Callan

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Mendocino County Employees' Retirement Association

Fixed Income Education and Manager Structure

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Agenda

- Fixed Income Education
- Current MCERA Fixed Income Portfolio
- MCERA Fixed Income Manager Structure





Fixed Income Structure

Guiding Principles/Best Practices

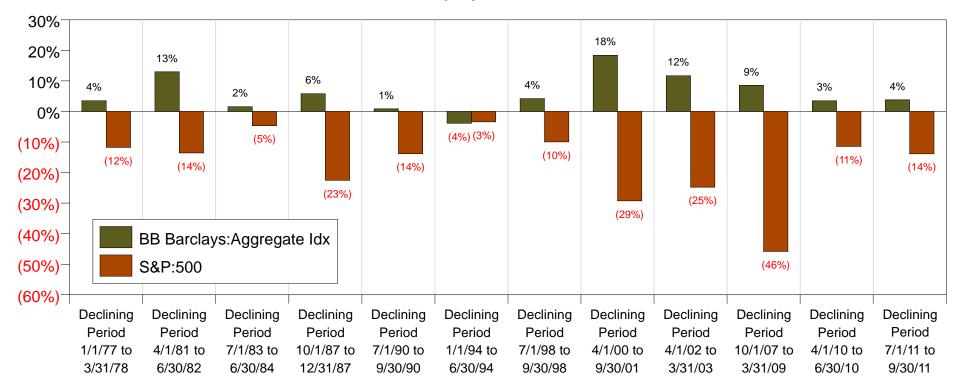
- Role of Fixed Income The portion of a fund's total portfolio that normally acts as a low risk anchor for the fund and should therefore be fairly conservative.
 - Broad, diversified exposure
 - Investment-grade quality bonds
- Primary determinants of fixed income performance:
 - Duration
 - Sector
 - Quality
- Callan's philosophy:
 - Neutral to the broad market, as represented by the Barclay's Aggregate Bond Index. Neutrality in this case is primarily defined as the duration range and secondarily as the credit quality.
 - Greater systemic credit exposure will tend to increase the relationship of bonds to stocks in periods of economic or market stress (e.g. market meltdown in 2008 to early 2009)
- Programs with low bond exposure probably should emphasize very high quality bonds.

Fixed Income Structure

Role as the "Anchor to Windward"

 High quality fixed income serves as a low-risk, diversifying anchor against which an investor takes on riskier investments in assets such as equity.

Cumulative Returns in Periods when Domestic Equity Declines





Terms

- A bond is a loan usually made by a government, NGO or company
 - The borrowing entity is known as the "issuer"
- The loan is made when an investor (lender) buys the bond
- The amount of the loan is the "par" amount of the bond
 - This is also the price of the bond when the loan is made
 - Individual bonds usually have a par amount of \$1,000
- The declared interest rate when the loan is made is the "coupon"
 - A 3% coupon means that the lender will pay 3% of the bond par amount each year
 - Coupon payments are usually made every 6 months
- The length of the loan is the "maturity" of the bond
 - Bonds are often referred to by their maturities: a "10-year bond" matures in 10 years
 - When the bond matures the borrower repays the lender
- Bonds are bought and sold among investors before they mature
 - The mechanics of bond sales between issuance and maturity are covered in the following slides

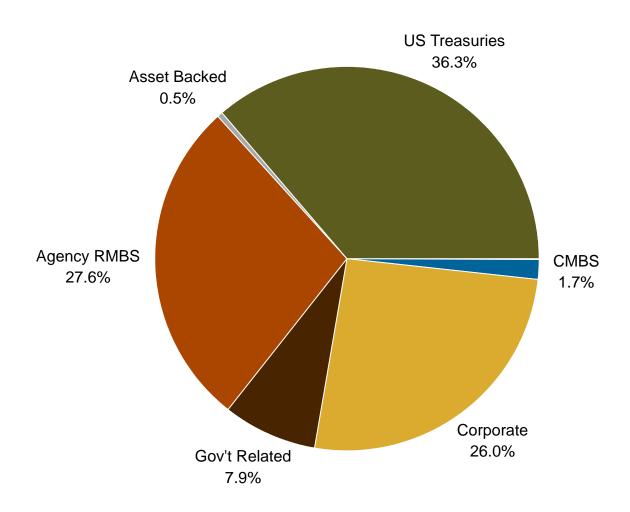
Fixed Income Securities

Sectors

- Treasury Backed by the full faith and credit of the U.S. government.
 - Treasury Inflation Protected Securities (TIPS) offer protection from inflation.
- Agency Issued by government agencies, as of 9/08 effectively backed by the Federal government.
- Credit Debt securities issued by publicly held corporations to raise money for expansion or other business needs.
- High Yield Credit (Junk Bonds) Carry a higher than average risk of default. Junk bonds must pay higher interest rates to offset this risk making them "high yield."
- Mortgage Backed Securities (MBS) A sponsor buys up mortgages, pools them and packages them for sale to the public.
- Commercial Mortgage-Backed Securities (CMBS) publicly traded bond-like products that are based on underlying pools of commercial mortgages.
- Asset Backed Security (ABS) Secured by money owed to a company for merchandise or services purchased on credit. A securities firm bundles debt, such as credit card or car loans, and sells investors the right to receive the payments made on these loans.

Fixed Income Sectors

Barclays Aggregate Bond Index



Barclays Aggregate Bond Index does not include the following sectors:

- High Yield
- International
- Emerging Market

Fixed Income Strategies

Descriptions, Pros and Cons

- Passive Core: Replicates the return of the underlying index
 - Pros
 - Virtually no tracking error
 - Low cost
 - Large Treasury allocation expected to perform well when equities perform poorly
 - Provides liquidity for cash flows, rebalancing, and transitions
 - Simple to monitor
 - Cons
 - Lacks the potential to add value over the index
 - Large Treasury allocation likely to be a drag on returns in normal markets due to low yields
- Active Core: Attempts to add modest amounts of value over the return of the Aggregate index while experiencing a limited amount of tracking error
 - Pros
 - Expectation of value added by modest interest rate, sector, and security management
 - Low tracking error
 - Cons
 - Outperformance over the index can be difficult to achieve net of fees
 - Active core managers can underperform during times of equity market stress due to low Treasury allocations

Dodge & Cox Income Fund is an example of this style in MCERA's portfolio



Fixed Income Strategies

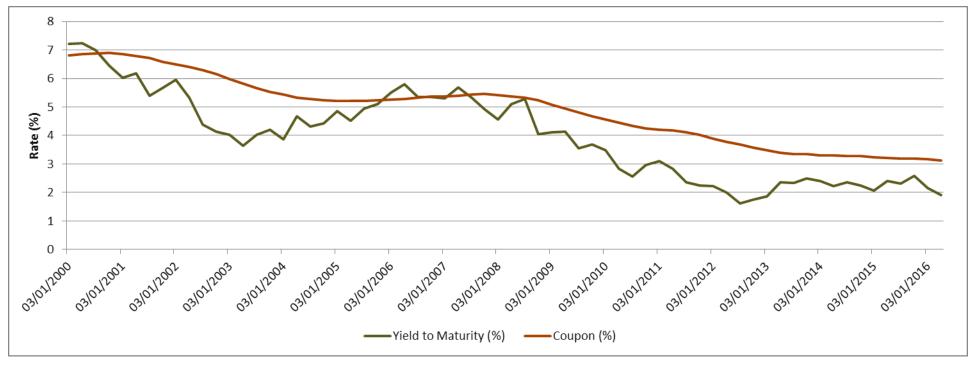
Descriptions, Pros and Cons

- Core Plus: Attempts to add significant value over the Aggregate with relatively high tracking error due in part to the use of non-index securities such as high yield and non-U.S. bonds
 - Pros
 - Managers have generally added value over the index net of fees
 - Tactical allocation to non-index securities when their valuations make them attractive
 - Cons
 - Higher tracking error may not be consistent with stabilizing role of fixed income
 - Non-index securities tend to have higher correlations to equities limiting the amount of overall portfolio diversification

PIMCO Total Return Fund is an example of this style in MCERA's portfolio

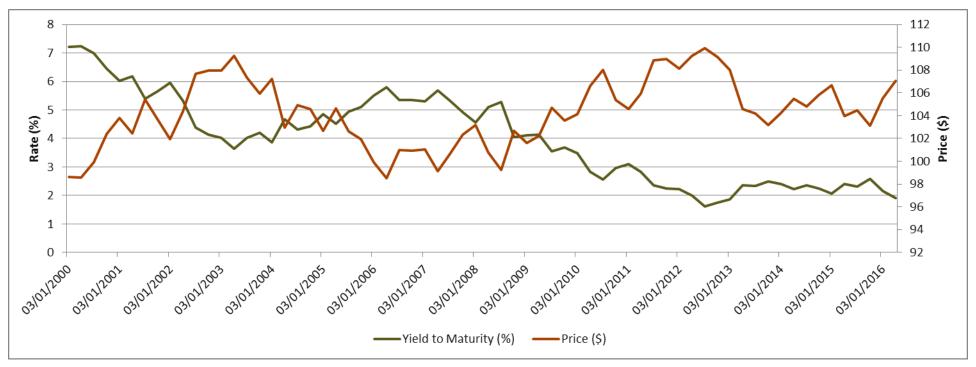


Historical Aggregate Index Interest Rates



- The coupon shown above is the average interest rate at the time of sale for the bonds contained in the Aggregate index
- The yield to maturity is the interest rate an investor is forecasted to receive for buying the basket of bonds that make up the index today
- The interest rate at any given time can differ significantly from the coupon and is based on the demand and supply of bonds at the time of the transaction

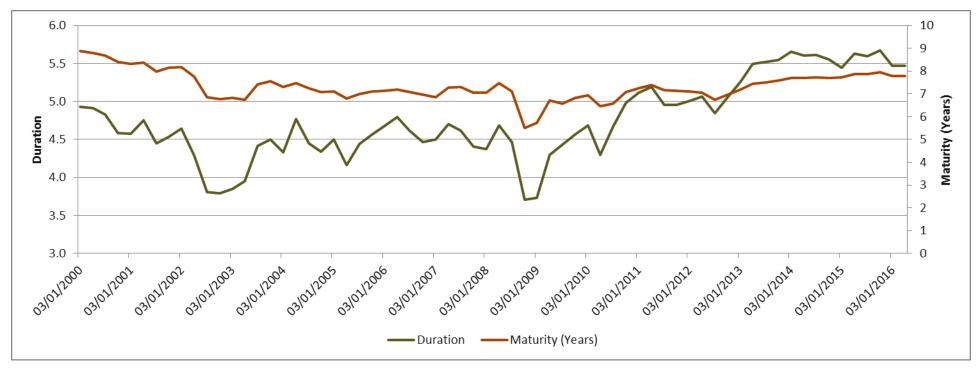
Historical Aggregate Index Interest Rates and Prices



- As with other traded items, the price of bonds goes up when demand for loans is high and down when demand is low
- Conversely, when the demand for loans is high, the interest rates investors are willing to receive goes down and vice versa
- These relationships mean that bond prices move inversely with bond yields
 - The chart above shows the historical relationship between price and yield for the Aggregate index



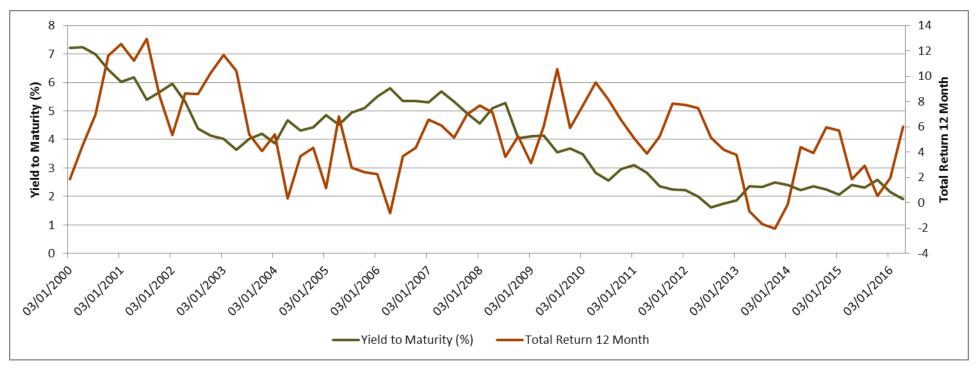
Historical Aggregate Index Maturities and Durations



- Duration is related to maturity in that bonds with longer maturities have higher durations
 - The duration of a bond is less than its maturity
- Duration is the amount a bond price changes for a 1% change in interest rates
 - If a bond has a duration of 5 then if interest rates fall by 1% the bond price increases by 5%
 - Conversely, a 5 duration means that if interest rates rise by 1% the bond price will fall by 5%
- The duration for the Aggregate index is currently about 5.5



Historical Aggregate Index Interest Rates and Returns



- For more than 30 years interest rates have generally been falling which means that bond prices have been going up
 - Investors have been selling bonds for higher prices than they paid earning a capital gain
- With interest rates at historic lows the fear is that increasing interest rates will lead to lower prices and capital losses
- If interest rates rise slowly than yields could offset some or all of the capital losses



Historical Aggregate Index and S&P 500 Returns

Rolling 3-Year Returns for 30 Years Ended June 30, 2016



- While the prospects for fixed income returns in the near future look modest, fixed income still plays a vital role in the portfolio
- Over the last 30 years the S&P 500 has suffered many 3-year periods with losses including double-digit losses while the Aggregate has had positive returns over all of these time periods

Core Bond Style versus Barclays Aggregate

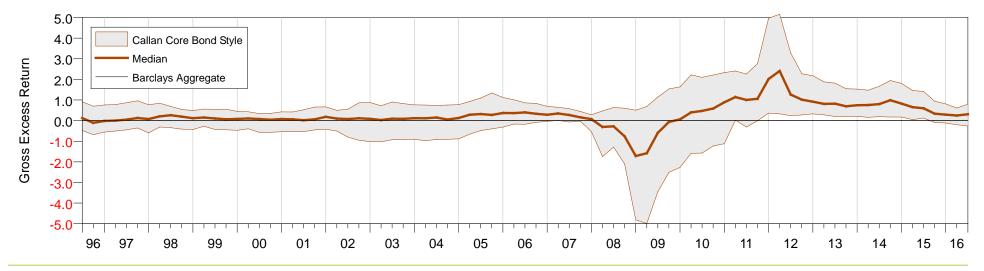
• Percent of Three-Year periods where Manager Beat Benchmark by more than Hurdle - by Percentile

Fee Hurdle	0.20%	0.25%	0.30%	0.35%	0.40%	0.45%	0.50%	0.55%	0.60%	0.65%
Median	48%	46%	38%	31%	26%	26%	25%	25%	23%	23%
45th Percentile	53%	49%	44%	39%	34%	29%	28%	28%	26%	24%
40th Percentile	65%	56%	49%	43%	39%	35%	31%	28%	28%	28%
35th Percentile	78%	65%	59%	48%	45%	38%	35%	34%	31%	28%
30th Percentile	89%	76%	68%	59%	50%	45%	41%	36%	35%	33%
25th Percentile	96%	89%	79%	69%	59%	54%	48%	43%	40%	36%

Average Annualized 3-Year Excess Return (gross) – Median Manager:

0.29%

Rolling 12 Quarter Gross Excess Return relative to Barclays Aggregate for 20 Years ended June 30, 2016



Core Plus Bond Style versus Barclays Aggregate

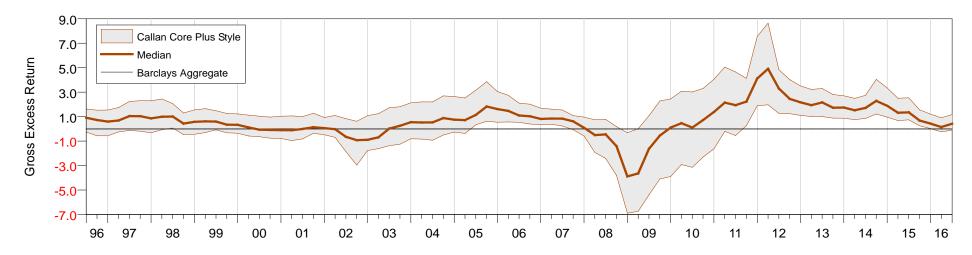
Percent of Three-Year periods where Manager Beat Benchmark by more than Hurdle – by Percentile

Fee Hurdle	0.20%	0.25%	0.30%	0.35%	0.40%	0.45%	0.50%	0.55%	0.60%	0.65%
Median	69%	69%	68%	65%	65%	61%	60%	58%	55%	50%
45th Percentile	71%	70%	68%	68%	68%	65%	61%	61%	59%	59%
40th Percentile	76%	74%	73%	71%	71%	70%	68%	64%	64%	64%
35th Percentile	80%	79%	76%	74%	73%	73%	73%	70%	69%	64%
30th Percentile	84%	83%	83%	81%	80%	78%	75%	74%	73%	69%
25th Percentile	90%	88%	88%	88%	84%	81%	80%	79%	76%	75%

Average Annualized 3-Year Excess Return (gross) – Median Manager:

0.70%

Rolling 12 Quarter Gross Excess Return relative to Barclays Aggregate for 20 Years ended June 30, 2016



Negative Yields across the Globe

As of September 30, 2016

G10 Government Bond Yields

	Switz.	Germ.	Japan	Neth.	Belg.	France	\$wę.	UK	Can.	Italy	USA
2Y	-1:05	-0.69	-0.29	-0.66	-0.65	-0.65	-0.68	0.10	0.52	-0.12	0.76
3Y	-1.01		-0.29	-0.65	-0.59	-0.62		0.11	0.52	-0.01	0.87
4Y	-0.94	-0.67	-0.27	-0.63	-0.55	-0.54	-0.56	0.17	0.55	0.05	1.06
5Y	-0.88	-0.58		-0.47	-0.47	-0.44	-0.38	0.22	0.61	0.26	1.15
6Y	-0.82	-0.54	-0.25	-0.48	-0.42			0.32	0.67	0.43	1.31
7Y	-0.76	-0.48	-0.25			-0.29	-0.24	0.41	0.76	0.61	1.42
8Y	-0.69	-0.39	-0.20	-0.26	-0,19	-0.11	-0.07	0.53	0.82	0.81	1.48
9Y	-0.63	-0.27	-0.16	-0.12	-0.02	0.03		0.65	0.89	1.02	1.57
10Y	-0.58	-0.12	-0.09	0.00	0.13	0.18	0.16	0.75	1.00	1.19	1.60
15Y	-0.36	0.01	0.09	0.22	0.51	0.48	0.68	1.16		1.54	1.73
20Y	-0.22	0.23	0.35	0.31	0.59	0.75	0.98	1.33	1.63	1.84	2.02
30Y	-0.07	0.44	0.45	0.52	1.06	0.97		1.49	1.66	2.24	2.32

Local currency yields

Source: Bloomberg, Lazard Asset Management





Current MCERA Fixed Income Structure

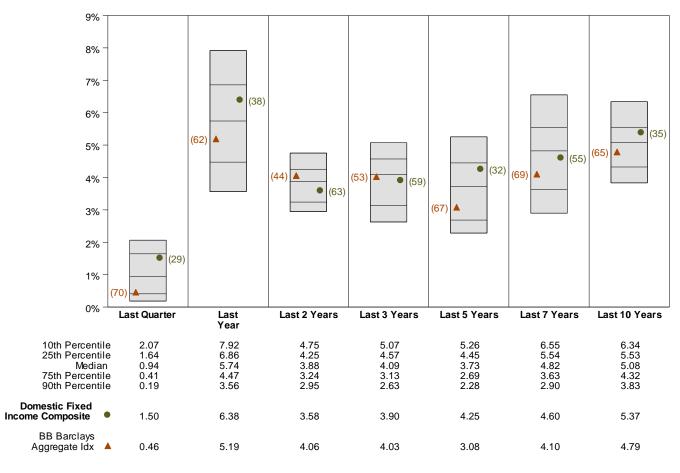
Style	Allocation (%, Fixed Income Assets)	Allocation (%, Total Assets)	Allocation (\$, mm)
Core			
Dodge & Cox Income Fund	50.2%	11.0%	\$48.74
Core Plus			
PIMCO Total Return Fund	49.8%	10.9%	\$48.28
Total	100.0%	21.9%	\$97.02

- Following the Asset Liability Study, the Fixed Income target allocation was reduced from 28% to 22%. The structure shift took place at the end of September, 2016.
- The Fixed Income Portfolio is split approximately 50% 50% in the Core Fund and the Core Plus Fund.

Total Fixed Income Portfolio

As of September 30, 2016

Performance vs Pub PIn- Domestic Fixed (Gross)



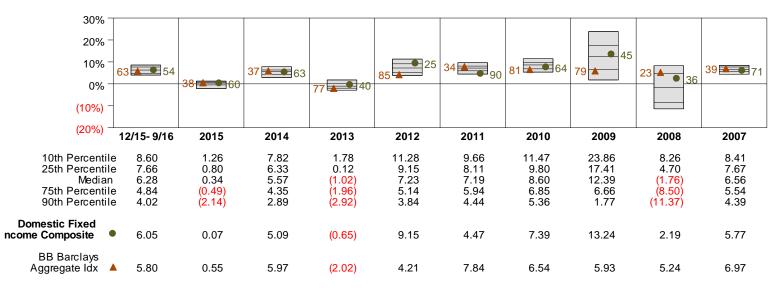
- MCERA Fixed Income Allocation leads the Index in the short- and long-term, but slightly trails in the intermediate-term.
- In the longer-term, the Portfolio either around or above peer median.



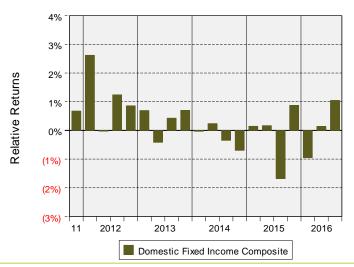
Total Fixed Income Portfolio

As of September 30, 2016

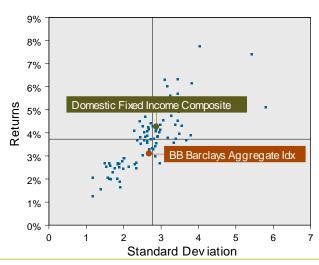
Performance vs Pub PIn- Domestic Fixed (Gross)



Relative Return vs BB Barclays Aggregate Idx



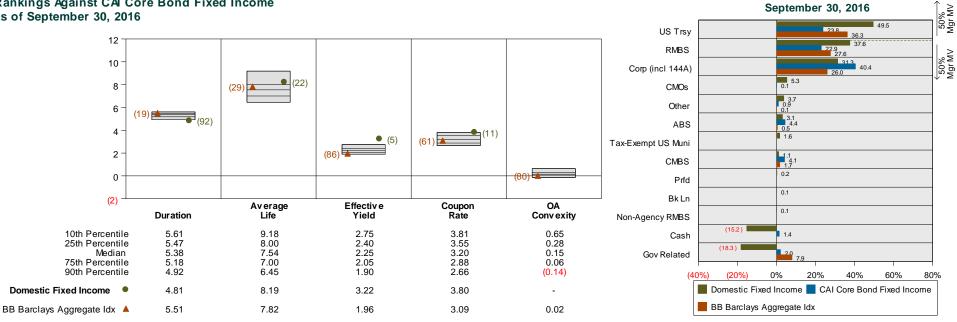
Pub Pln- Domestic Fixed (Gross)
Annualized Five Year Risk vs Return



Total Fixed Income Portfolio

As of September 30, 2016

Fixed Income Portfolio Characteristics Rankings Against CAI Core Bond Fixed Income as of September 30, 2016



Duration **Effective Yield** Percent 5.51 4.81 3.22 3 1.96 2011 2012 2013 2014 2015 2016 2011 2014 2016 2012 2013 2015 BB Barclays Aggregate Idx Fixed Income Portfolio

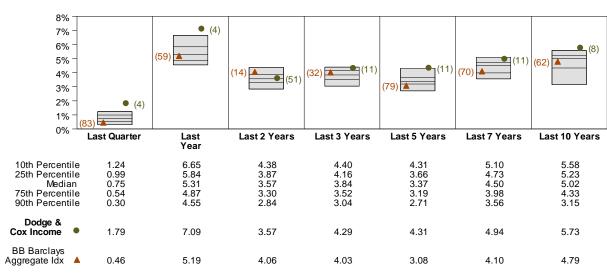


Sector Allocation

Dodge & Cox Income Fund

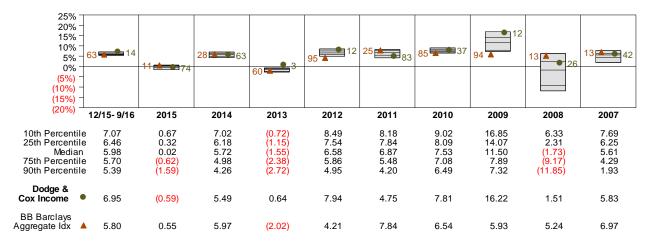
As of September 30, 2016

Performance vs CAI Core Bond Mutual Funds (Net)



- Core Bond Strategy
- Mutual Fund
- Bottom up manager
- Emphasis on Corporate and Mortgage bond security selection
- Historical bias to overweight Corporate Debt
- Maintains shorter than index Duration
- Yields generally higher relative to the benchmark
- Mutual Fund fees are 43 bps

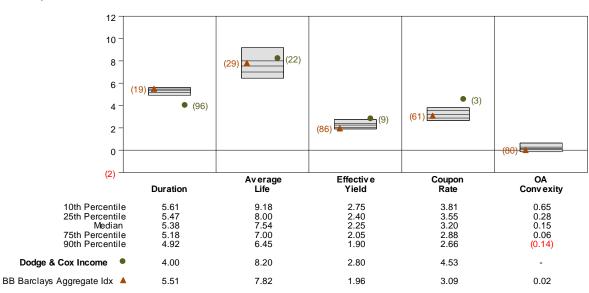
Performance vs CAI Core Bond Mutual Funds (Net)

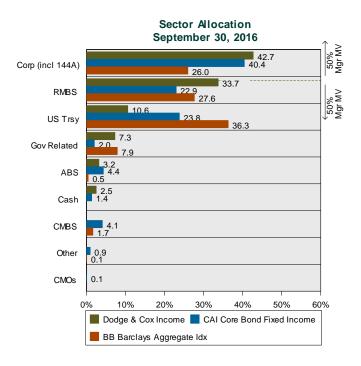


Dodge & Cox Income Fund

As of September 30, 2016

Fixed Income Portfolio Characteristics Rankings Against CAI Core Bond Fixed Income as of September 30, 2016





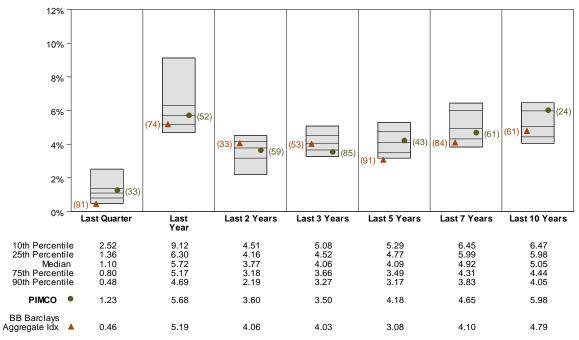
Effective Yield Duration Percent 5.51 4.00 2.80 1.96 2011 2012 2013 2014 2015 2016 2011 2012 2013 2014 2015 2016 BB Barclays Aggregate Idx Dodge & Cox Income Fund



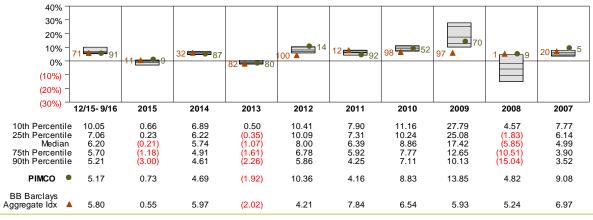
PIMCO Total Return Fund

As of September 30, 2016

Performance vs CAI Core Plus Mutual Funds (Net)



Performance vs CAI Core Plus Mutual Funds (Net)



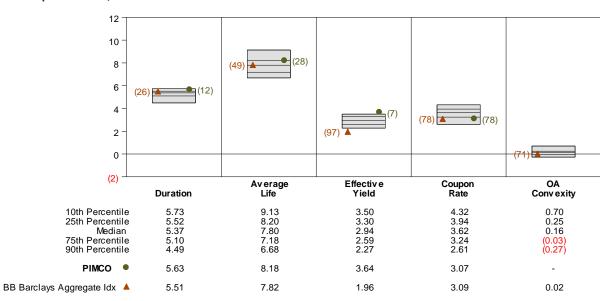
- Core Plus Mandate
- Mutual Fund
- Top down manager actively managing interest rate & sector exposure
- Latitude to invest tactically in High Yield, Emerging Debt & Bank Loans
- Tends to underweight Corporate bonds
- Duration has varied relative to the Index
- Yields generally higher relative to the benchmark
- Mutual Fund fees are 47 bps

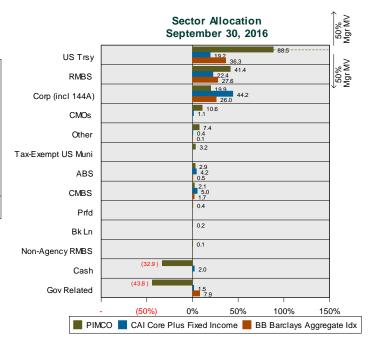


PIMCO Total Return Fund

As of September 30, 2016

Fixed Income Portfolio Characteristics Rankings Against CAI Core Plus Fixed Income as of September 30, 2016

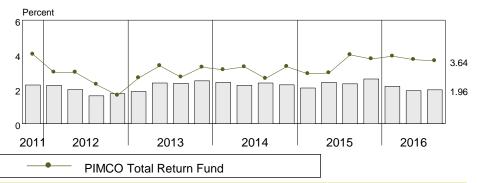




Duration

8 6 4 2 0 2011 2012 2013 2014 2015 2016 BB Barclays Aggregate Idx

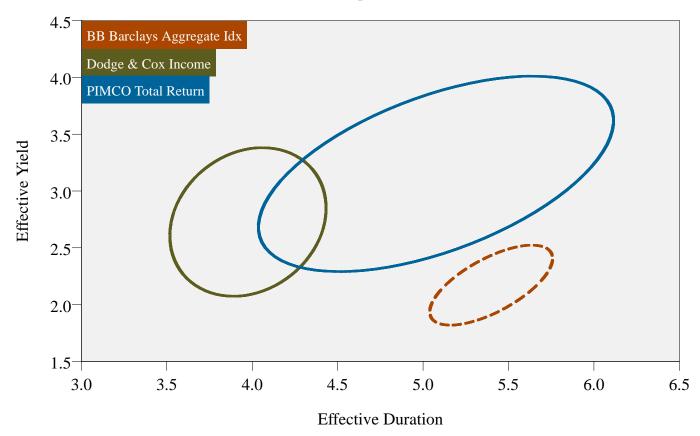
Effective Yield



Interest Rate Sensitivity and Yield

As of September 30, 2016

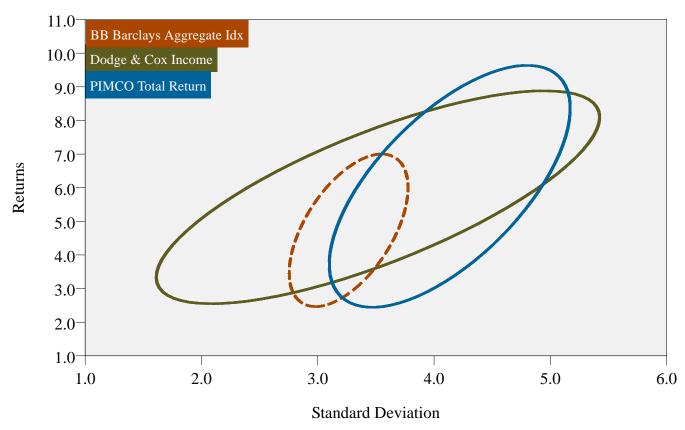
Rolling 1 Quarter Scatter Chart for 5 Years Ended September 30, 2016



Return and Risk

As of September 30, 2016

Rolling 12 Quarter Scatter Chart for 10 Years Ended September 30, 2016

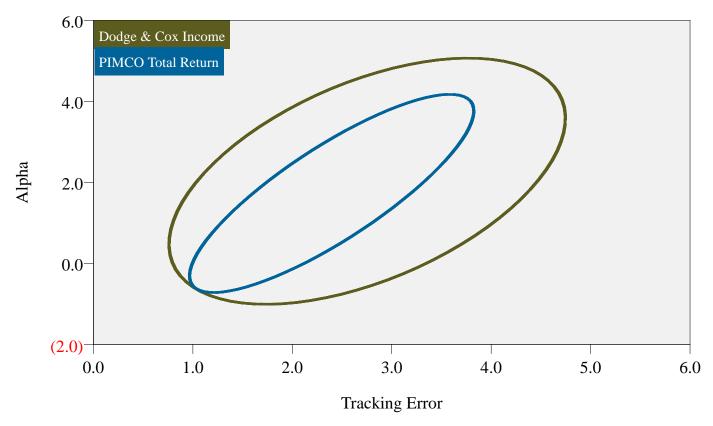




Alpha and Tracking Error

As of September 30, 2016

Rolling 12 Quarter Scatter Chart for 10 Years Ended September 30, 2016 Benchmark: BB Barclays Aggregate Idx





Guiding Principles of Investment Structure All Asset Classes

- Active management offers the potential to add value over the index and can be complementary to passive management.
 - Excess returns are more difficult to achieve in efficient markets such as large cap U.S. equity and U.S. fixed income
 - Potential for excess returns are compelling in small/mid cap US equity, non-US equity, emerging equity and non-US small cap equity
- Well-diversified market-neutral exposure with no unintended biases
 - Avoid overlapping mandates
 - May wish to purposefully add bias to small/mid cap U.S. equity and emerging markets equity for potential return enhancement
- Callan's overriding philosophy is to keep the structure as simple as possible
- Allocations to managers should be meaningful for the Plan
- The appropriate number of managers must balance style and relationship diversification with lower fees and more manageable monitoring
- Two primary influences on the appropriate number of managers
 - Size of the allocation relative to the total Plan
 - The higher the allocation, the greater the desired manager diversification
- Active versus passive
 - Fewer managers may be suitable when the portfolio is managed passively.



Current MCERA Fixed Income Structure

Style	Allocation (%, Fixed Income Assets)	Allocation (%, Total Assets)	Allocation (\$, mm)
Core			
Dodge & Cox Income Fund	50.2%	11.0%	\$48.74
Core Plus			
PIMCO Total Return Fund	49.8%	10.9%	\$48.28
Total	100.0%	21.9%	\$97.02

- Following the Asset Liability Study, the Fixed Income target allocation was reduced from 28% to 22%. The structure shift took place at the end of September, 2016.
- The Fixed Income Portfolio is split approximately 50% 50% in the Core Fund and the Core Plus Fund.
- Programs with a lower Fixed Income allocation, should emphasize simple and pure structure.

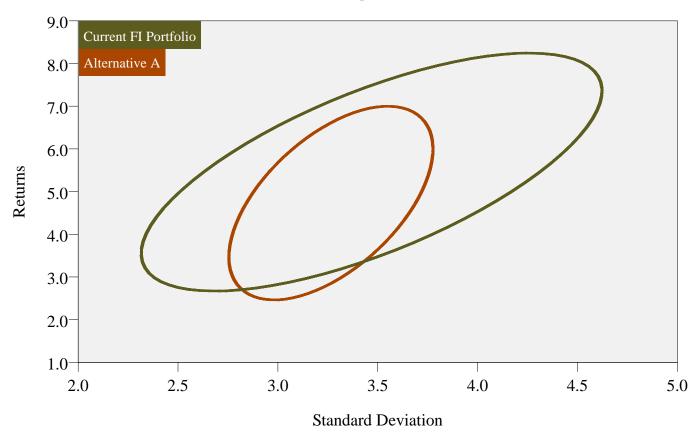
Current and Alternative Fixed Income Structures

Style	Current	Alternative A
Passive		
Manager A		100.0%
Core		
Dodge & Cox Income Fund	50.2%	
Core Plus		
PIMCO Total Return Fund	49.8%	
Total	100.0%	100.0%

- The Current structure remains reasonable. It is diversified and liquid, which can facilitate rebalancing. The 2 active managers provide a balance between opportunity to add return while controlling risk.
- Alternative A, would eliminate active management in lieu of a passive structure. The rationale for passive management would be to provide similar broad market exposure with a reduction in fees, and monitoring and reporting complexity.

Current and Alternative Fixed Income Structures

Rolling 12 Quarter Scatter Chart for 10 Years Ended September 30, 2016



Current and Alternative Fixed Income Structures

Returns for Periods Ended September 30, 2016

							Last 10
	Last Quarter	Last Year	Last 2 Years	Last 3 Years	Last 5 Years	Last 7 Years	Years
Current FI Portfolio	1.50	6.38	3.58	3.90	4.25	4.60	5.37
Alternative A	0.46	5.19	4.06	4.03	3.08	4.10	4.79
BB Barclays Agg Idx	0.46	5.19	4.06	4.03	3.08	4.10	4.79
CAI Core Bond MFs	0.75	5.31	3.57	3.84	3.37	4.50	5.02
CAI Core Plus MFs	1.10	5.72	3.77	4.06	4.09	4.92	5.05

Returns for Calendar Years 10 Years Ended September 30, 2016

	3 Qtrs.									
	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007
Current FI Portfolio	6.05	0.07	5.09	(0.65)	9.15	4.47	7.39	13.24	2.19	5.77
Alternative A	5.80	0.55	5.97	(2.02)	4.21	7.84	6.54	5.93	5.24	6.97
BB Barclays Agg Idx	5.80	0.55	5.97	(2.02)	4.21	7.84	6.54	5.93	5.24	6.97
CAI Core Bond MFs	5.98	0.02	5.72	(1.55)	6.58	6.87	7.53	11.50	(1.73)	5.61
CAI Core Plus MFs	6.20	(0.21)	5.74	(1.07)	8.00	6.39	8.86	17.42	(5.85)	4.99



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