

CDIAC and CMTA

Advanced Public Funds Investing Case Study

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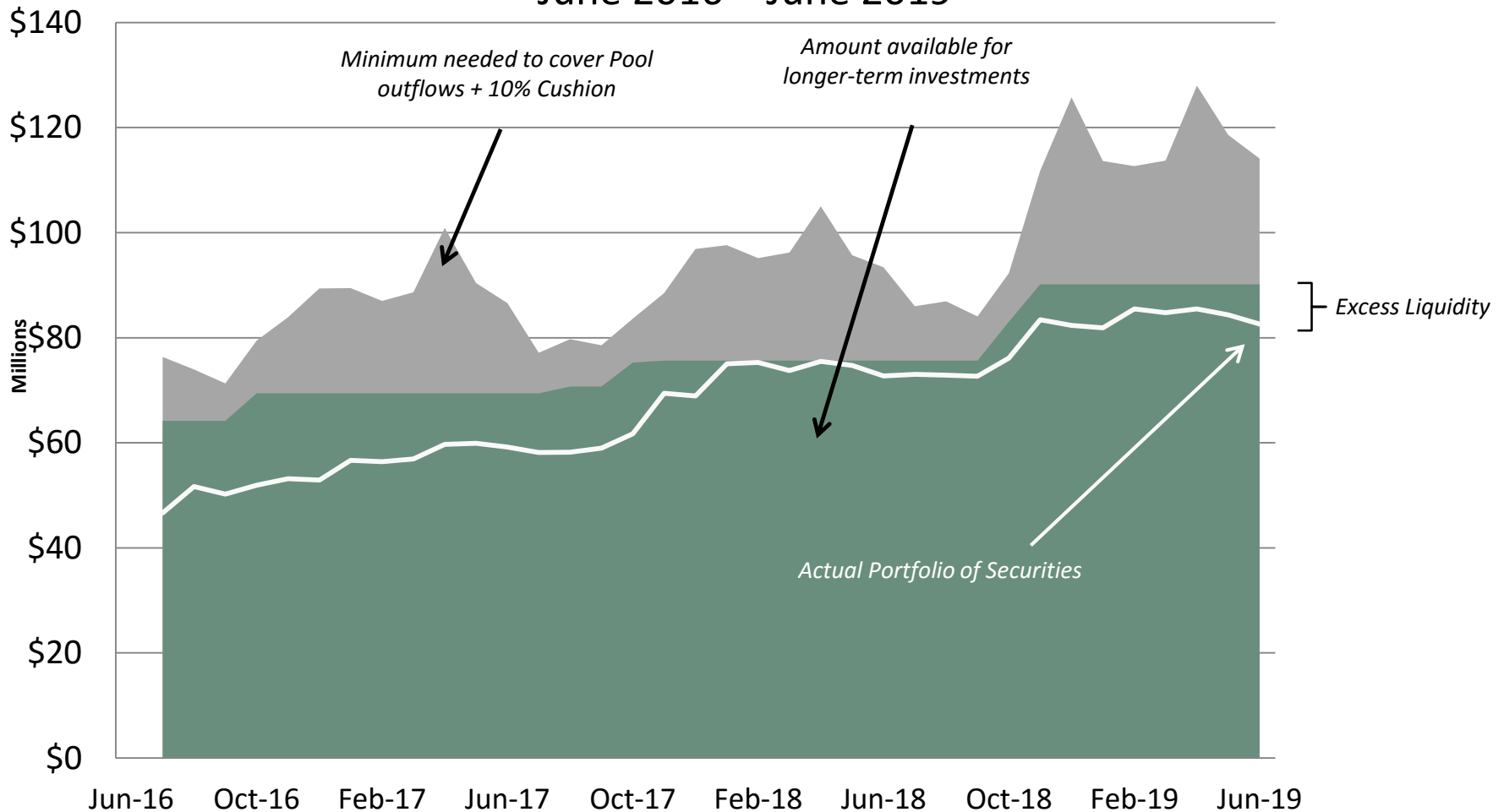


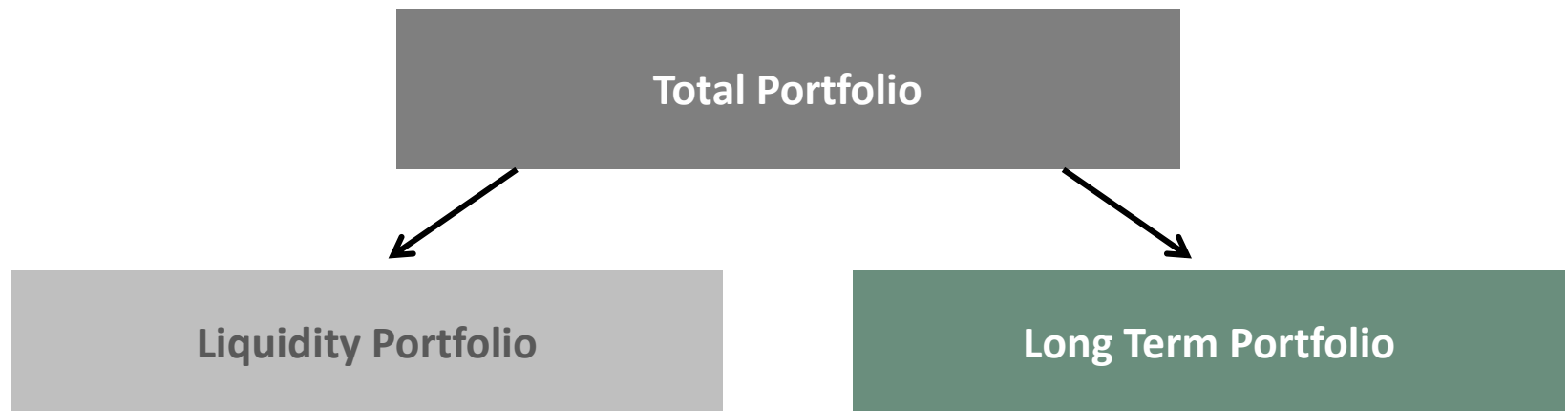
Steps to building an investment program





Sample Local Government Cash and Investments June 2016 – June 2019





- Local Government Investment Pool (LGIP)
- Matching maturities to known expenditures
 - Common money market instruments
 - Agency Discount Notes
 - Commercial Paper
 - Certificates of Deposit

- Target generally to a higher duration to enhance the potential to increase earnings
 - Invest in all securities allowed by Code and the County's policy, such as:
 - U.S. Treasury Securities
 - U.S. Agency Securities
 - High-Grade Credit



- 1. What are the objectives of the investment program**

- 2. What are the investment constraints**
 - a. State Statutes and/or Code
 - b. Investment Policy
 - c. Government's risk tolerances
 - d. Investment staff experience

- 3. What strategies can be implemented that achieve stated objectives and are compliant with constraints**



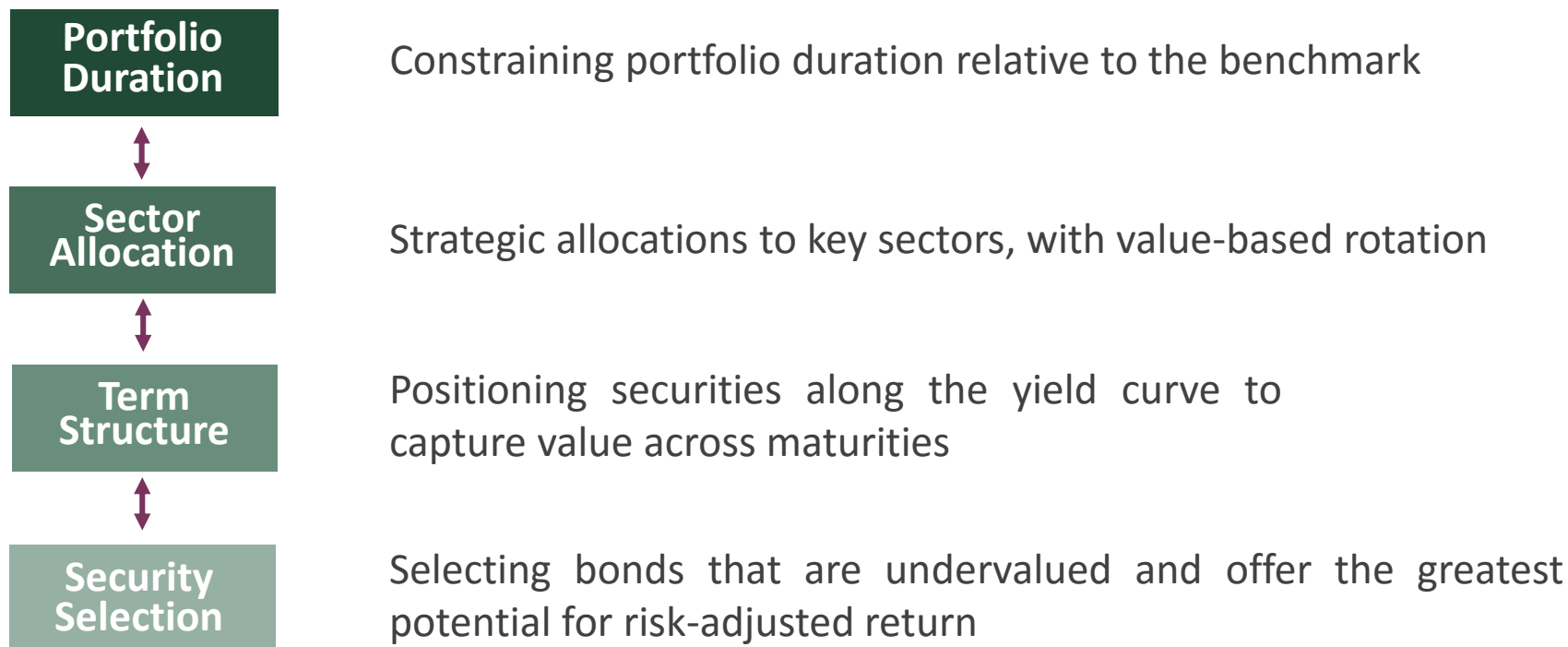
1. Yield

- a. Snapshot in time measure of coming year's interest income earnings
- b. Assumes reinvestment at the same rate
- c. Presumes no changes in the portfolio

2. Total Return

- a. Measures value added to the portfolio over a specified period of time
- b. Includes interest income as well as realized and unrealized gains and losses

Four Key Elements of Investing Fixed-Income Funds





1. Economic Environment

- a. Expanding/contracting
- b. Employment
- c. Inflation
- d. Monetary Policy
- e. Fiscal Policy

2. Market Environment

- a. Shape of yield curve
- b. Interest rate expectations
- c. Spread analysis

3. Global Environment

- a. Economic
- b. Markets
- c. Geo-political



1. Interest rate analysis

- a. Interest rate trend
- b. Shape of yield curve
- c. Direction of yield curve (e.g. steepening; flattening, inverting)

2. Selecting securities

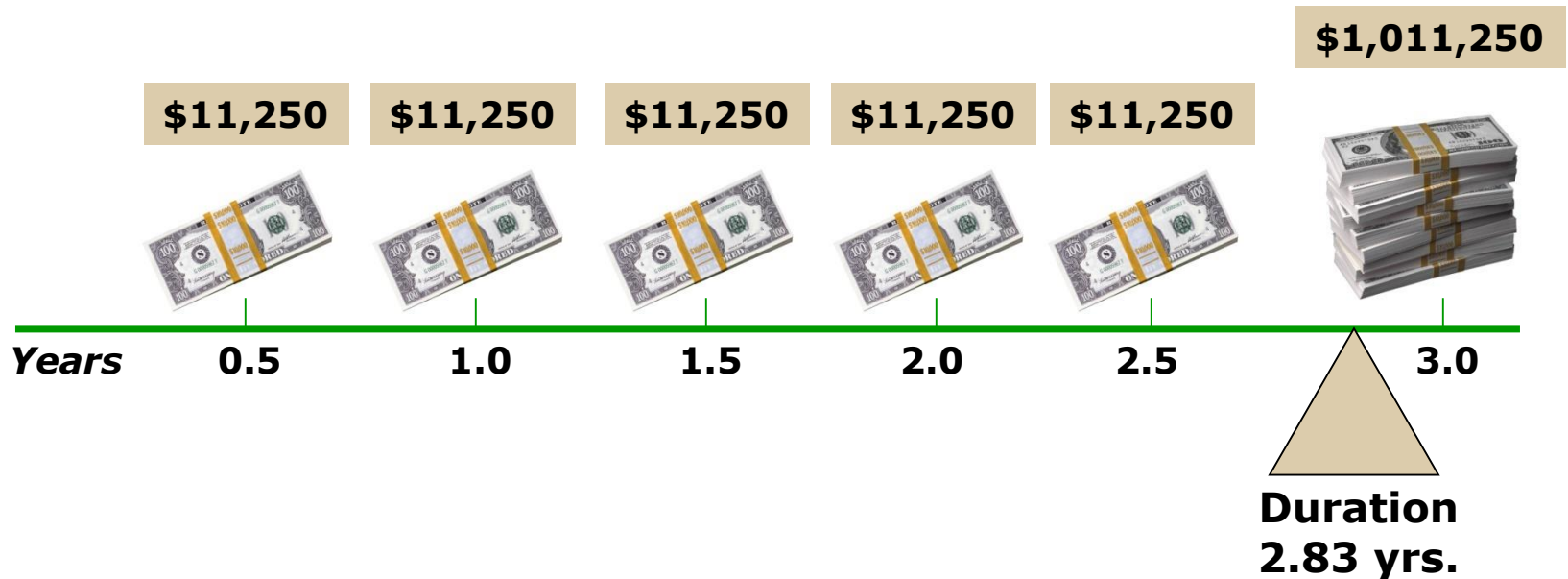
- a. Identify securities with good relative value
- b. Examine characteristics of bond
 - **Coupon, maturity, credit quality, options**
- c. Construct a portfolio that maximizes return/yield given a targeted level of risk

Duration



Measures price sensitivity of a bond to changes in interest rates

Invest in \$1MM Tsy. 2.25% 2/15/23



For illustrative purposes only. References to specific securities and their characteristics are examples of securities held in a portfolio managed by Chandler and are not intended to be, and should not be interpreted as an offer, solicitation, or recommendation to purchase or sell any financial instrument, an indication that the purchase of such securities was or will be profitable, or representative of the composition or performance of the portfolio. The information contained in this report is subject to change and obtained from sources we believe to be reliable, but we do not guarantee its accuracy. Past performance is not indicative of future success. Please see disclosures at the end of this presentation.



Portfolio #1: \$50 million and 2.0 duration

- If rates increase 2.25%, then **(\$2,250,000) Loss**

$$\$50 \text{ million} \times 2 \times 2.25\% \times -1 = \$50 \text{ million} \times -4.5\% = \mathbf{(\$2,250,000)}$$

- If rates decrease 2.25%, then **\$2,250,000 Gain**

$$\$50 \text{ million} \times 2 \times 2.25\% \times 1 = \$50 \text{ million} \times 4.5\% = \mathbf{2,250,000}$$

Portfolio 2 = \$50 million and 1.0 duration

- If rates increase 2.25%, then **(\$1,125,000) Loss**

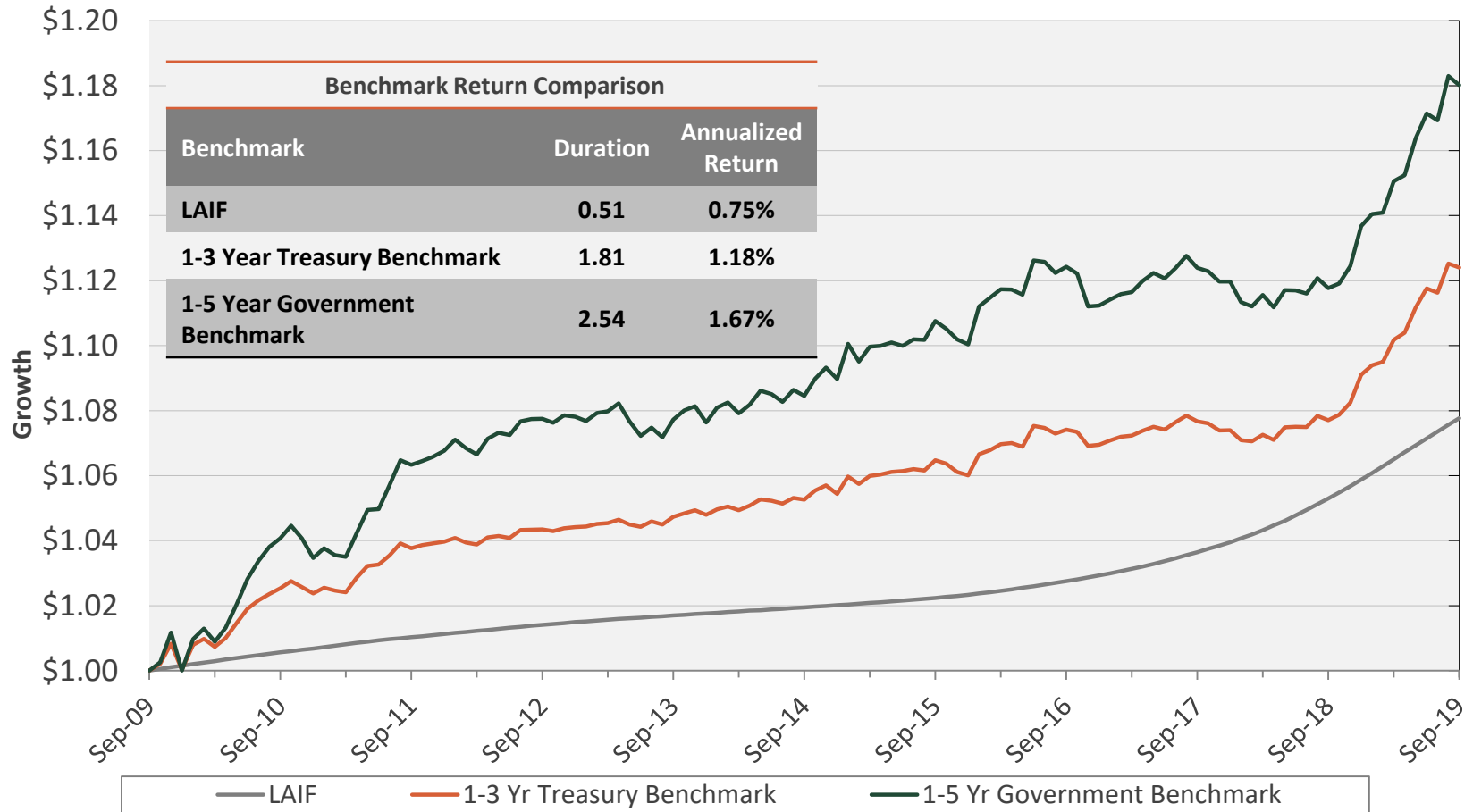
$$\$50 \text{ million} \times 1 \times 2.25\% \times -1 = \$50 \text{ million} \times -2.25\% = \mathbf{(\$1,125,000)}$$

- If rates decrease 2.25%, then **\$1,125,000 Gain**

$$\$50 \text{ million} \times 1 \times 2.25\% \times 1 = \$50 \text{ million} \times 2.25\% = \mathbf{\$1,125,000}$$



10-Year Benchmark Comparison September 30, 2009 – September 30, 2019



Source: LAIF and ICE BAML Indices as of 9/30/2019. Please see disclosures attached for LAIF, ICE BAML 1-3 Year U.S. Treasury Index, and ICE BAML 1-5 Year U.S. Treasury & Agency Index. LAIF duration estimated based on average maturity in days, as of 9/30/2019, divided by 365 days. LAIF returns include an administrative fee charged to investors by the California State Treasurer. The data contained in this chart is the property of providers which were obtained from sources believed to be reliable but are subject to change at any time at the provider's discretion. Index returns assume reinvestment of income dividends and capital gains, if any, but do not reflect fees, brokerage commissions or other expenses of investing. It is not possible to invest directly in an index. Past performance is not indicative of future results. Please see disclosures at the end of this presentation.

Risk/Return Trade-off With Longer Duration Mandates



Annual Benchmark Study: Period Ending December 31, 2018

	ICE BAML 1-3 Yr US Treasury/Agency Index	ICE BAML 1-5 Yr US Treasury/Agency Index	ICE BAML 1-10 Yr US Treasury/Agency Index
0-6 months			
6-12 months			
1-3 years	100.00%	61.09%	43.81%
3-5 years		38.91%	27.90%
5-10 years			28.29%
Treasury	94.92%	96.00%	96.78%
Agency	5.08%	4.00%	3.22%
Corporate			
Modified Duration 12/31/2018	1.87	2.60	3.64
10 Year Annualized Total Return	1.01%	1.38%	1.85%
10 Year Standard Deviation	1.84%	2.36%	3.43%
Sharpe Ratio	0.34	0.43	0.43
Qualitative Risk Objective	12/31/1988 - 12/31/2018	12/31/1988 - 12/31/2018	12/31/1988 - 12/31/2018
Negative Quarterly Return Occurrences	13	23	33
2 Consecutive Negative Quarterly Return Occurrences	2	3	7
Negative Return For Year Occurrences	0	2	3
Worst Year Total Return	0.37%	-0.63%	-1.61%

Index returns assume reinvestment of all distributions. Historical performance results for investment indexes generally do not reflect the deduction of transaction and/or custodial charges or the deduction of an investment management fee, the incurrence of which would have the effect of decreasing historical performance results. It is not possible to invest directly in an index. Please see disclosures at the end of this presentation.



- 1. Alter portfolio's duration (sensitivity to rate changes) based on interest rate forecast**
 - a. Increase duration if rates are expected to fall and decrease duration if rates are expected to rise (relative to the benchmark)
 - b. Degree to which the duration is permitted to diverge from the benchmark can be limited by the policy

- 2. Portfolio is realigned through swapping to achieve duration target**

- 3. Challenge: forecasting interest rates is very difficult. must be right on each of the following:**
 - a. Direction
 - b. Timing
 - c. Magnitude



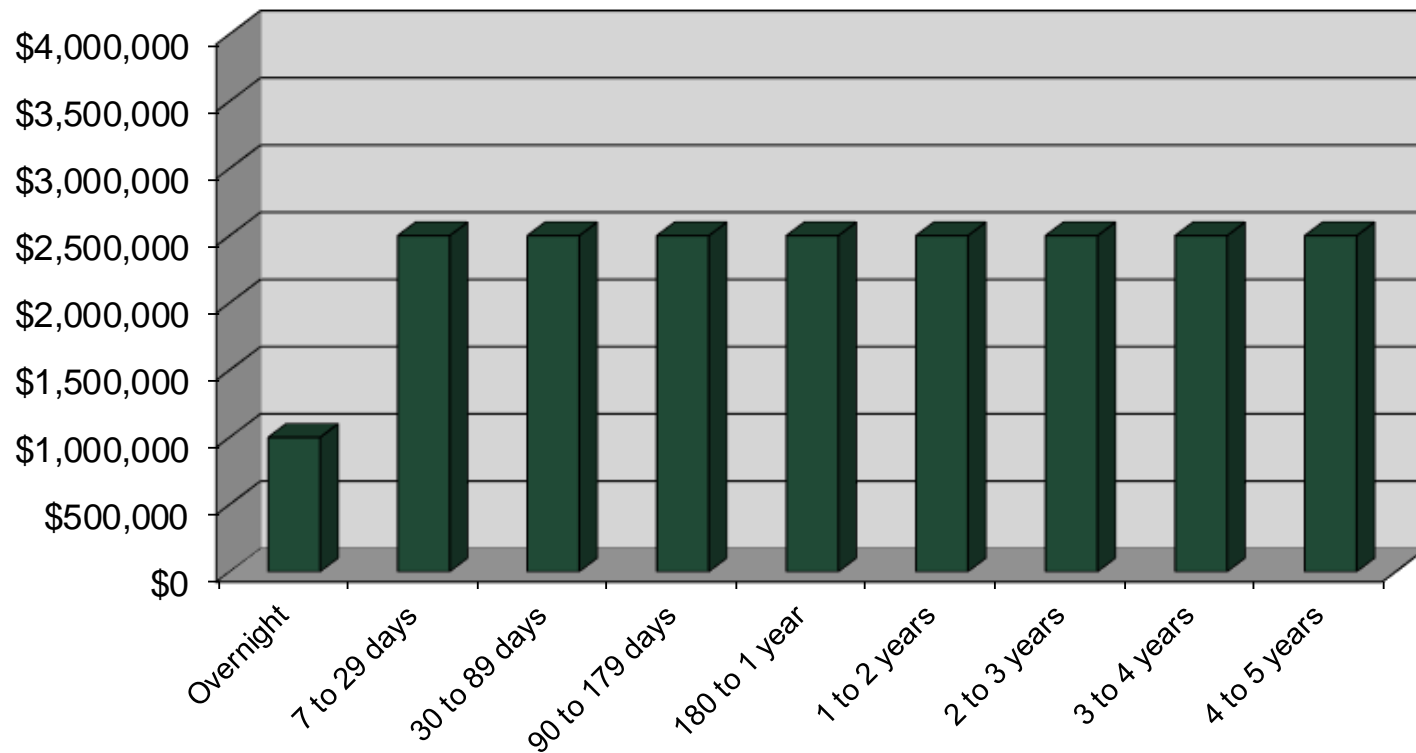
- 1. Position portfolio to capitalize on expected changes in the yield curve**

- 2. The duration and spacing of the maturity of bonds will have a significant impact on the total rate of return (TRR) over a short horizon**

- 3. Three Yield Curve Strategies**
 - a. Bullet - maturity of the bonds in the portfolio are highly concentrated at one point on the curve
 - b. Barbell - securities are concentrated at 2 extreme maturities
 - c. Ladder - equal amounts at each maturity. For example, equal amounts maturing each month or quarter



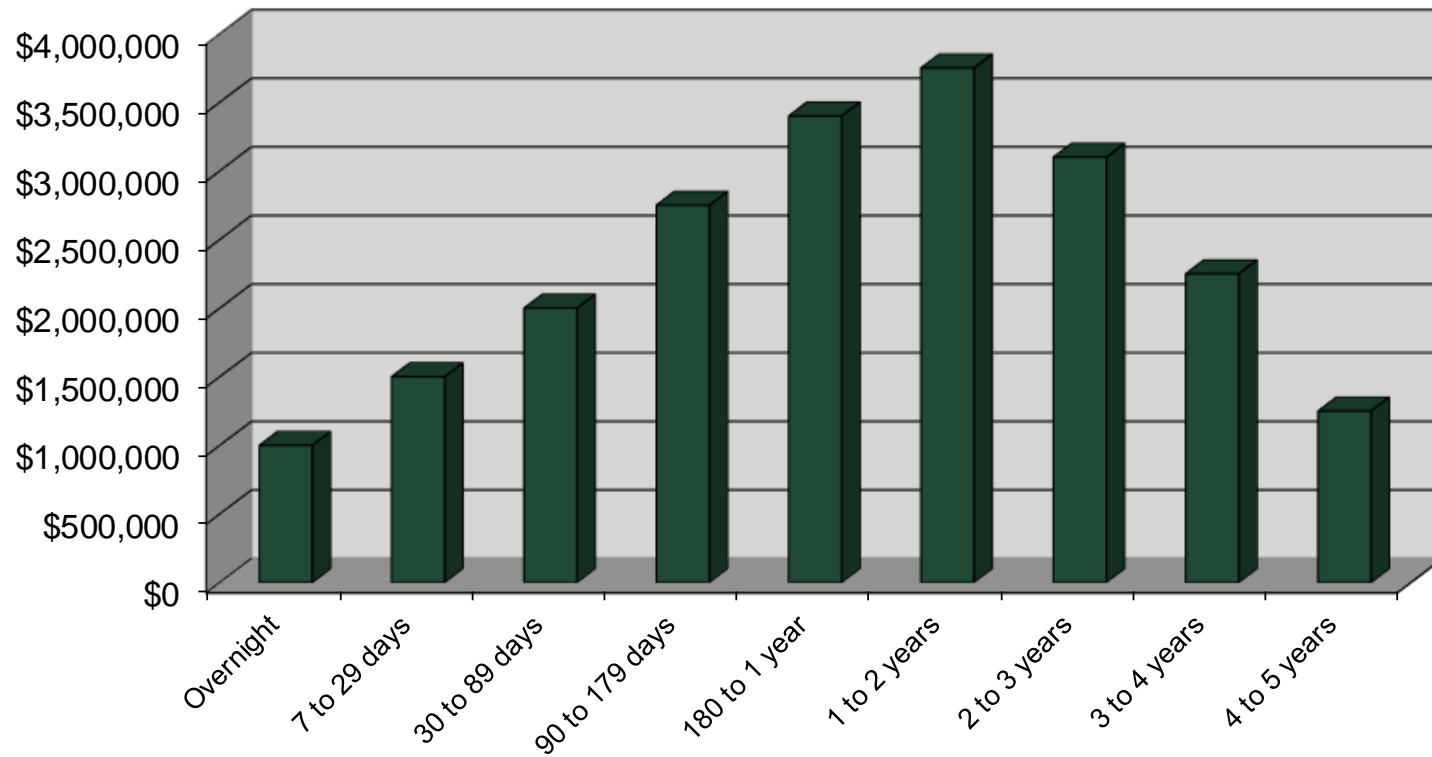
Portfolio Structure - Laddered



This sample illustration is being provided to demonstrate the Ladder portfolio structure.

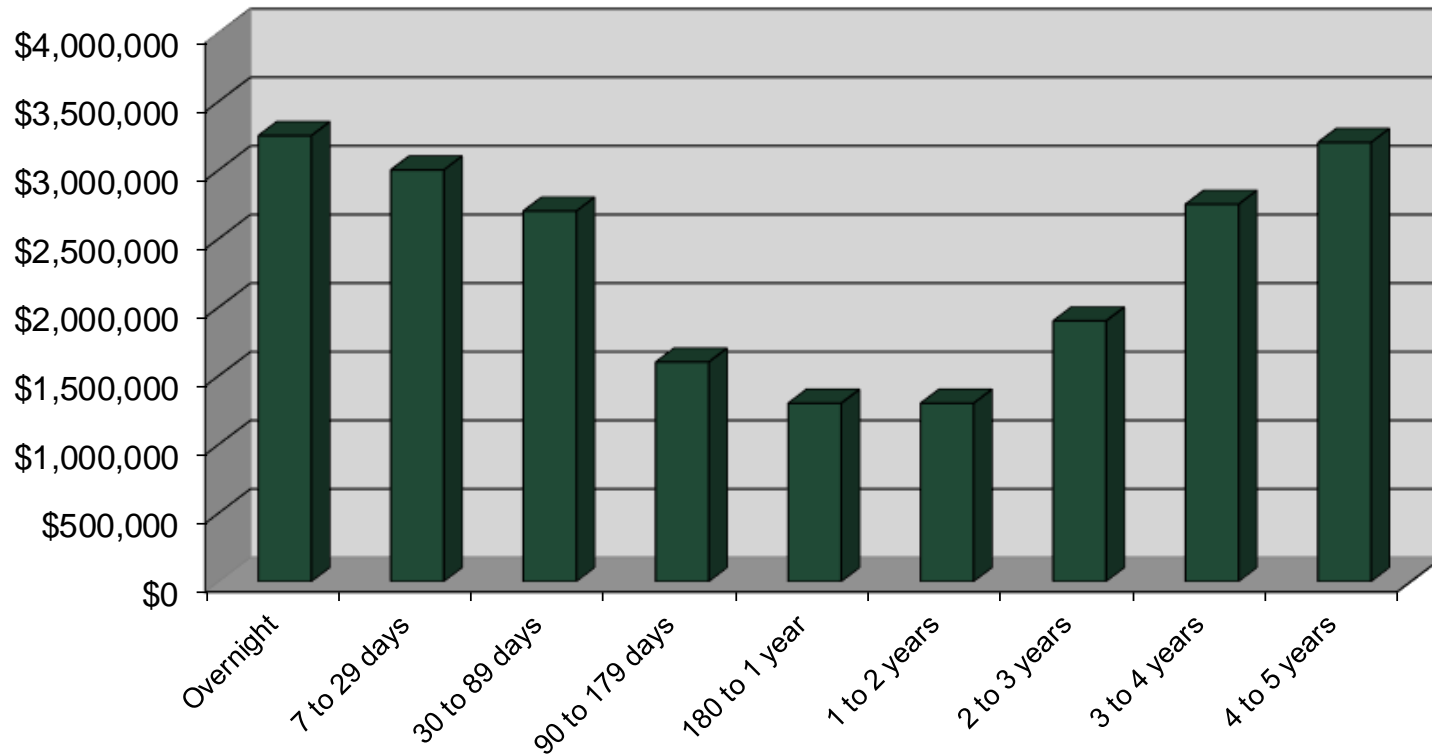


Portfolio Structure - Bullet



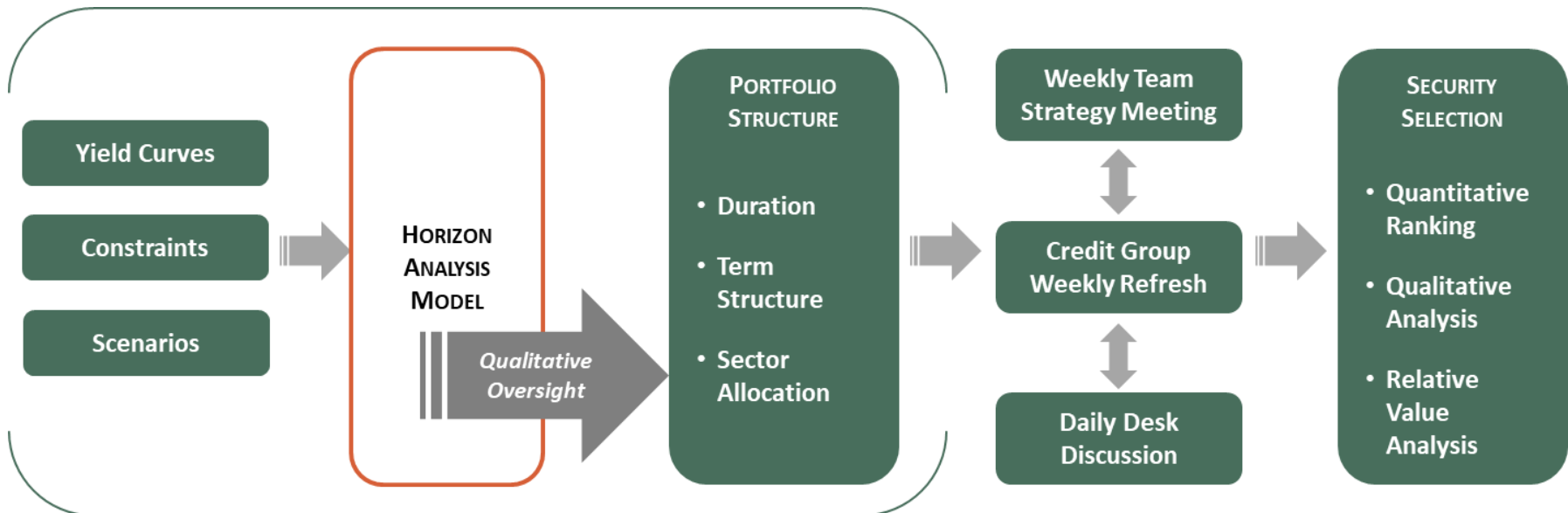


Portfolio Structure - Barbell



This sample illustration is being provided to demonstrate the Barbell portfolio structure.

Chandler's Investment Process

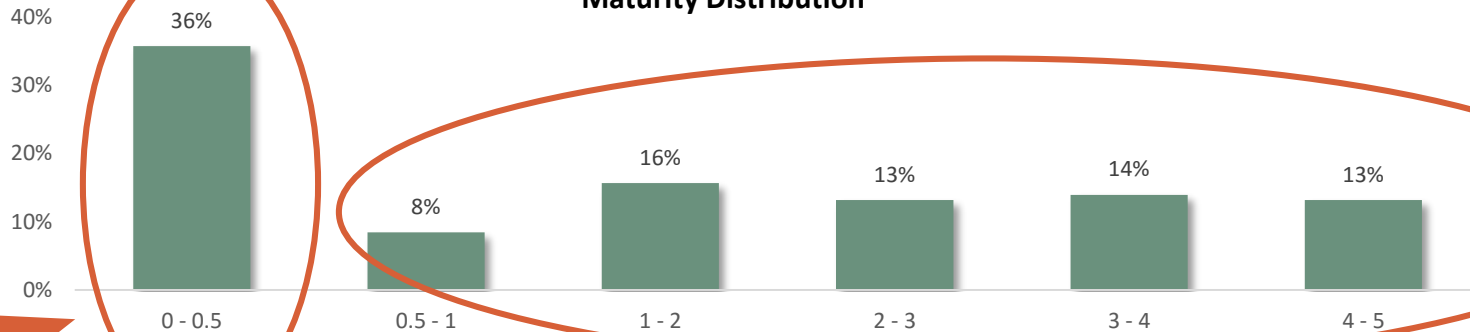


- Proprietary quantitative Horizon Analysis Model suggests target duration, sector allocation and term structure.
- The security selection process employs quantitative tools and rigorous qualitative analysis to determine relative value.

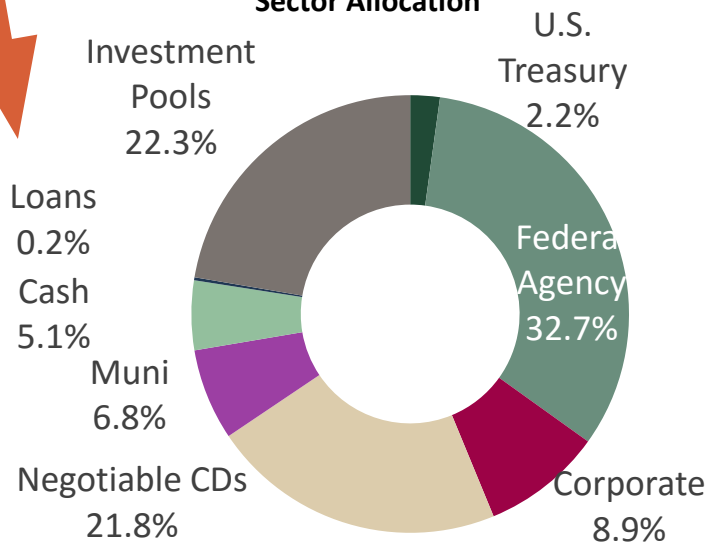
Sample Portfolio—WWYD???



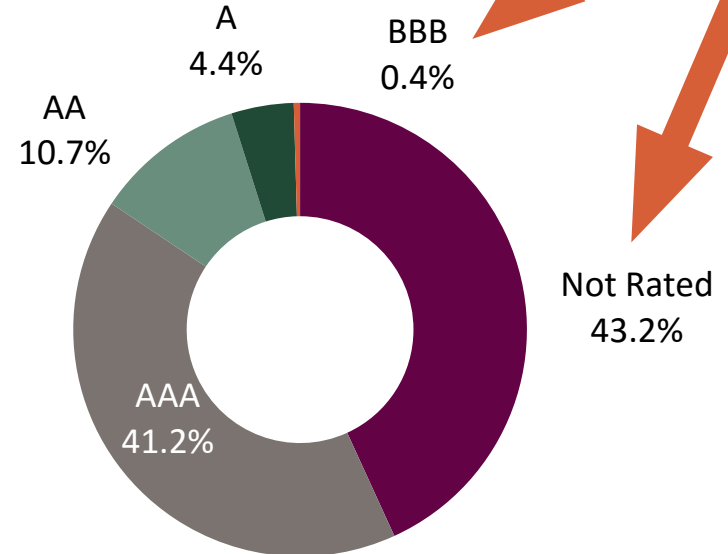
Maturity Distribution



Sector Allocation



Credit Quality



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Christopher McCarry, AIF
*Senior Vice President,
Portfolio Strategist*

Christopher McCarry joined Chandler Asset Management in 2013 and is a Portfolio Strategist. Chris is a member of the Investment Management Team and participates actively in the portfolio management process as well as builds and maintains client relationships. As a portfolio strategist, Chris focuses on identifying and communicating key investment related themes and trends for implementation into fixed income strategies for local government and institutional clients. Prior to joining the Investment Management Team in 2019, Chris was an Investment Consultant for the Client Services Team at Chandler. Chris has worked in the investment industry since 2001 with a diverse background in financial services. In his most recent role prior to Chandler, he was the Regional Vice President for Zack's Investment Management focusing on retail sales for the West Coast Territory. Other roles include an Advisory Consultant at LPL Financial and he began his career at Penn Mutual Life.

Chris is a graduate of Bucknell University with his BA in both International Relations (Latin America Focus) and Spanish. He holds his Accredited Investment Fiduciary (AIF®) designation.



Carlos Oblites
*Senior Vice President,
Portfolio Strategist*

Carlos Oblites is a Senior Vice President and Portfolio Strategist at Chandler Asset Management. He is responsible for building and maintaining client relationships with public agencies along with participating actively in the portfolio management process. Carlos has 24 years of investment and financial experience, focused largely on managing short-term fixed income and pension strategies for governmental and institutional non-profit clients.

Prior to joining Chandler, Carlos served as the Administrative Services Manager at Central Marin Sanitation Agency (CMSA) and was responsible for all aspects of the Agency's financial, human resources, administrative support, and information systems activities. He also has significant expertise in serving California public agencies, healthcare, and insurance clients through his roles as Director at PFM Asset Management, and as a Principal at Wells Capital Management. Previous responsibilities include managing a variety of institutional client relationships and developing, implementing, and monitoring customized investment strategies for operating funds, bond proceeds, pension, and post-retirement funds. Carlos has also worked as a marketing/research consultant with Wells Fargo Bank and as teacher for the Long Beach Unified School District.

Carlos holds a Bachelor of Arts degree in History from the University of California, Santa Barbara, and earned a Master's degree in Business Administration from San Francisco State University.



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Index returns assume reinvestment of all distributions. Historical performance results for investment indexes generally do not reflect the deduction of transaction and/ or custodial charges or the deduction of an investment management fee, the incurrence of which would have the effect of decreasing historical performance results. It is not possible to invest directly in an index. Past performance is not indicative of future results.

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Fixed income investments are subject to interest, credit and market risk. Interest rate risk: the value of fixed income investments will decline as interest rates rise. Credit risk: the possibility that the borrower may not be able to repay interest and principal. Low rated bonds generally have to pay higher interest rates to attract investors willing to take on greater risk. Market risk: the bond market in general could decline due to economic conditions, especially during periods of rising interest rates.

The California State Local Agency Investment Fund (LAIF) is an investment portfolio managed by the State Treasurer. All securities are purchased under the authority of Government Code Section 16430 and 16480.4 and include securities issued by entities of the US Government, including the US Treasury and Agencies, Corporate debt, Certificates of Deposit, Mortgage Backed Securities and certain loans to the State and state agencies. The average maturity of the Fund will be between 120 days and 18 months.

The ICE BAML 1-5 Year US Treasury & Agency Index tracks the performance of US dollar denominated US Treasury and nonsubordinated US agency debt issued in the US domestic market. Qualifying securities must have an investment grade rating (based on an average of Moody's, S&P and Fitch). Qualifying securities must have at least one year remaining term to final maturity and less than five years remaining term to final maturity, at least 18 months to maturity at time of issuance, a fixed coupon schedule, and a minimum amount outstanding of \$1 billion for sovereigns and \$250 million for agencies.

The ICE BAML 1-10 Year US Treasury & Agency Index tracks the performance of US dollar denominated US Treasury and nonsubordinated US agency debt issued in the US domestic market. Qualifying securities must have an investment grade rating (based on an average of Moody's, S&P and Fitch). Qualifying securities must have at least one year remaining term to final maturity and less than ten years remaining term to final maturity, at least 18 months to maturity at time of issuance, a fixed coupon schedule, and a minimum amount outstanding of \$1 billion for sovereigns and \$250 million for agencies.