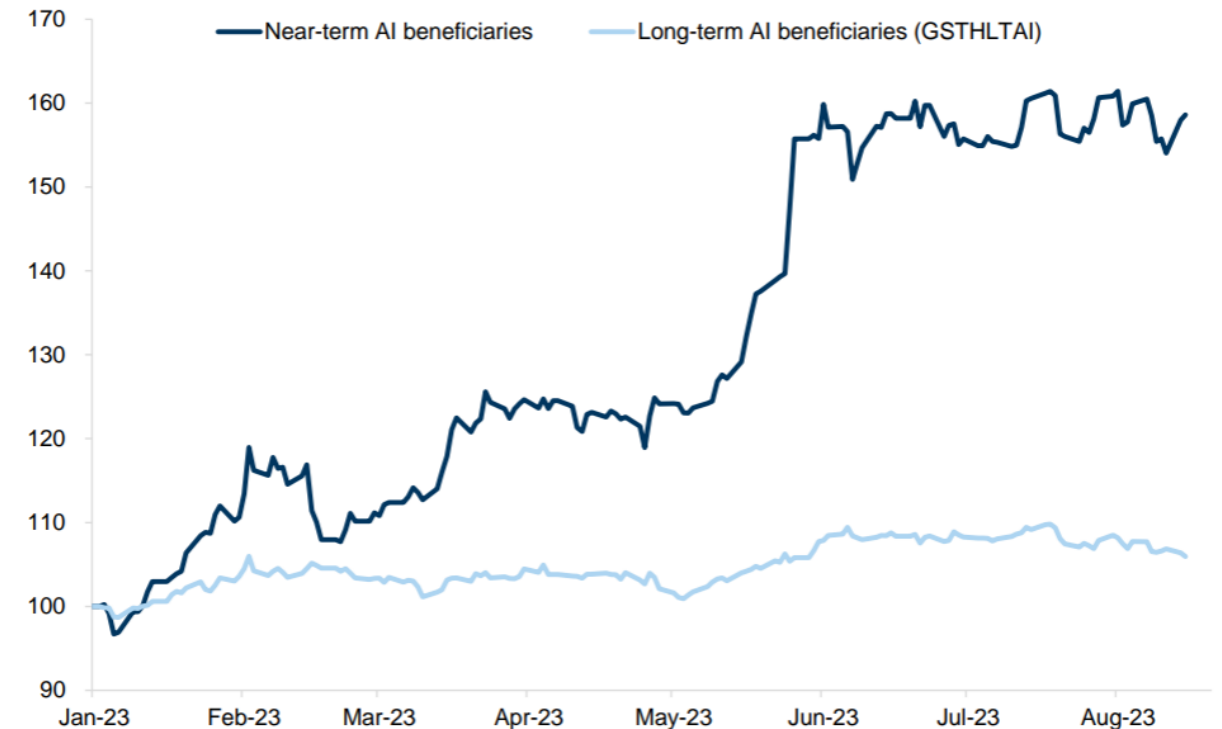
Goldman Sachs Global Investment Research

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ETHICAL & REGULATORY CONCERNS

Finance and AI Key Aspects:

- Data privacy: Protecting sensitive financial information in AI models

- Bias and Fairness: Preventing discriminatory practices in AI decision-making (e.g. credit scoring, risk assessments)

- Transparency and Explainability: Making AI processes clear and understandable especially in automated investment decisions

- North Dakota is working on a policy document for AI technology

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INVESTMENT IMPLICATIONS

Quantitative Investment Managers Have Long Employed NLP

Key Applications Include:

- **Large-Scale Data Extraction:** NLP models efficiently mine information from corporate communications
  - Earnings call transcripts
  - Company filings
  - News
- **Sentiment**
  - Positive & negative information
- **Identifying Economically Linked Peers:**
  - Enhanced precision in identifying economically linked peers beyond traditional means

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RIO OPPORTUNITY

AI Experimentation with ChatGPT:

- Code interpretation for "The Tool" optimization
- Summarizing information

Potential AI Use Cases:

- Data validation
- Data transformation: from unstructured to structured
- Portfolio theme identification
- Risk hotspot detection
- Compliance monitoring
- Manager behavior analysis
- Research

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PUTTING OPPORTUNITY INTO PRACTICE

Weekly Meetings:

- Markets and Tasks discussions
- Specialized Friday sessions on Python and markets modeling

Professional Development:

- Senior leadership enrolled in the "Data Science for Investment Professionals" certification from the CFA Institute
- Topics covered include machine learning and NLP

Knowledge Sharing:

- The teams occasionally present various topics among ourselves

Infrastructure Improvement:

- Focused efforts on enhancing infrastructure, including the development of a data warehouse
- Aiming for daily data analytics
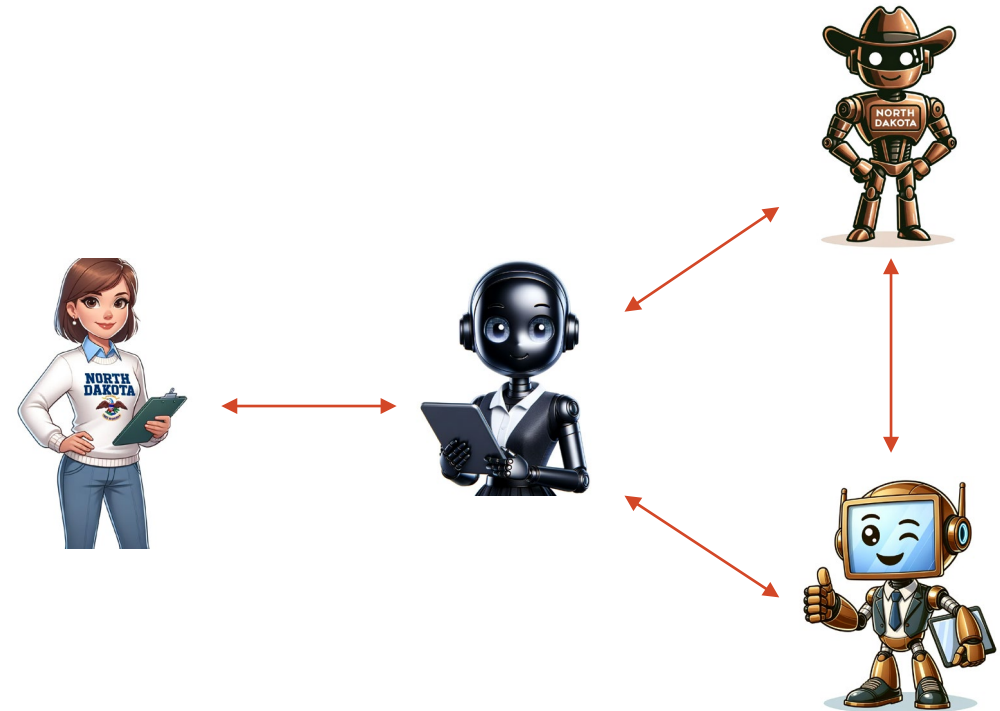
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MICROSOFT COPILOT

- Microsoft's AI integration into Windows 11 and Office 365 applications

- Goal of providing an enhanced work experience by merging LLMs with organizational data and popular workplace applications

- Available for North Dakota employees in 2024

- GitHub Copilot has helped developers code up to 55% faster

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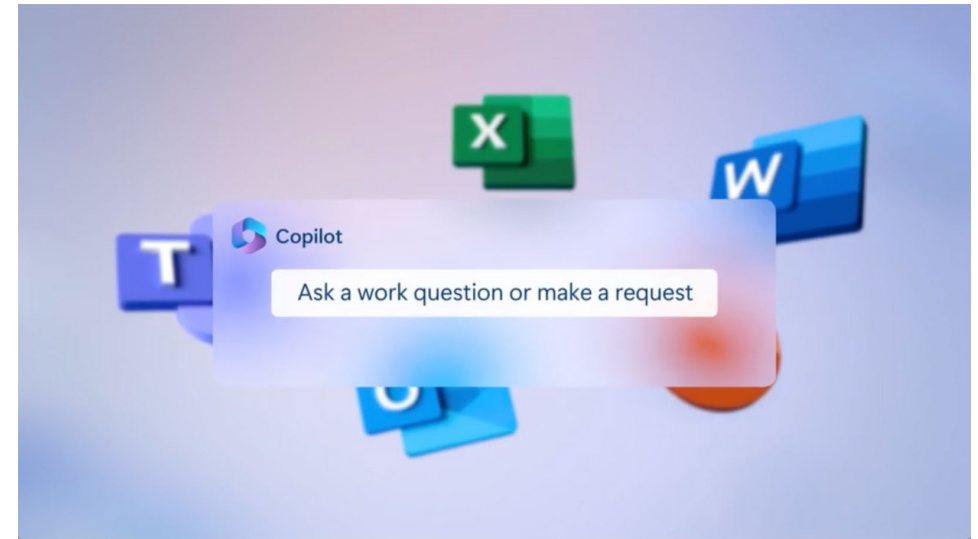
LARGE LANGUAGE MODEL AGENTS

- Promising future use cases as LLMs improve and costs reduce

- Customizable agents can be utilized to provide additional automation and more accurate results

- Each agent has a specific role and is included in the chat when needed

- Advanced agent framework can automate creating solutions from developing the initial outline to executing each step

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Retirement & Investment