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**Mendocino County Employees'
Retirement Association**

2016 Asset/ Liability Study Meeting 2:
Asset Class Education

Greg DeForrest, CFA
San Francisco Consulting

John Pirone, CFA, CAIA
Capital Market Research

Agenda

- Asset class education
 - Private equity
 - Multi-asset class strategies (MAC's)
- Potential impact on plan
- Next steps
 - Determine whether to include new asset classes in study
 - Incorporation of CMERS' liability into the analysis
 - Choice of asset allocation policy



Private Equity

Introducing Private Equity

Definition: Private unregistered investments in operating companies, typically accessed through limited partnerships

- Private equity is an additional tool that investors can employ to finance a future payment stream
- It provides a differentiated return stream and diversification
- Addresses a different opportunity set – private companies
- The key benefit sought from private equity is to earn a rate of return in excess of the returns of publicly stocks and bonds
- The primary drawbacks are illiquidity and program complexity
- Public funds on average have an 8% allocation to private equity

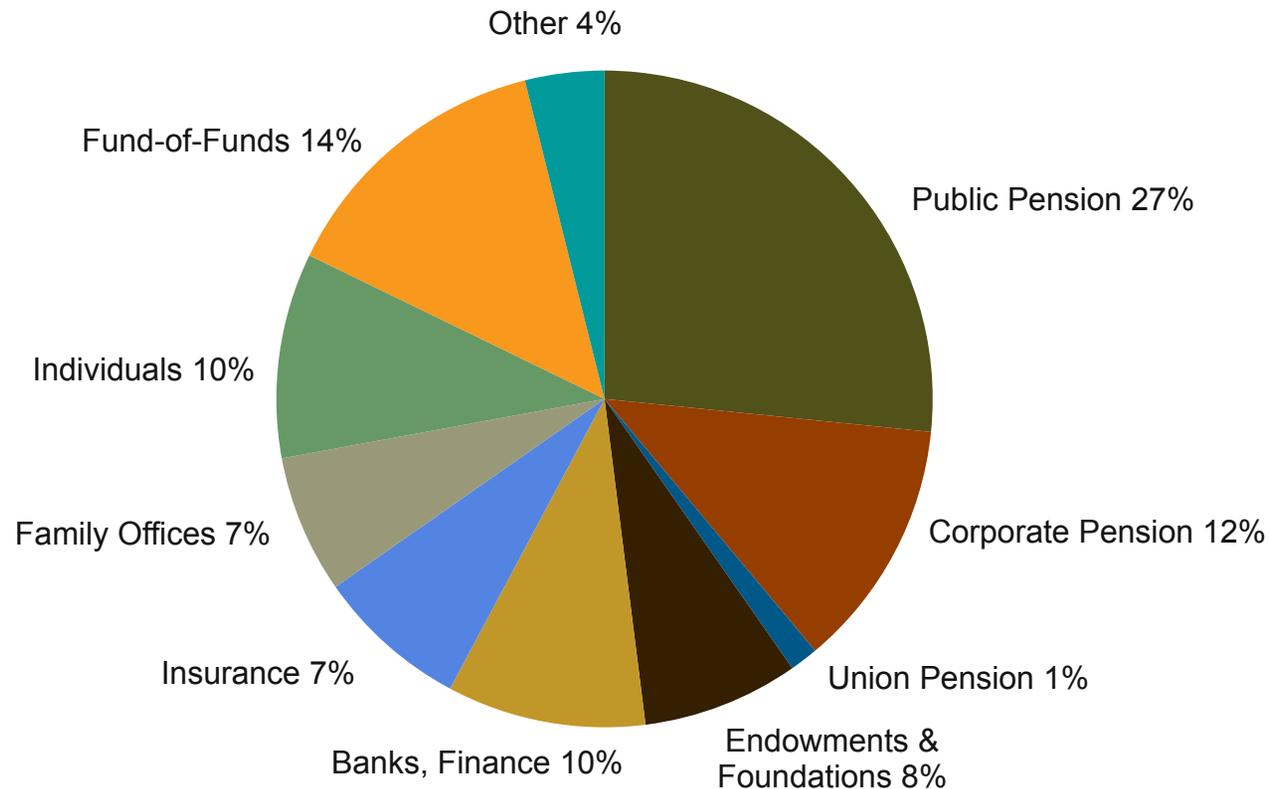
Private Equity is “Different” from Public Equity

- Similarity: Revenues – Expenses = Earnings
- Control over value-improvement is the key differentiator from public equities
- Private equity market is fragmented (no central marketplace) and unregulated
 - Creates opportunities for General Partners with skill to add value
- Active execution and control of value-creation plans
 - Grow companies fast, use leverage to the degree applicable
 - Bring best resources to companies, management, boards, customers

Challenges of Private Equity

- Private equity is illiquid
- Implementation is a primary risk and critical to success
 - Inefficiencies can work for or against investors, median returns are not adequate
 - Mistakes are long-lasting, cannot be easily liquidated
 - Professionally managed portfolios mitigate much of this risk
- Program complexity
 - Takes five or more years to become fully funded
 - Ongoing implementation – periodic reinvestments are required
- Return calculation and benchmarking methodology differs from public securities, and performance data is not publicly available
 - Minor learning curve for investors
- The “J-curve” effect can potentially detract from short-term performance
 - Returns and asset value take time to develop (negative early returns)
 - Risk: Individual company investments fail
- Fees are high in relation to the fees for managing portfolios of publicly traded securities
- Headline risk

Sources of Private Equity Partnership Commitments



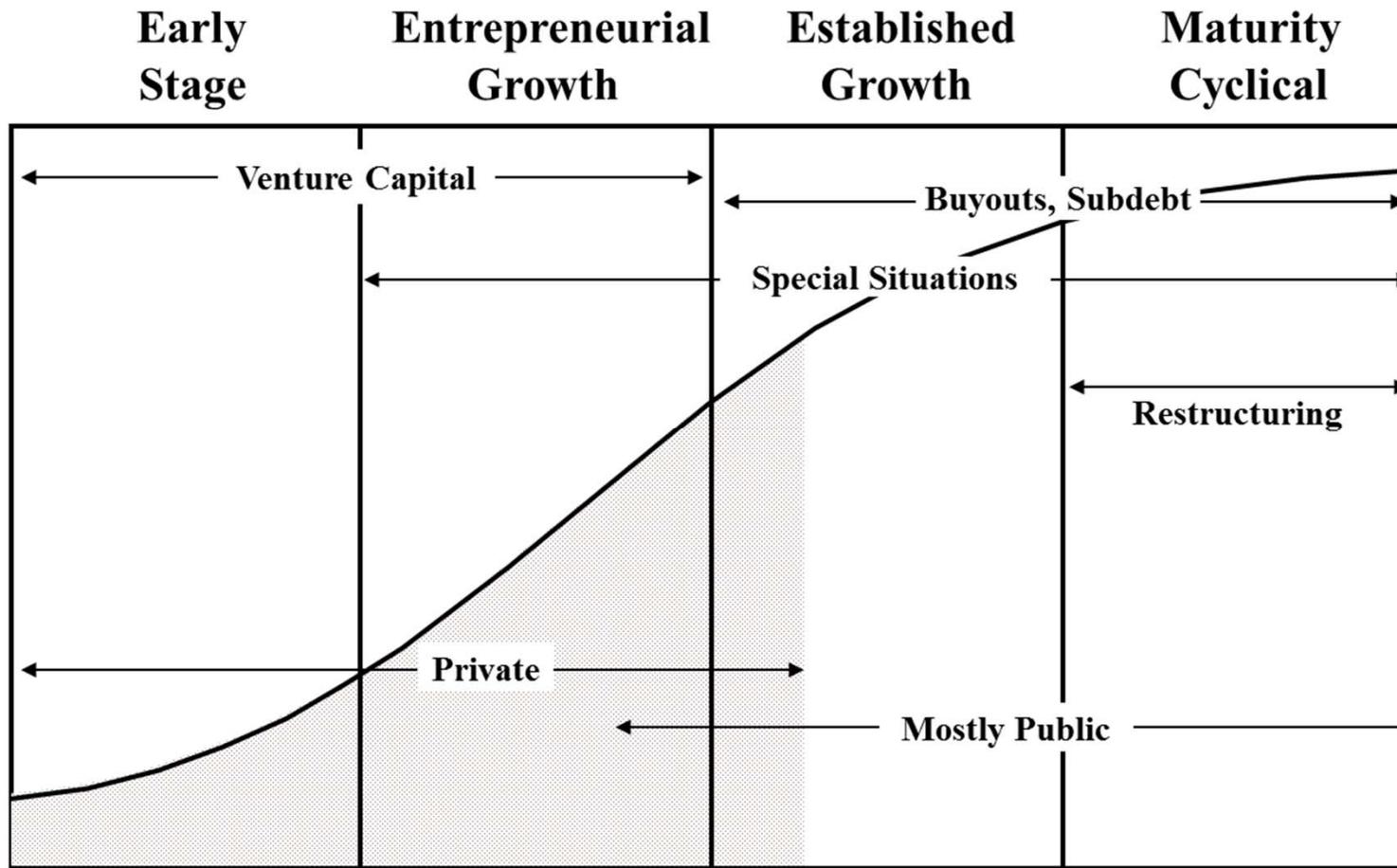
- Public pension plans are the largest investors in private equity at over 25%
- Tax-exempt plans constitute about half the market, and institutional investors make up approximately 80%

Five Types of Private Equity Strategies

Private Equity Addresses a Full Spectrum of Corporate Financing Needs

- Venture Capital
 - Nascent growing companies in technology, health care, retail and other large market sectors
 - Early-, Multi-, Late-Stage
- Buyouts
 - Mature businesses in traditional industries
 - Mega, Large, Middle-Market, Small
- Special Situations
 - Tend to be larger company corporate finance funds that fall outside other categories (“Other” segment)
 - Industry-Focused, Multiple-Strategy, Secondary
- Subordinated Debt
 - Private high yield debt with equity participation
 - Large, Small / Captive, Independent
- Distressed Debt/Restructuring
 - Rejuvenate good companies that have financial woes, generally large traditional mature companies
 - Senior Secured, Equity Infusion

Corporate Growth & Private Finance Cycle



Annual Private Equity Fund Formation

Historical Commitments to U.S. Private Equity Funds

Historical Commitments to U.S. Private Equity Funds

Number of Funds

Strategy	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Sep-15	# Total	%
Venture	115	118	119	148	150	123	119	133	154	232	307	225	1,943	38%
Buyouts	90	125	121	158	114	104	110	157	167	244	305	212	1,907	37%
Subdebt	17	14	25	16	17	20	27	29	26	35	33	27	286	6%
Restructuring	9	10	8	24	29	30	28	12	25	46	33	32	286	6%
Other/FOF	49	50	49	69	53	58	52	63	54	104	87	61	749	14%
Total	280	317	322	415	363	335	336	394	426	661	765	557	5,171	100%

\$ Amount (in millions)

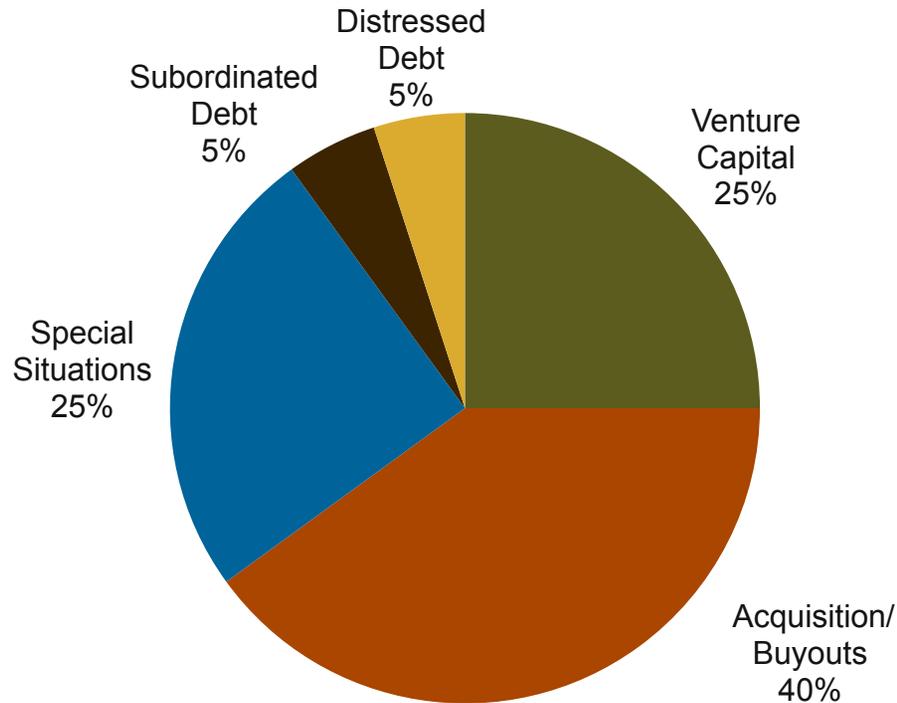
Strategy	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Sep-15	\$ Total	%
Venture	14,870	22,360	25,138	32,222	24,729	13,162	11,636	15,546	20,273	20,353	32,968	26,726	259,982	12%
Buyouts	46,217	98,552	138,038	179,796	130,884	39,552	34,955	75,670	92,798	141,018	174,783	129,821	1,282,083	59%
Subdebt	4,348	3,278	20,375	8,572	40,202	3,262	6,224	4,728	10,775	14,917	8,663	8,038	133,381	6%
Restructuring	7,698	7,887	10,805	48,202	49,978	14,206	18,364	8,977	21,510	39,134	22,613	18,511	267,885	12%
Other/FOF	11,617	19,735	21,044	33,232	19,675	25,733	15,160	14,050	15,083	22,933	27,175	13,881	239,318	11%
Total	84,750	151,812	215,400	302,024	265,468	95,915	86,339	118,971	160,439	238,355	266,201	196,976	2,182,649	100%

Source: *Private Equity Analyst*

- Domestic institutional private equity investment opportunity set averaged about 480 partnerships and \$205 billion annually over the last decade
- International partnerships represent about 25% of the global opportunity set

Strategic Planning

Institutional Baseline Portfolio Structure



Strategy	% Target
Venture Capital	20 - 30%
Acquisition/Buyouts	30 - 45%
Special Situations	20 - 30%
Subordinated Debt	0 - 20%
Distressed Debt	0 - 20%

- An adjusted-market portfolio reflects the most common approach for manager-of-managers vehicles
- International component is typically 35% to 40%

How Private Equity Works

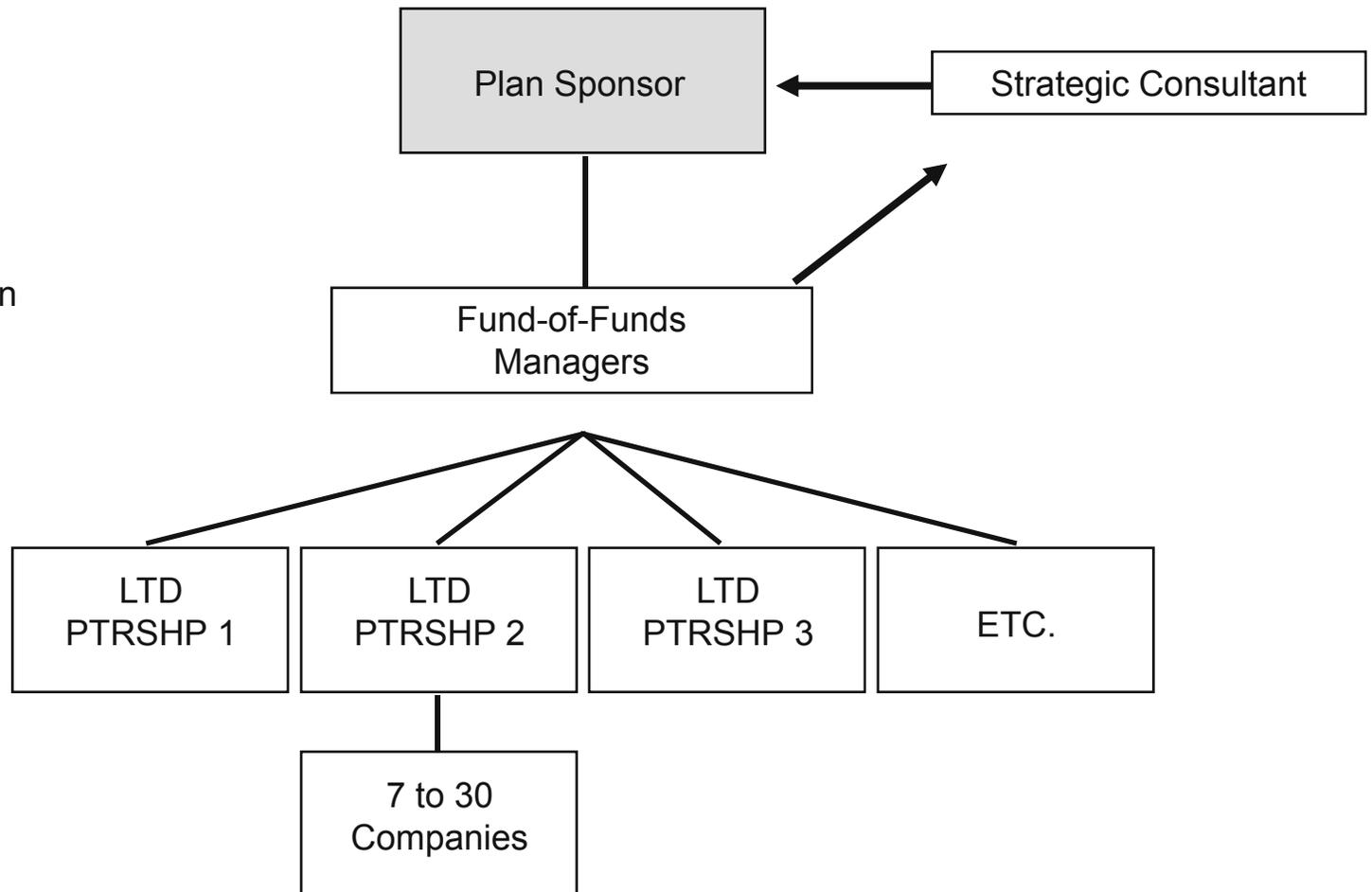
Private Equity Partnerships Program Structure

Policy
Strategic Planning
Performance Evaluation

Proactive Security Selection
Active Management
Reporting

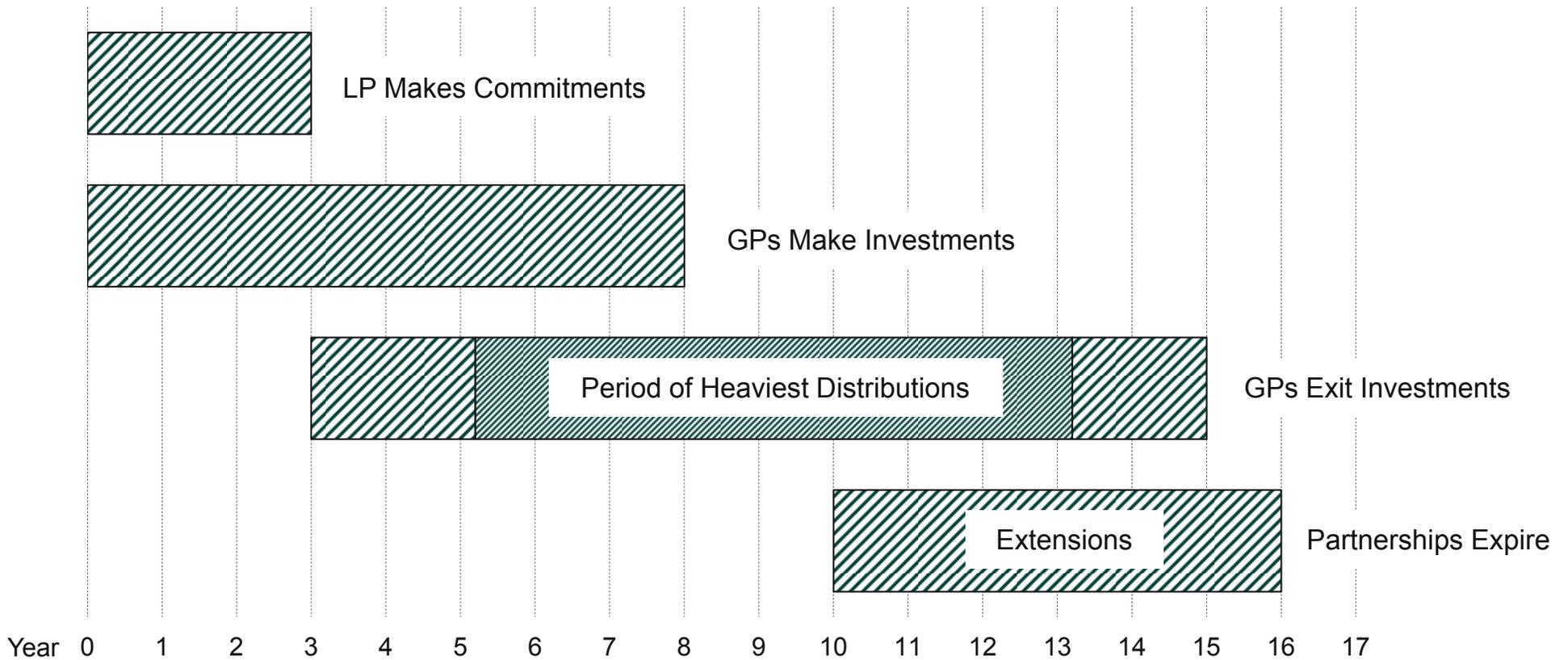
Mini-Conglomerate
(Security)

Divisions



Private Equity Investment Timeline

Private equity is illiquid and requires a long-time horizon
Decisions made today last 10 to 15 years



Source: *Private Equity Analyst*

Private Equity Returns vs. Public Equity Returns

U.S. Private Equity Performance Database – Pooled Horizon IRRs (%) Through September 30, 2015 – Returns are net of fees

Strategy	1 Year	3 Years	5 Years	10 Years	15 Years	20 Years
Venture capital	25.1	21.4	18.0	11.1	3.5	25.5
Buyouts	8.4	13.9	13.7	11.8	11.4	13.0
Mezzanine	6.8	10.5	11.4	10.3	7.8	9.8
All Private Equity	10.0	14.6	13.8	11.4	8.9	14.0
S&P 500	-0.6	12.4	13.3	6.8	4.0	8.1

Source: Thomson-Cambridge

- There can be large return differences between strategy types over time
 - Each strategy has contributed to success at various times
- Venture capital has struggled for about ten years since the technology bust, but returns have recovered over the last five years.
- “All Private Equity” has outperformed public stocks over longer horizons
 - Approximately 4% to 5% over past 10 to 20 years

Proper Implementation is Critical

- Dispersion of returns is very high between funds
- Poor choices last a long time

U.S. Private Equity Funds (as of 09/30/15)

Strategy	Lower Quartile IRR	Median IRR	Upper Quartile IRR
Venture capital	-1.7%	7.3%	17.4%
Buyouts	3.8%	11.0%	19.5%
All Private Equity	0.4%	9.2%	18.0%

Source: Thomson-Cambridge and Callan

Private Equity Returns

Manager Selection and Vintage Year Matter

THOMSON REUTERS PRIVATE EQUITY UNIVERSE
All Private Equity Database (All Regions)
IRRs Vintage Year Through December 31, 2014

Strategy	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Top 5%	23.7%	29.5%	40.2%	43.4%	40.5%	35.8%	33.1%	20.5%	29.4%	35.3%	38.0%	41.2%	61.5%	51.7%	61.1%	68.1%
Upper Qtl	11.3%	12.0%	19.6%	22.8%	17.0%	13.6%	13.0%	13.8%	15.2%	18.0%	22.9%	23.1%	22.6%	20.2%	18.0%	12.8%
Median	0.6%	3.3%	8.4%	10.5%	9.5%	7.8%	7.5%	7.7%	10.0%	11.1%	15.7%	13.2%	11.9%	11.7%	5.4%	-3.3%
Lower Qtl	-6.3%	-5.1%	0.0%	0.0%	1.8%	0.9%	1.8%	2.0%	3.9%	5.5%	7.2%	7.4%	5.4%	1.4%	-8.4%	-16.0%
Lower 5%	-21.4%	-18.0%	-13.8%	-12.4%	-14.6%	-14.2%	-9.0%	-10.6%	-12.0%	-7.1%	-4.5%	-1.5%	-15.1%	-23.6%	-26.7%	-50.7%
Pooled	6.2%	10.4%	18.0%	18.1%	16.5%	11.9%	9.1%	7.6%	9.9%	14.3%	16.3%	16.2%	16.9%	16.5%	10.8%	4.1%
Size	217	312	167	97	109	159	246	274	293	255	114	137	180	177	144	131

Note: Returns are net of all partnership fees, expenses.
 Source: Thomson ONE

- Significant dispersion within vintage years (15% to 20%) between the upper and lower quartile
 - Top quartile returns are targeted
 - Successful individual managers have return persistence
- Large differences between adjacent vintage years
 - Cannot market-time, need to invest consistently
- J-curve effect is evident in newer vintage years
 - Return reduction is shorter and shallower with higher qualities

Private Equity Returns

Diversification Matters

Annual Return for Thomson-Cambridge Fund Indices (1998-2014)

Ranked in order of performance (Best to Worst)

1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Venture & GE 23.7%	Venture & GE 224.0%	Natural Resources 26.8%	Natural Resources 7.4%	Natural Resources 8.0%	Mezz & DD 25.0%	Natural Resources 37.6%	Natural Resources 65.3%	Natural Resources 37.9%	Natural Resources 23.7%	Natural Resources -6.3%	Mezz & DD 36.0%	Buyouts 21.6%	Natural Resources 14.6%	Mezz & DD 16.3%	Venture & GE 24.3%	Venture & GE 18.2%
All Private Equity 18.9%	All Private Equity 103.8%	Venture & GE 21.7%	Mezz & DD -1.9%	Mezz & DD 0.6%	Buyouts 24.2%	Buyouts 26.9%	Buyouts 27.6%	Buyouts 29.1%	Venture & GE 21.2%	Venture & GE -19.8%	Buyouts 14.8%	All Private Equity 19.4%	All Private Equity 15.7%	Buyouts 15.7%	Buyouts 23.0%	Buyouts 13.7%
Buyouts 17.6%	Buyouts 31.8%	All Private Equity 11.8%	Buyouts -11.1%	Buyouts -6.9%	Natural Resources 17.3%	All Private Equity 23.0%	All Private Equity 22.4%	All Private Equity 25.6%	All Private Equity 17.7%	All Private Equity -22.3%	All Private Equity 14.0%	Mezz & DD 18.1%	Buyouts 10.6%	All Private Equity 13.3%	All Private Equity 22.2%	All Private Equity 12.7%
Mezz & DD 10.3%	Mezz & DD 16.9%	Mezz & DD 3.9%	All Private Equity -21.5%	All Private Equity -14.8%	All Private Equity 16.6%	Mezz & DD 18.3%	Mezz & DD 15.5%	Venture & GE 19.5%	Buyouts 17.4%	Buyouts -25.3%	Venture & GE 9.1%	Venture & GE 17.9%	Venture & GE 9.2%	Venture & GE 9.1%	Mezz & DD 16.9%	Mezz & DD 8.9%
Natural Resources -14.6%	Natural Resources 7.7%	Buyouts 0.3%	Venture & GE -34.1%	Venture & GE -27.9%	Venture & GE 1.8%	Venture & GE 14.8%	Venture & GE 11.0%	Mezz & DD 16.2%	Mezz & DD 11.7%	Mezz & DD -28.1%	Natural Resources 7.0%	Natural Resources 15.5%	Mezz & DD 6.1%	Natural Resources 7.4%	Natural Resources 10.3%	Natural Resources -2.7%

Source: Thomson-Cambridge

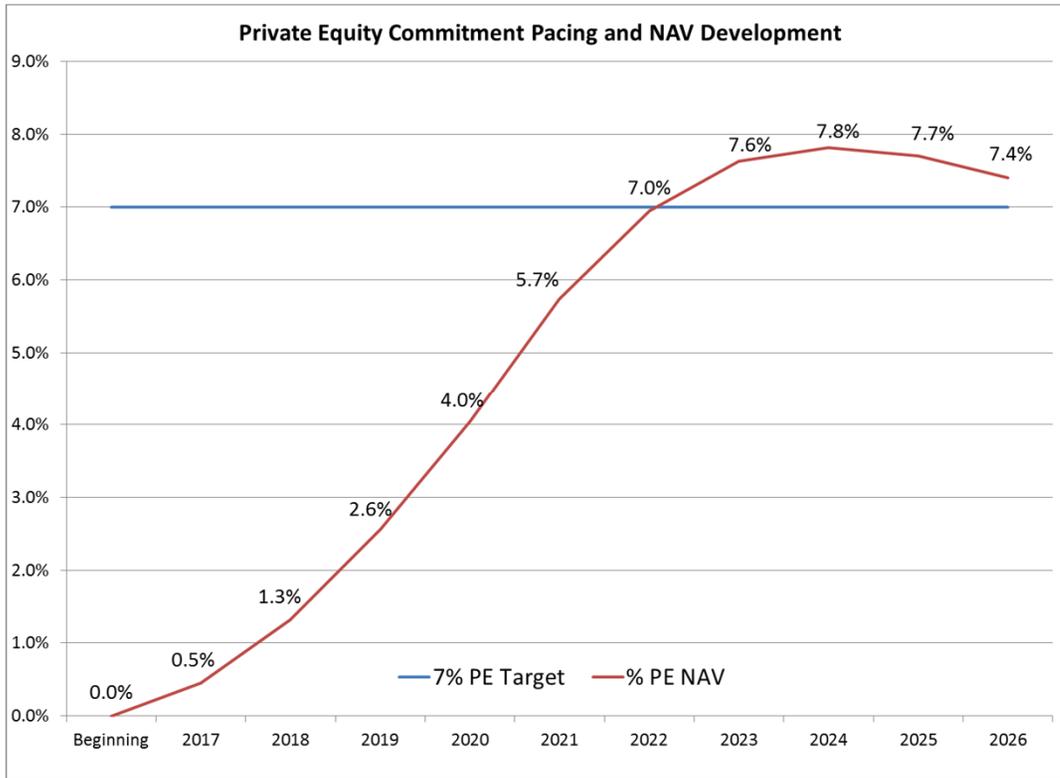
- Each strategy takes its turn at the top, middle, and bottom
- Venture has produced the highest returns, but is the most volatile
- Buyouts has less volatility, but returns are lower than venture capital
- Mezzanine has proven a good defensive strategy and contributed to returns
- The market-weighted “All Private Equity” portfolio has been most consistently strong

Implementation: Private Equity Account Vehicles

- Commingled Fund-of-Funds Vehicles
 - Smaller fund sponsors or commitments < \$150 million annual commitments
 - *Pros - low minimums, cash-to-cash service, high quality portfolios, more venture*
 - *Cons - higher fees, no strategy input, long-term lock-up, requires several years of commitments*
- Fund-of-One Vehicles
 - Single investor partnership vehicle
 - *Pros - available from more tenured managers, generally have more venture capital*
 - *Cons - require several years of commitment, fees higher, less governance and liquidity*
- Separate Accounts (Discretionary or Non-discretionary)
 - Larger fund sponsors > \$150 million annual commitments
 - *Pros - some customization, lower fees*
 - *Cons - shrinking/transitioning supplier base, better providers only offering discretionary “fund-of-one” vehicles*

Commingled fund-of-funds would be the only viable option for MCERA

Hypothetical PE Commitment Pacing Example



Year	MCERA FOF Commitments	FOF Commits to Partnerships	Resulting NAV Development	MCERA Private Equity \$ Target	Over/ (Under) Target
2017	40,000	13,333	1,867	28,840	(26,973)
2018	-	13,333	5,600	29,705	(24,105)
2019	-	13,333	11,200	30,596	(19,396)
2020	30,000	10,000	18,200	31,514	(13,314)
2021	-	10,000	26,600	32,460	(5,860)
2022	-	10,000	33,200	33,433	(233)
2023	20,000	6,667	37,533	34,436	3,097
2024	-	6,667	39,600	35,470	4,130
2025	-	6,667	40,200	36,534	3,666
2026	30,000	10,000	39,800	37,630	2,170
Total	120,000	100,000	NM	NM	NM

- \$400 million fund sponsor with a 7% Private Equity Target
- Fund net growth rate is 3% = 7% investment return – 4% net cash flow (contributions – benefit payments and expenses)
- Every \$1 committed peaks at 70 cents of NAV due to cash flow timing and fees
- FOFs commit to partnerships over three years
- Partnerships invest and liquidate over a 12-year period

Private Equity – Asset Class Profile

Benefits and Considerations

Benefits

- Returns above stocks and bonds
 - Large variation between best and worst-performing funds
 - Large variation between vintage years
 - Proper implementation is essential
- Moderate diversifier due to valuation based accounting

Considerations

- More costly (higher fees) and significantly less liquid than public stocks and bonds
- Implementation, which requires a long time horizon and continual investment, is the key risk and critical to success
- Requires greater oversight than public market investments and is more difficult to value and monitor

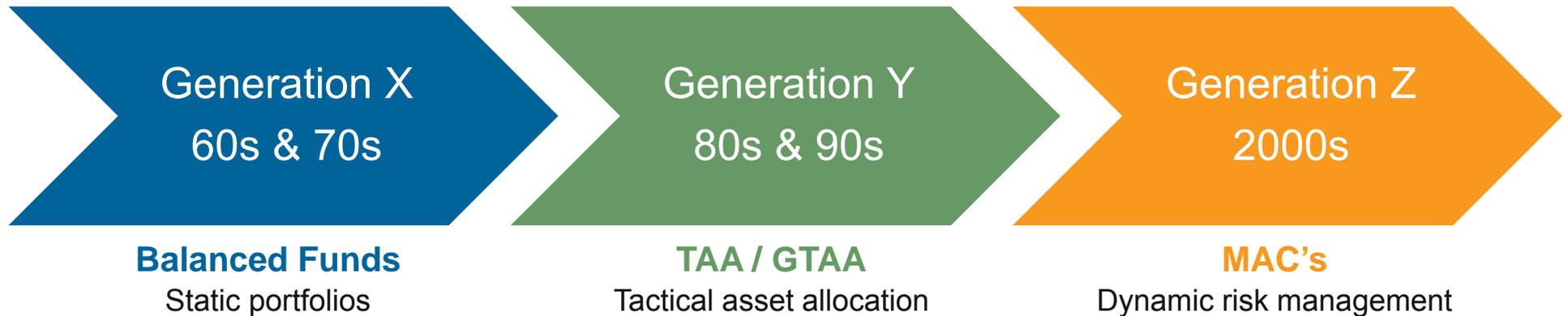
Highest expected return and risk asset class. Requires long horizon commitment and is highly illiquid. High fees. Highly correlated with public equity so only modest diversification benefits.





Multi-Asset Class Strategies

Multi-Asset Class Investing Has Been Around a Long Time



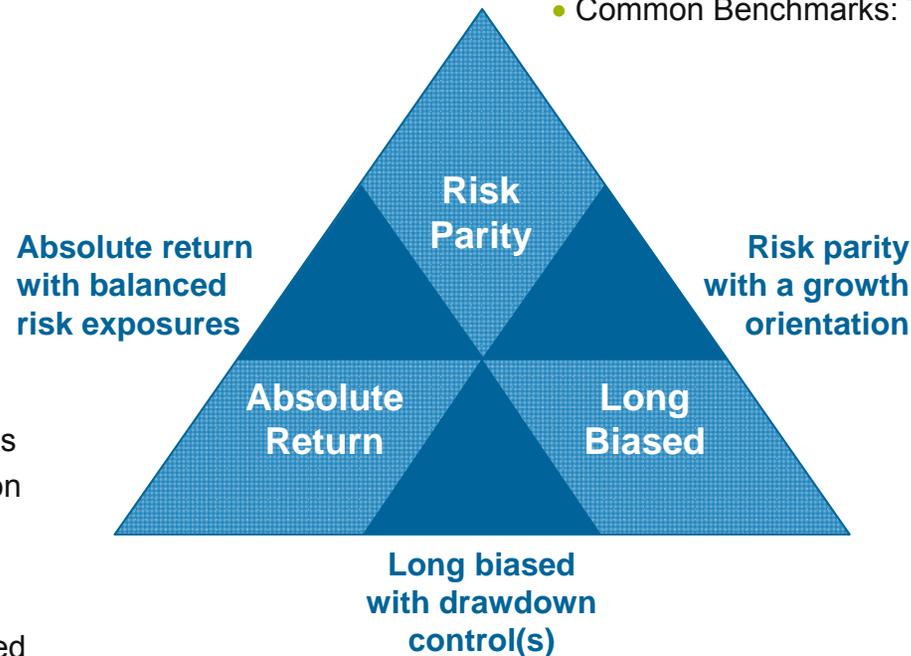
- Early tactical strategies were considered an equity style, defensively allocating between cash and equities. TAA peaked in 1988 after the 1987 crash
- Second generation (TAA) were “three-way” strategies, allocating between stocks, bonds, and cash. TAA version 2.0 peaked around 1998 in the face of a bull market headwind
- Global TAA has roots in the ‘90s with the introduction of global asset classes and currencies into the TAA framework
- The latest iteration of multi-asset class investing emerged in the early 2000s. Since the 2008 financial crisis, there has been a proliferation of these products which we call “Multi-Asset Class products” (MAC’s)

Categorization of MAC Products

- MACs do not fit nicely into homogeneous “style groups”
- Overlap between groups (blue triangles) is inescapable

Risk Parity

- Equal risk-weighted (or close to) exposure to major asset classes/risk factors/economic regimes
- Exposure implemented through long positions with lower volatility holdings levered to meet desired risk target
- Common Benchmarks: T-bills + 5-8%, Global 60/40



Absolute Return

- Bias to non-directional exposures
- Emphasis on downside protection via derivatives and long/short relative value positions
- Target exposure to risk factors while engaging in trades designed to enhance returns
- Common benchmarks: T-bills + 3-7%; CPI + 3-5%

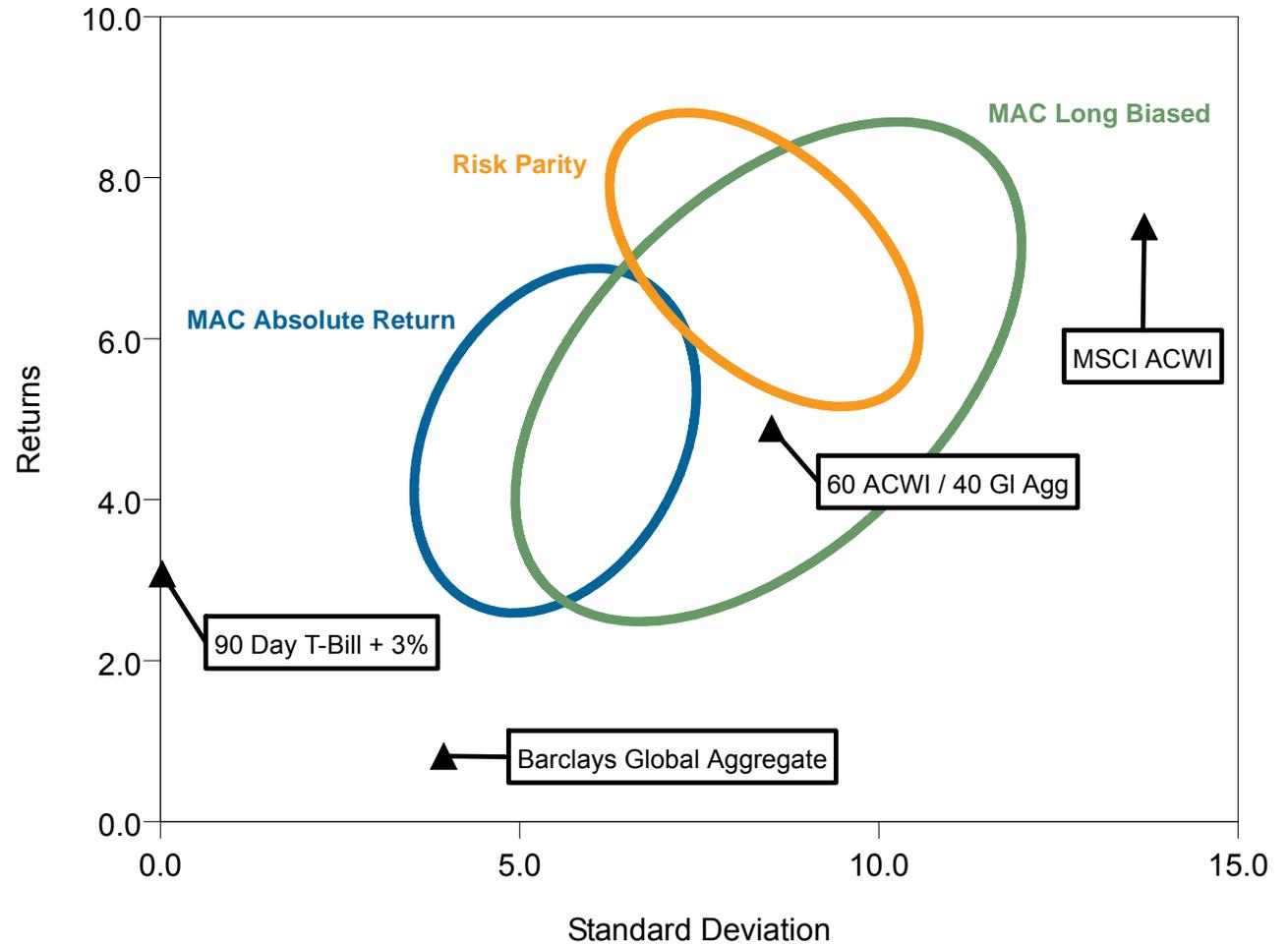
Long Biased

- Bias to directional asset class exposure
- Higher volatility than absolute return
- Shorting and derivatives may be employed but to a lesser extent
- Dynamic risk management
- Common benchmarks: T-bills + 5-8%; CPI + 4-6%

Five-Year Return vs. Risk

- Callan has created MAC peer groups
 - The ellipses represent an 80% confidence region
- Peer groups have no product overlap, yet outcomes can be jumbled
- Manager dispersion is meaningful
- Key measure of success for MAC strategies is a higher Sharpe ratio (return/risk) than traditional asset mixes

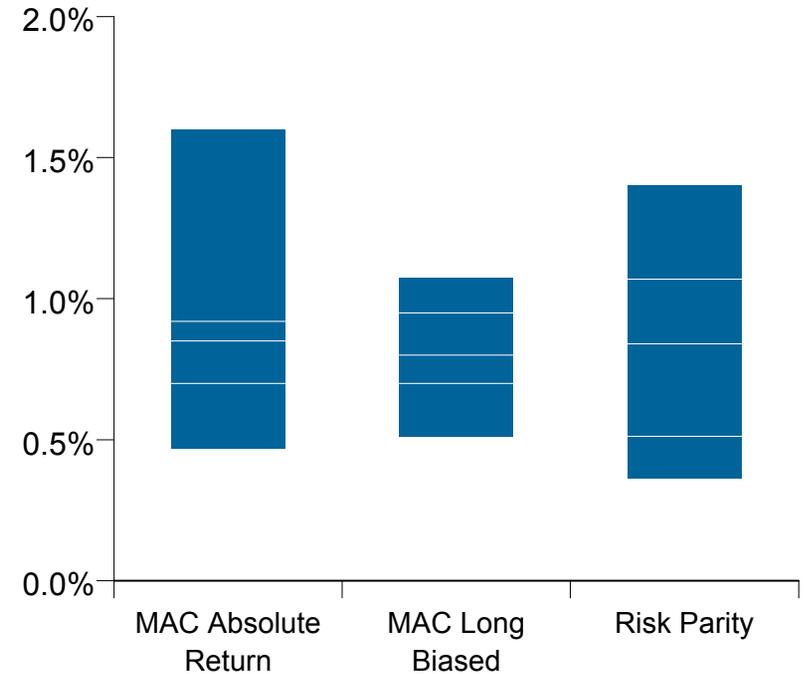
Scatter Chart for 5 Years ended September 30, 2015



Product Attributes

- Fees and complexity
 - Higher than traditional assets
 - Lower than alternative assets
- Capacity
 - Generally capacities are large unless implementation employs meaningful exposure to security selection
- Vehicles
 - Generally commingled solutions (CTs, MFs, LPs) due to complexity
 - Some strategies will run separate accounts for very large mandates
- Liquidity
 - Daily for MFs and some CTs
 - Monthly for some CTs and LPs
- Transparency
 - Excellent for most strategies

Management Fees*

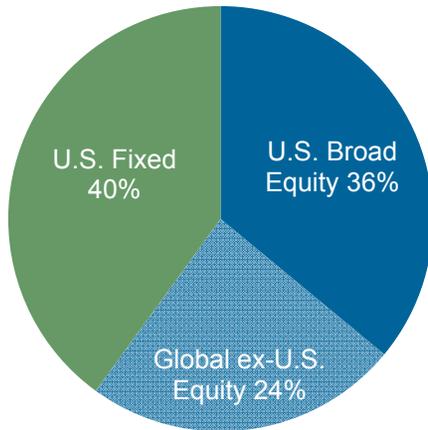


	MAC Absolute Return	MAC Long Biased	Risk Parity
10th Percentile	1.60	1.08	1.40
25th Percentile	0.92	0.95	1.07
Median	0.85	0.80	0.84
75th Percentile	0.70	0.70	0.51
90th Percentile	0.47	0.51	0.37

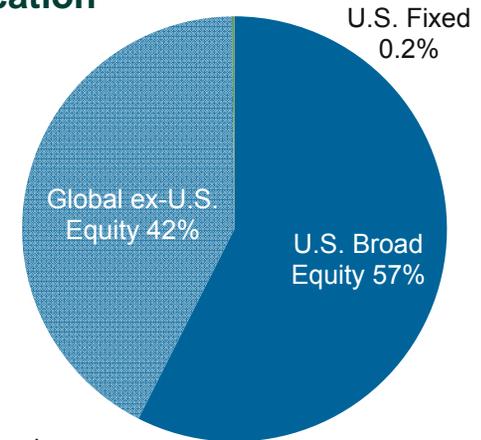
*Vehicle costs and administrative costs can add substantially

Asset Allocation vs. Risk Allocation

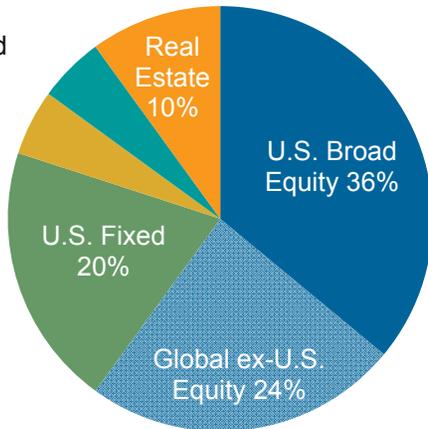
Asset Allocation



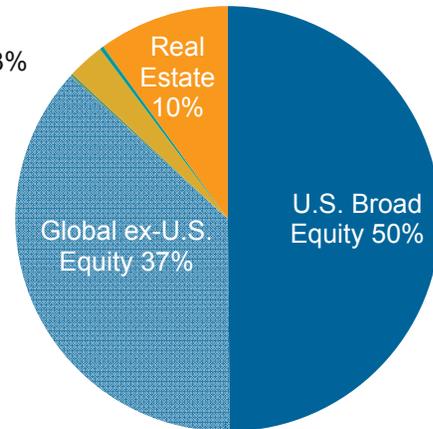
Risk Allocation



Non-U.S. Fixed 5%
High Yield 5%



Non-U.S. Fixed 0.3%
High Yield 3%
U.S. Fixed 0.2%

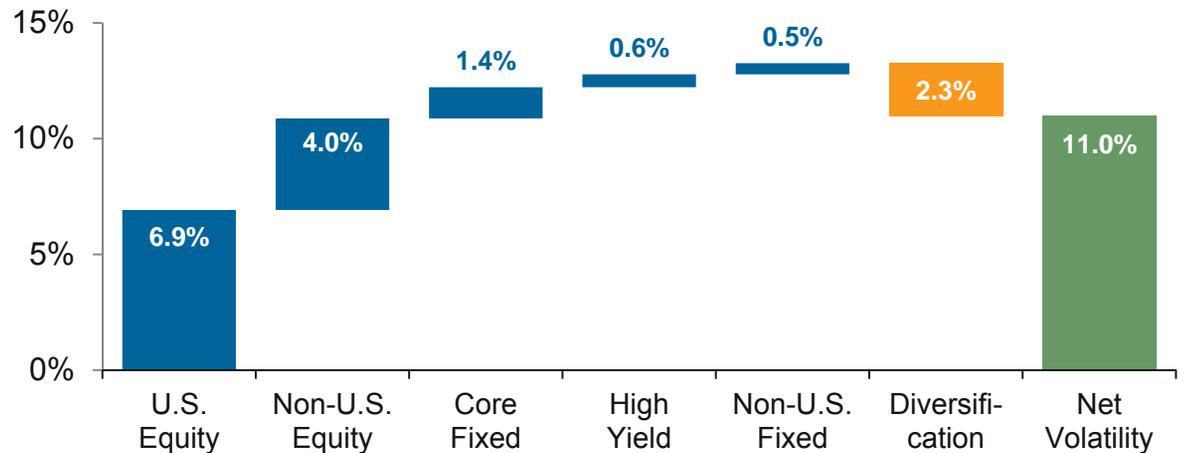


- While many portfolios *appear* to be well diversified, equity risk typically drives the level of portfolio volatility over time
- Many MAC's seek to allocate risk in a more diversified manner

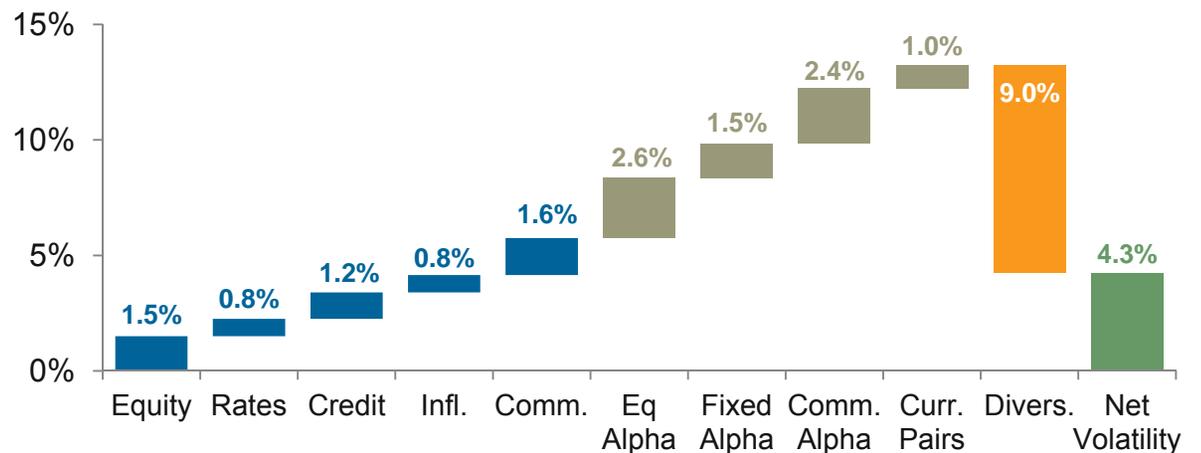
Benefits of Diversification

- The top graph illustrates the diversification benefit from a strategic asset allocation perspective.
 - Total volatility is reduced 2.3%
- The bottom graph is a stylized example of a **MAC Absolute Return** strategy.
 - This particular risk factor framework consists of five factors: equity, interest rates, credit, inflation, and commodities.
 - Non-directional (e.g., relative value trades) bets comprise the rest of the portfolio.
 - Total volatility is reduced by 9.0%
- The risk factors used, if any, and the split between directional and non-directional trades vary widely across MAC strategies.

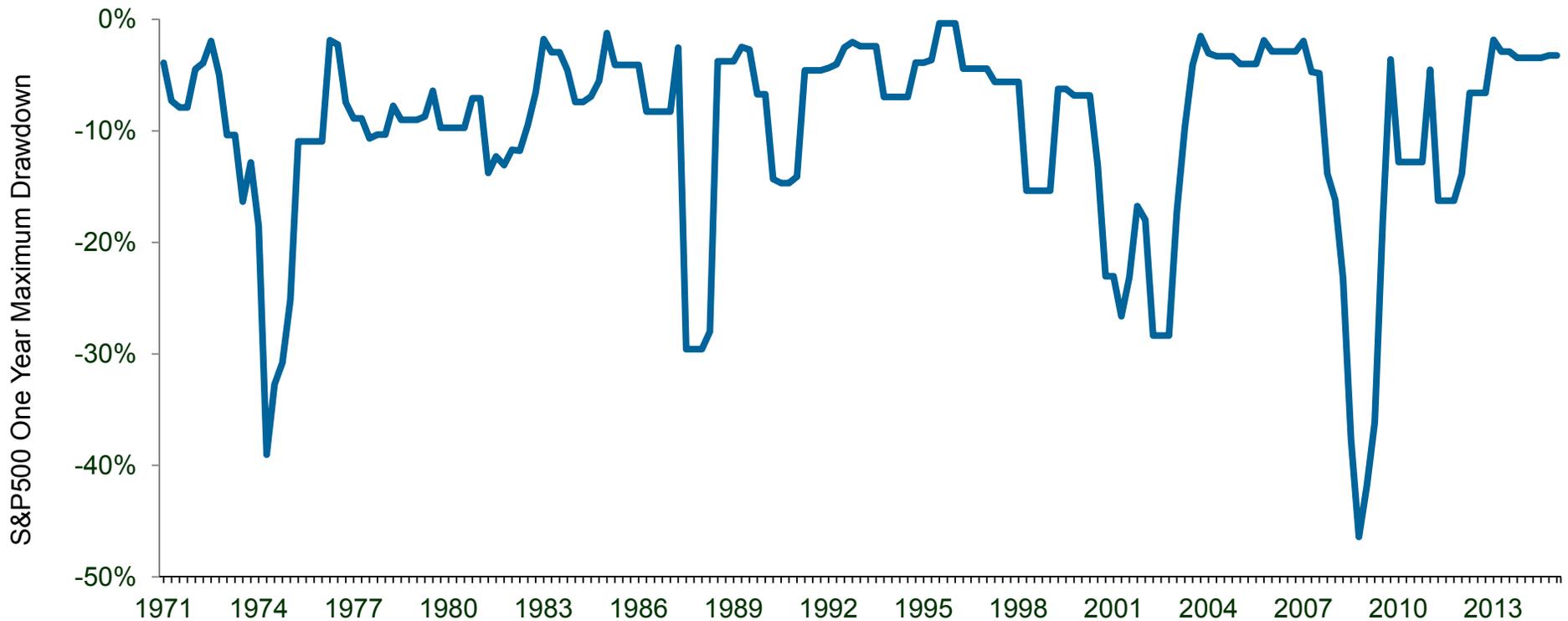
Global 60/40 Risk Allocation



MAC Absolute Return Risk Allocation



Drawdown Risk



- This chart depicts the rolling one-year maximum drawdown (based on monthly returns) of the S&P 500
- Drawdown risk may be mitigated in a number of ways, such as tail risk hedging, relative value trades, and dynamic risk allocation
- The amount of drawdown protection and methods used vary considerably by MAC strategy

Use in Strategic Asset Allocation

Investment Goals	Strategy Preference
<ul style="list-style-type: none">– Improve diversification– De-risk portfolio– Lower drawdown risk	Absolute Return
<ul style="list-style-type: none">– Outperform a static global 60/40 allocation over the long run	Long Biased, Risk Parity
<ul style="list-style-type: none">– Seek uncorrelated investment strategies– Higher risk-adjusted returns	All

- Allocation can be funded pro-rata from rest of portfolio or primarily from lower risk asset classes for absolute return and long biased
- Size of allocation depends on many factors
 - Confidence and comfort with MAC strategies
 - What allocation is required to meet the investment goal?
 - Fees, complexity and use of leverage may also be a factor

Multi-Asset Class Strategies – Profile

Benefits and Considerations

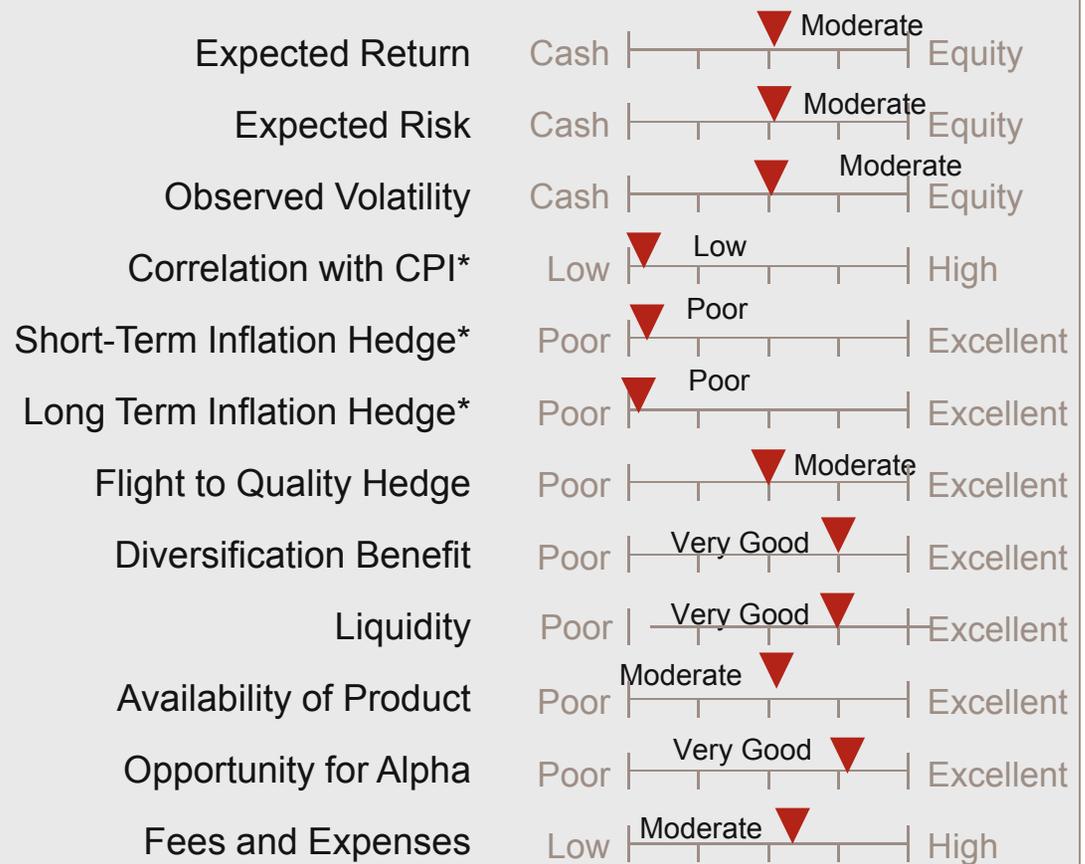
Benefits

- Can provide diversification from equities and bonds.
- Can provide downside protection in equity bear markets
- Skillful managers can provide meaningful returns (e.g. T-bills + 3-5%)
- More transparent than hedge funds
- Significantly lower fees than hedge funds

Considerations

- Many products are relatively new haven't been tested in periods of severe market stress such as 2008
- Will typically underperform equities in bull markets
- Assessment can be challenging due to wide dispersion of investment approaches and difficulty of benchmarking
- Requires knowledge and comfort with the use of derivatives and leverage.
- Generally more expensive than traditional long only products

Strong diversifier to a traditional portfolio, with low correlation to other asset classes. Moderate expected return and risk expectations. Moderate fees and very good liquidity.



* In general - some MAC's target inflation protection as a specific objective



Potential Impact on plan

Expected return and risk characteristics

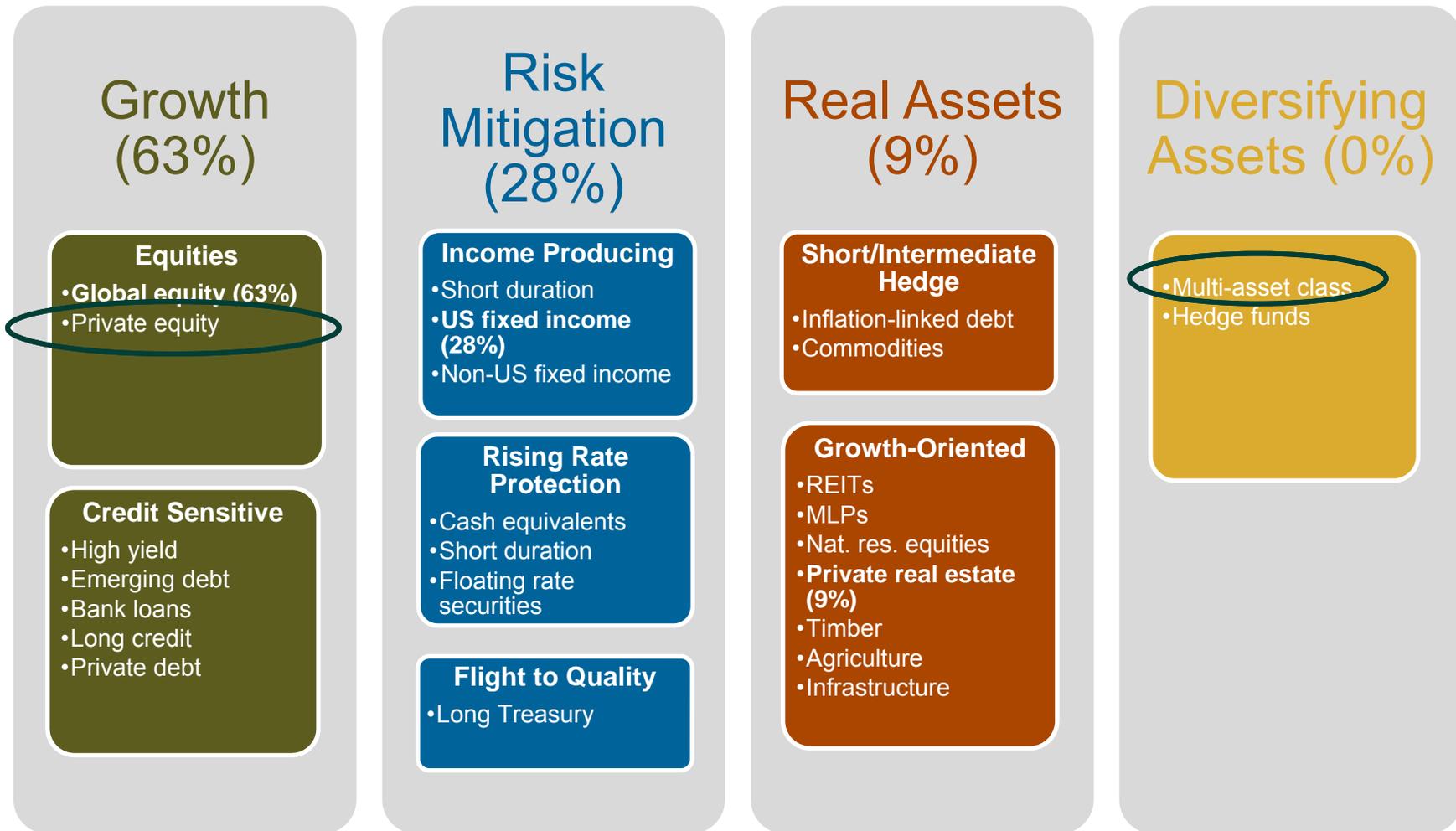
MCERA's current asset allocation policy

Asset Class	Target
US Broad Equity	38%
Global Ex-US Equity	25%
Domestic Fixed	28%
Real Estate	9%
Cash Equivalents	0%
Total	100%

Arithmetic Expected Return	7.25%
Geometric Expected Return*	6.58%
Risk (Standard Deviation)	13.12%
Inflation (CPI)	2.25%

*Annualized return over 10 year horizon

Role of Asset Classes in Different Scenarios



- Percentages in parentheses and bolded represent MCERA's current target allocation

2016 Capital Market Expectations—Return and Risk

Summary of Callan's 10 year Capital Market Projections

Asset Class	Benchmark	Expected Return*	Standard Deviation
Equities			
Broad Domestic Equity	Russell 3000	7.35%	18.70%
Large Cap	S&P 500	7.25%	17.75%
Small/Mid Cap	Russell 2500	7.55%	22.75%
Global ex-U.S. Equity	MSCI ACWI ex USA	7.55%	21.30%
International Equity	MSCI World ex USA	7.25%	20.05%
Emerging Markets Equity	MSCI Emerging Markets	7.60%	27.85%
Fixed Income			
Short Duration	Barclays G/C 1-3	2.60%	2.25%
Domestic Fixed	Barclays Aggregate	3.00%	3.75%
Long Duration	Barclays Long G/C	3.70%	11.40%
TIPS	Barclays TIPS	3.00%	5.30%
High Yield	Barclays High Yield	5.00%	10.50%
Non-U.S. Fixed	Barclays Global Aggregate ex US	1.40%	9.20%
Emerging Market Debt	EMBI Global Diversified	4.70%	10.00%
Other			
Real Estate	Callan Real Estate	6.00%	16.45%
Private Equity	TR Post Venture Cap	8.15%	32.80%
MACs	Cash + 3%	5.25%	9.30%
Commodities	Bloomberg Commodity	2.75%	18.50%
Cash Equivalents	90-Day T-Bill	2.25%	0.90%
Inflation	CPI-U	2.25%	1.50%

* Annualized return over 10 year horizon

Impact of Private Equity

	Current Policy	7% PE at Current Risk Level	Substitute 7% PE for Equity
Broad US Equity	38%	29%	34%
Global Ex-US Equity	25%	22%	22%
Private Equity	0%	7%	7%
Broad US Fixed Income	28%	32%	28%
Private Real Estate	9%	10%	9%
Total	100%	100%	100%
Role in Portfolio			
Growth	63%	58%	63%
Risk Mitigation	28%	32%	28%
Real Assets	9%	10%	9%
Diversifying Assets	0%	0%	0%
Mix Characteristics			
Expected Return*	6.58%	6.58%	6.75%
Standard Deviation	13.12%	13.12%	13.99%

- Incorporating 7% to private equity at current risk level improves scenario diversification
- Substituting 7% private equity for public equity increases both expected return and risk

Impact of MAC's

	Current Policy	9% MAC at Current Risk Level	Substitute 9% MAC for Fixed Income
Broad US Equity	38%	32%	38%
Global Ex-US Equity	25%	26%	25%
Broad US Fixed Income	28%	22%	19%
Private Real Estate	9%	11%	9%
Multi-Asset Class	0%	9%	9%
Total	100%	100%	100%
Role in Portfolio			
Growth	63%	58%	63%
Risk Mitigation	28%	22%	19%
Real Assets	9%	11%	9%
Diversifying Assets	0%	9%	9%
Mix Characteristics			
Expected Return*	6.58%	6.58%	6.72%
Standard Deviation	13.12%	13.12%	13.82%

* 10 year annualized return

- Incorporating 9% to MAC's at current risk level reduces dependence on growth but also lowers allocation to the risk mitigation bucket
- Substituting 9% to MAC's from fixed income increases both expected return and risk

Impact of both Private Equity and MAC's

	Current Policy	Optimal at Current Risk Level
Broad US Equity	38%	29%
Global Ex-US Equity	25%	22%
Private Equity	0%	7%
Broad US Fixed Income	28%	32%
Private Real Estate	9%	10%
Multi-Asset Class	0%	9%
Total	100%	100%
Role in Portfolio		
Growth	63%	58%
Risk Mitigation	28%	32%
Real Assets	9%	10%
Diversifying Assets	0%	9%
Mix Characteristics		
Expected Return*	6.58%	6.59%
Standard Deviation	13.12%	13.12%

* 10 year annualized return

- Incorporation of both private equity and MAC's increases scenario diversification



Appendix: Asset Class Correlations

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