

FUNDAMENTALS OF PUBLIC FUNDS INVESTING



SESSION 5 | CASH FLOW AND CASH FLOW FORECASTING

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SESSION OVERVIEW

- Management of a public agency's cash requirements,
- Balancing revenues (taxes and fees) with monthly obligations, periodic debt-service payments, and other recurring or non-recurring cash demands.
- Practice for preparing and implementing a cash flow forecast
- Using budgetary and statistical forecast to make investment decisions

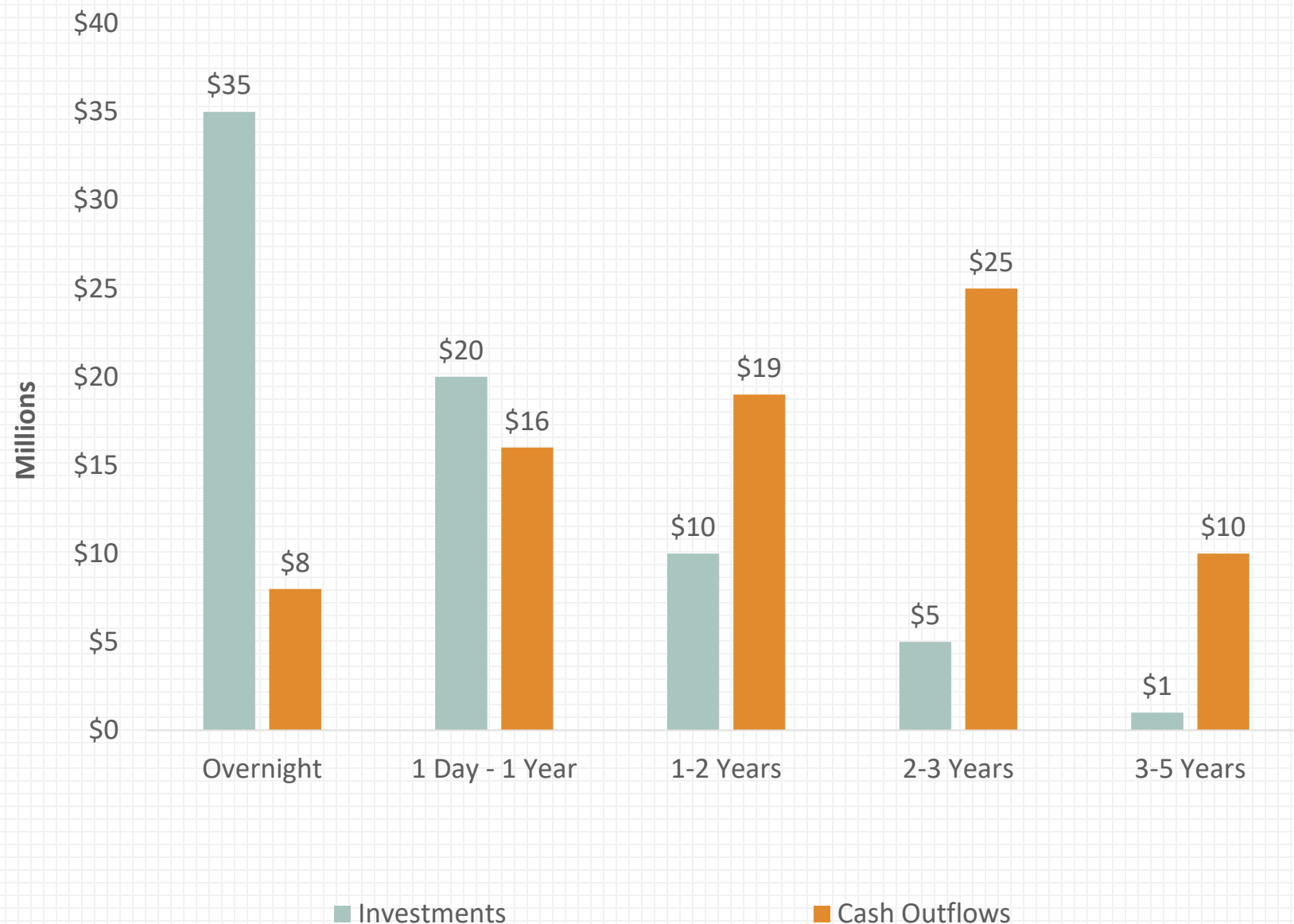




Determining Cash Available

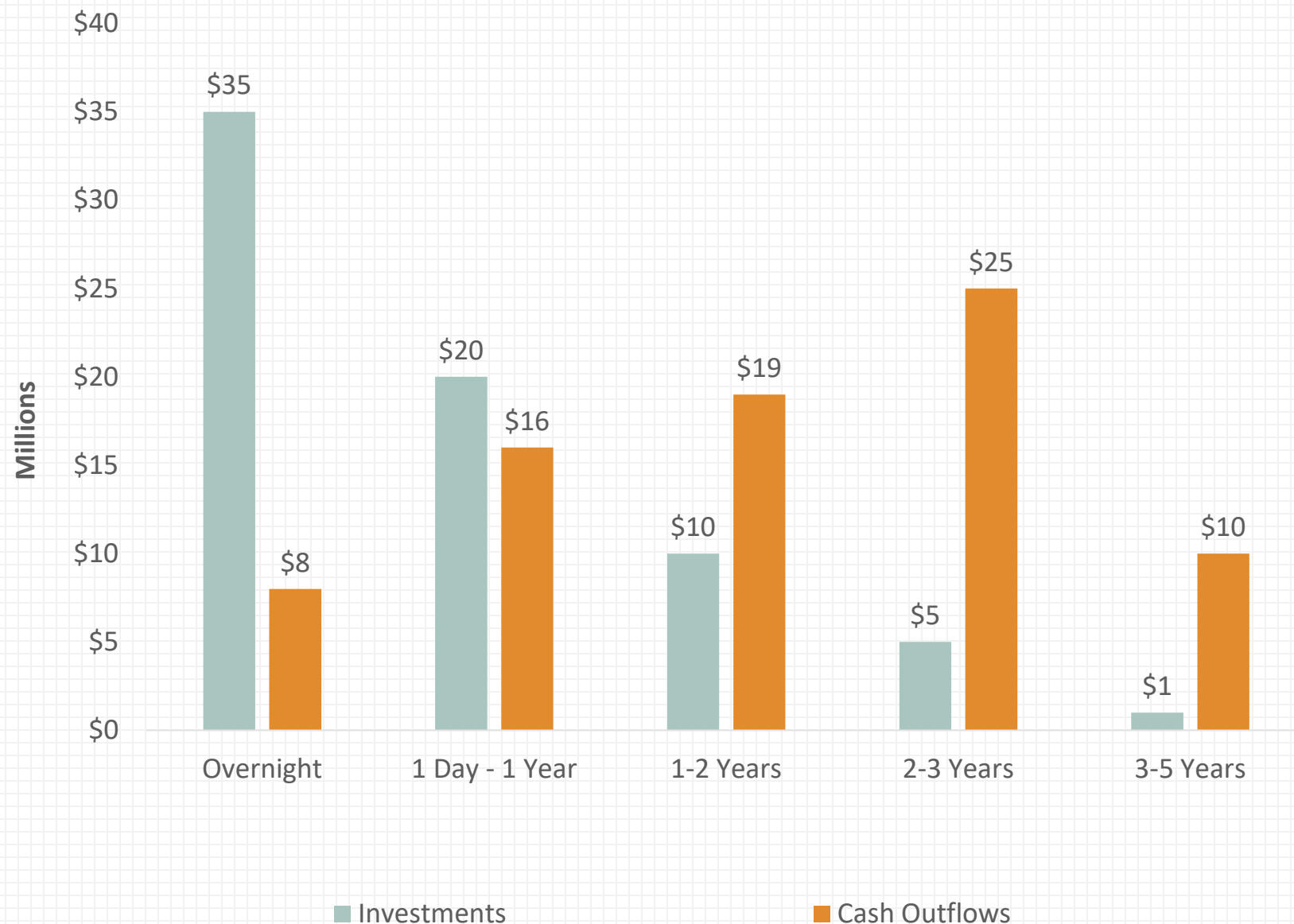
How Much Liquidity is Enough?

Do your investments meet cash needs?



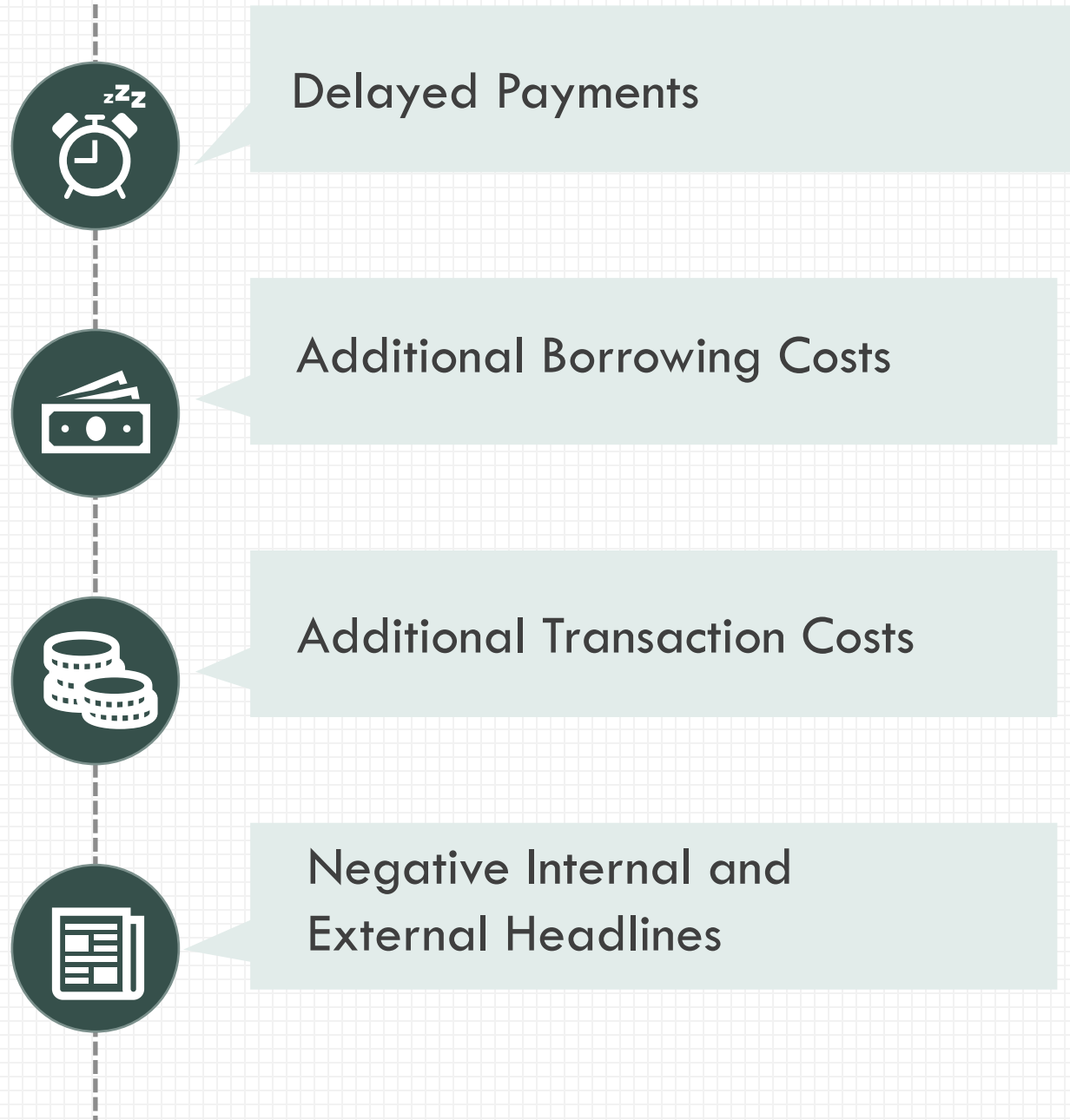
How Much Liquidity is Enough?

Are your investments optimized for return?



How Much Liquidity is Enough?

Cost of Insufficient Liquidity:



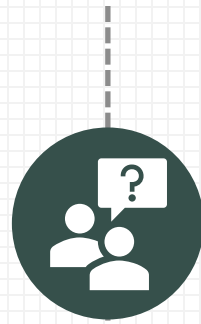
How Much Liquidity is Enough?

Cost of Excess Liquidity:

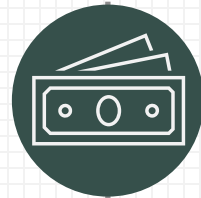


How Much Liquidity is Enough?

Most Crucial Questions:



Am I meeting my Code-mandated goal of safety and liquidity?



Will I have the cash available when I need it?



Am I earning as much as I could?

The Cost of Too Much Liquidity

Select Fixed-Income Benchmark Total Returns By Duration As of September 30, 2020				
Index	Duration	10 YR Annualized Return	Cumulative Value of \$100 Million	Additional Value Over LAIF
Local Agency Investment Fund	0.46 Years	0.85%	\$108,825,144	N/A
ICE BAML 1 YR Treasury Note Index	0.99 Years	0.931%	\$109,709,885	\$884,741
ICE BAML 1-3 YR Treasury Index	1.90 Years	1.278%	\$113,540,595	\$4,715,451
ICE BAML 1-5 YR Treasury Index	2.65 Years	1.718%	\$118,570,902	\$9,745,758
ICE BAML 3-5 YR Treasury Index	3.86 Years	2.381%	\$126,530,048	\$15,861,071

Source: Bloomberg, ICE BAML Indices and LAIF. Data as of September 30, 2020. Performance for ICE BAML indices based on a \$100 million portfolio, relative to LAIF. Performance shown is hypothetical and not based on an actual client's account. LAIF returns include an administrative fee charged to investors by the California State Treasurer. LAIF duration estimated based on average maturity in days, as of September 30, 2020 divided by 365 days. Past performance is not a guarantee of future results. Please see disclosures at the end of this presentation for further details.

Why a Cash Flow Analysis?

“The analysis is intended to measure and assess the government’s ability to meet its needs, to negate the need for any short-term borrowing or liquidation of long-term investments before maturity, and to identify any idle funds, and the duration of that idle period, to determine whether those funds could be invested over that time frame. Cash flow analysis is therefore an essential tool for informed management decision making.”

- GFOA Best Practice: “Cash Flow Analysis”

What is a Cash Flow Analysis?

Projection of
anticipated cash
receipts

Projection of
anticipated
cash
disbursements

It considers all
funds

It considers
timing of
receipts and
disbursements

What a Cash Flow Analysis Is NOT!

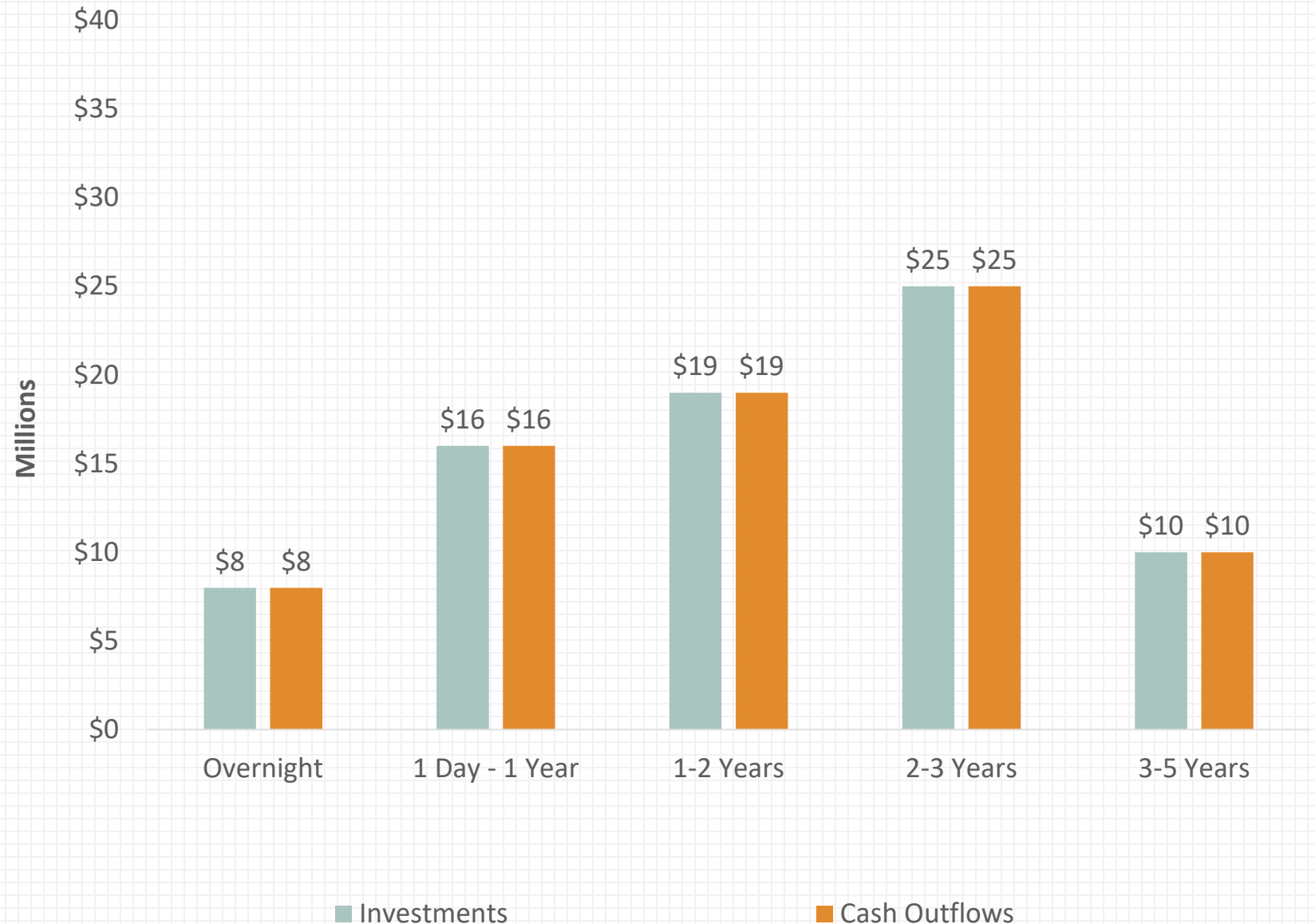
“Cash” is the operative word in
“Cash Flow Forecasting”

It is not accruals or
budgeted funds

Only cash is spendable
or investable!

Ensuring Liquidity

Ensuring maturing cash and reserves are available when needed by matching investments to cash outflows



Ensuring Liquidity

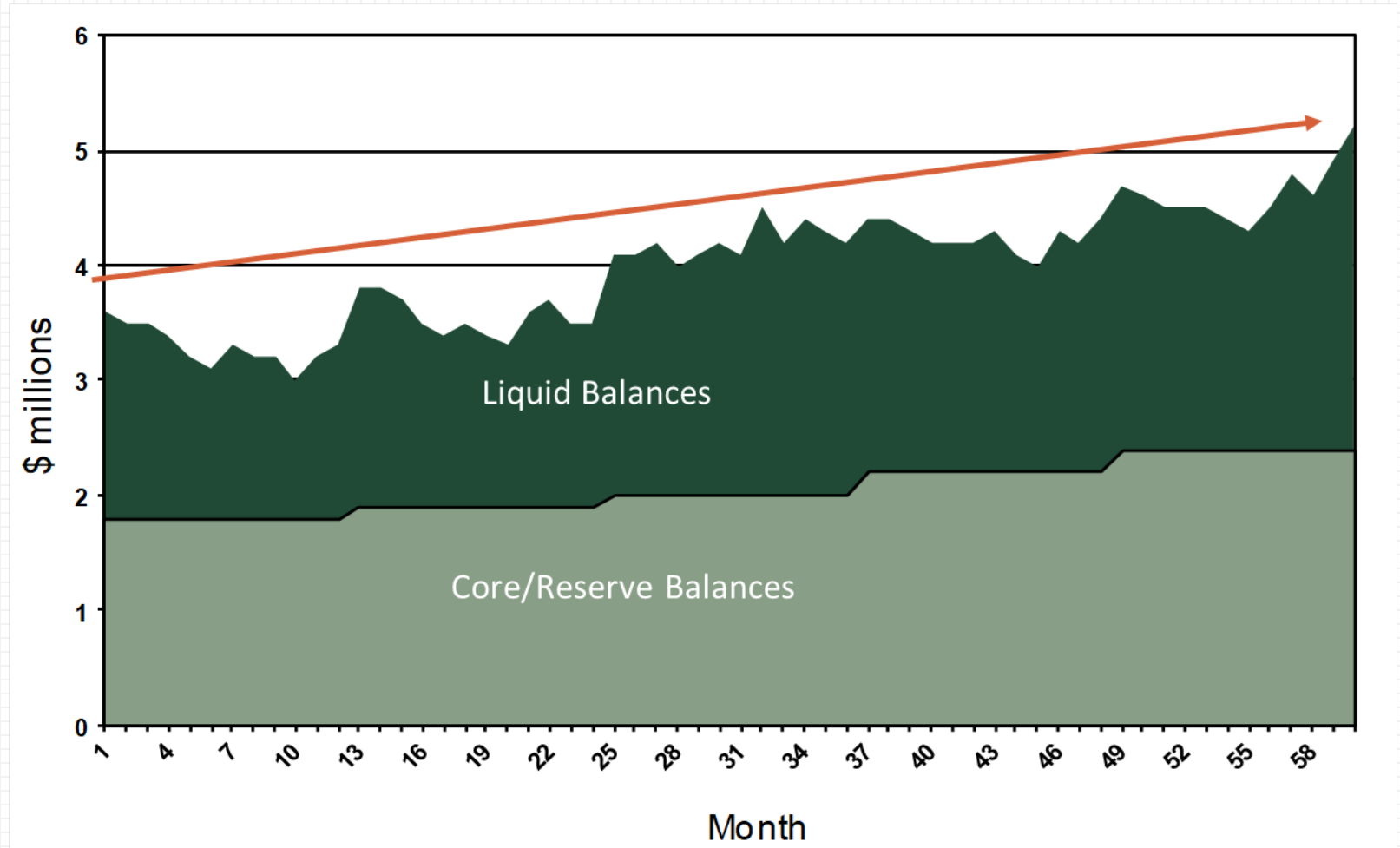
Total balances trend higher or lower

Balances fluctuate through the year

The “liquid” balances are for meeting cash needs

The “core” balances are available for longer-duration investing

Sample Local Government
Balances
5 Year Period



This is shown as an example for illustrative purposes only. Please refer to the important disclosures at the end of this presentation.

What Are You Hoping to Accomplish?

1

Ensure sufficient liquidity for 6-12 months of disbursements

2

Improve earnings:

- Match sources and uses of cash
- Invest core funds in longer duration investments for higher return potential
- Manage liquidity and market risks

3

Identify short-term cash deficits

4

Warn of impending budget problems

Annual Cash Flow Forecasts

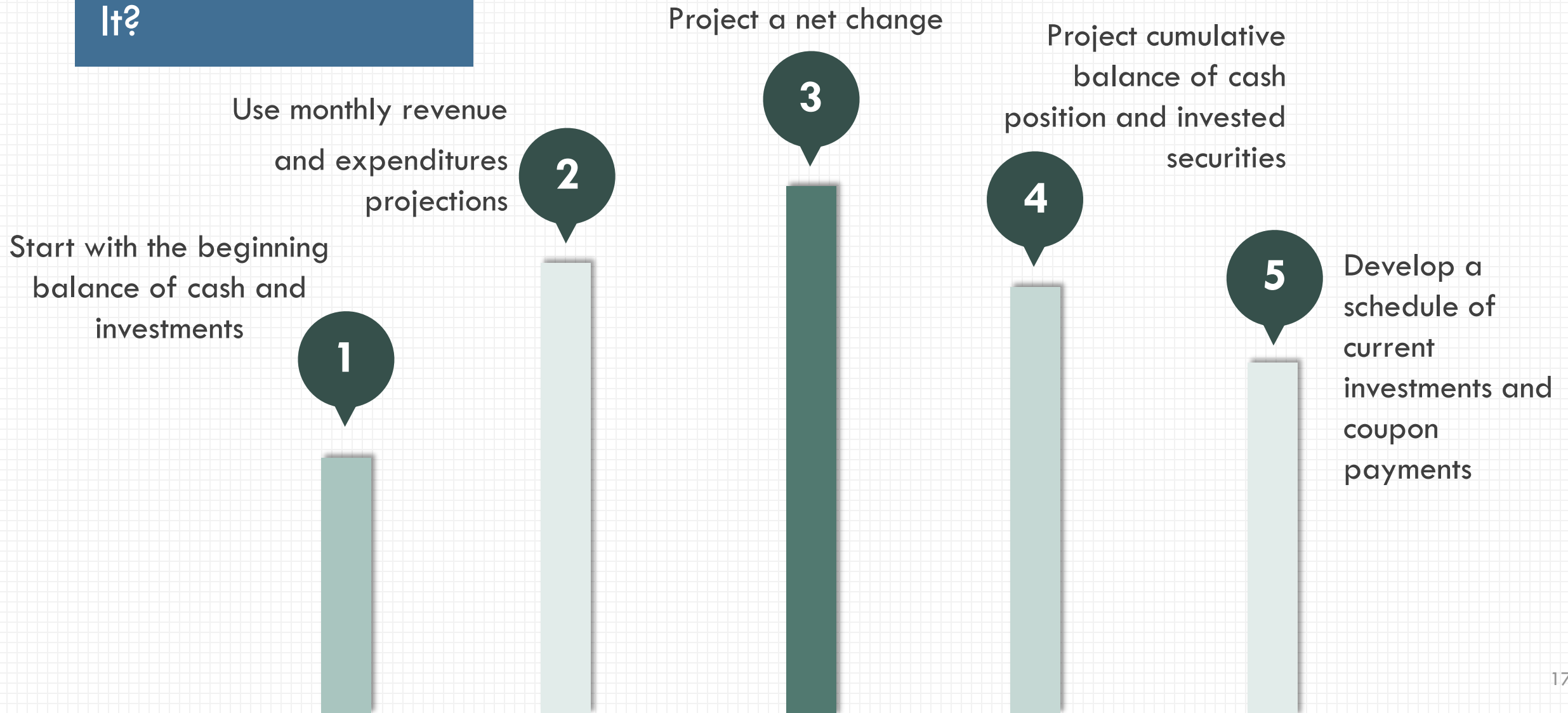
Estimates
monthly cash
position for next
12 months

Determines
cash available
for investments
of more than
30 days

Provides a useful
monthly overview
for investment
decision-making

Covers anything
from this fiscal
year to the next
out to possibly 3
years

How Do I Create It?



Start by Identifying Revenues and Expenditures

Major Revenues	Major Expenditures
Property taxes	Payroll and benefits
Sales and use taxes	Operating expenses
User fees	Debt service
Shared revenues	Capital projects (spending schedules)
Non-recurring revenues (financing)	Non-recurring
Other	Other

Sources of Information



Historical data from general ledger



Current year budget



Capital project spending projections

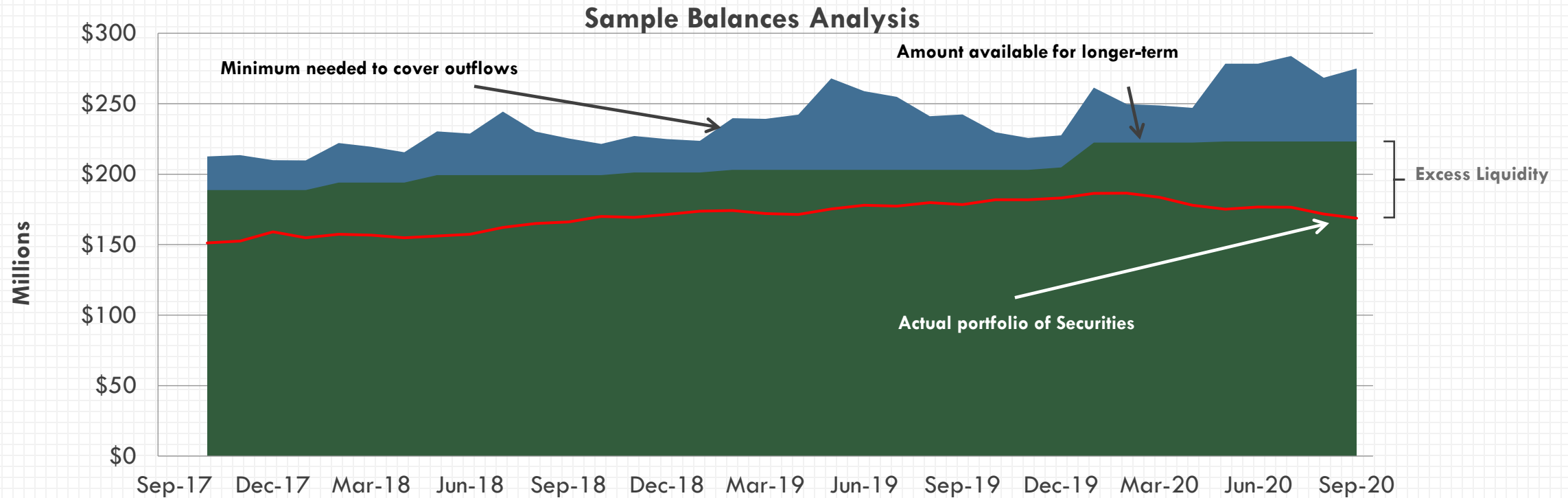


Historical data from bank, pool investments
Schedule of maturities and coupon payments

The Budgetary Approach

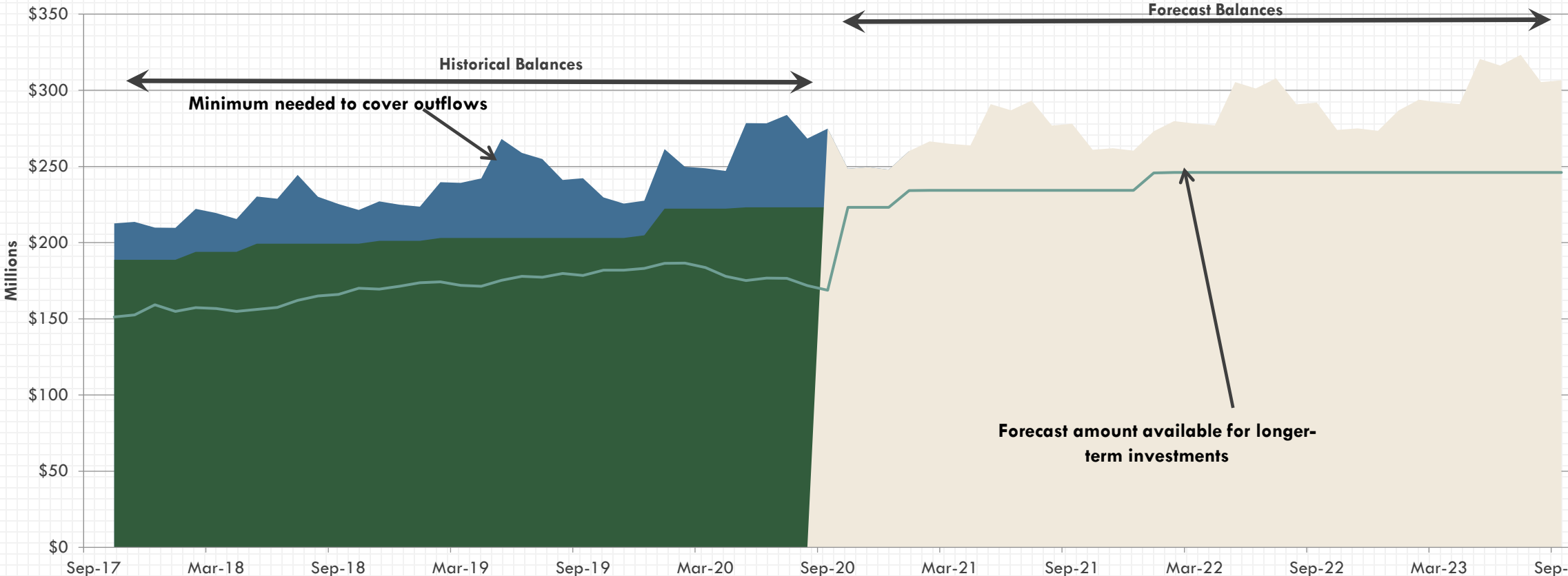
Beg. Liq. Balance													
Cash Flow Projection	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9	Month 10	Month 11	Month 12	Average
Liquid Funds Balance	75,542,961	72,193,828	72,989,997	75,608,994	68,206,564	79,169,321	85,840,491	79,609,930	71,751,540	72,031,107	70,112,247	73,518,379	74,714,613
Inflows													
Sales Tax/User Fees	3,516,116	3,164,504	2,848,054	2,278,443	2,050,599	1,845,539	1,476,431	1,328,788	3,164,504	2,531,604	2,278,443	2,050,599	
Development Fees	250,000	225,000	202,500	162,000	145,800	131,220	104,976	94,478	225,000	180,000	162,000	145,800	
Property Tax Collections							9,658,325	3,889,856		8,474,249	3,264,252		
Intergovernmental Revenue	10,264,623	10,264,623	10,264,624	6,532,625	10,264,625	4,141,257			10,264,627		10,264,628	2,314,254	
Other Revenues	7,919,282	1,000,025	3,000,075	500,013	11,500,288	14,429,296	221,989	443,978	125,000	150,369	536,412	141,487	
	21,950,021	14,654,152	16,315,253	9,473,081	23,961,311	20,547,312	11,461,721	5,757,101	13,779,131	11,336,222	16,505,735	4,652,140	14,199,432
Outflows													
Payroll	(16,534,645)	(12,457,365)	(12,333,658)	(15,834,779)	(11,856,123)	(11,633,792)	(16,534,645)	(12,457,365)	(12,333,658)	(12,078,453)	(11,856,123)	(11,633,792)	
Operating and Maintenance	586,124	(900,254)	(882,249)	(864,604)	(900,255)	(882,250)	(864,605)	(900,256)	(882,251)	(864,606)	(900,257)	(882,252)	
Charges for Services	(1,597,717)	(500,364)	(160,116)	(176,128)	(193,741)	(213,115)	(234,427)	(257,869)	(283,656)	(312,022)	(343,224)	(377,546)	
Debt Servcie	(1,093,706)					(1,093,706)							
Other Expenses	(6,659,210)		(320,233)		(48,435)	(53,279)	(58,607)					(94,387)	
	(25,299,154)	(13,857,983)	(13,696,256)	(16,875,511)	(12,998,554)	(13,876,142)	(17,692,283)	(13,615,490)	(13,499,565)	(13,255,081)	(13,099,603)	(12,987,977)	(15,062,800)
Projected Net Change	(3,349,133)	796,169	2,618,997	(7,402,430)	10,962,758	6,671,170	(6,230,562)	(7,858,389)	279,566	(1,918,859)	3,406,132	(8,335,837)	(863,368)
Projected Liquid Balance	72,193,828	72,989,997	75,608,994	68,206,564	79,169,321	85,840,491	79,609,930	71,751,540	72,031,107	70,112,247	73,518,379	65,182,542	73,851,245
Projected Core Balance	141,565,000	141,565,000	141,565,000	141,565,000	141,565,000	141,565,000	141,565,000	141,565,000	141,565,000	141,565,000	141,565,000	141,565,000	141,565,000
Total Projected Balance	213,758,828	214,554,997	217,173,994	209,771,564	220,734,321	227,405,491	221,174,930	213,316,540	213,596,107	211,677,247	215,083,379	206,747,542	215,416,245
Actual Liquid Balance													
Actual Core Balance													
Total Actual Balance													

The Statistical Approach



The Statistical Approach

Sample Balances Analysis with Forecast



This sample illustration is being provided to demonstrate the tools on how we analyze cash balances. Please refer to disclosures at the end of this presentation.

Challenges to Developing Forecasts

Systems

Limitations of
computer systems
for historical data
or data
management

Physical Structure

Locations
of people

Political

Elected
officials
agendas

Inter-departmental Communications

Other departments not
understanding
importance of
information

Review and Maintain Cash Flow Forecast

Compare actual results vs. forecast results

Make sure to identify reasons for variances

Adjust assumptions if warranted

**Follow up with department heads on
capital project slippage**

**Update your model and retain
documentation for future reference**

How Do I Invest It?

You must take into account:



In Summary:

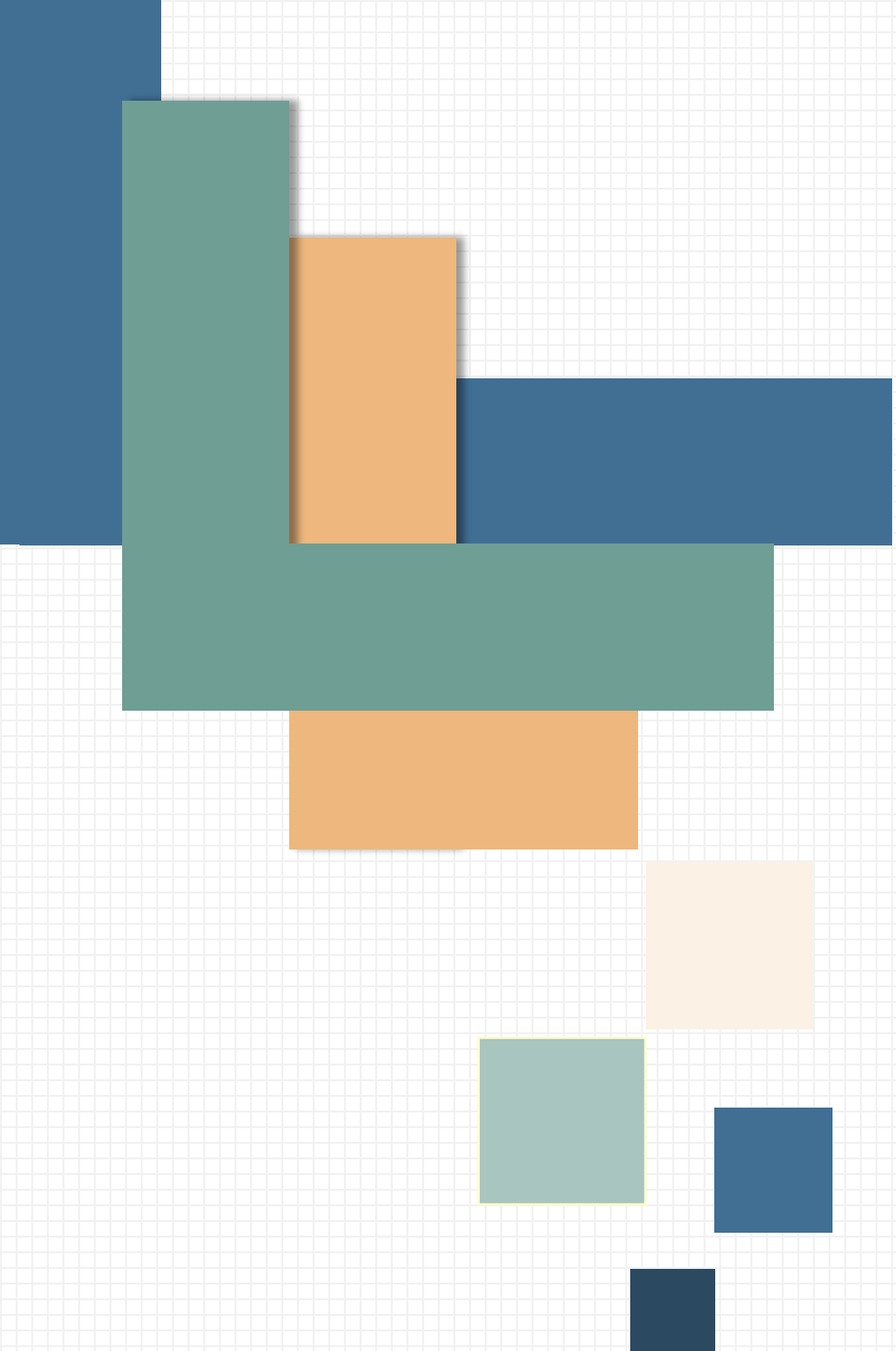
Determine how
much is needed
liquid

Check in with all your
resources:

- Revenues and expenditures historical and to date
- Debt payments
- Everchanging CIP schedules

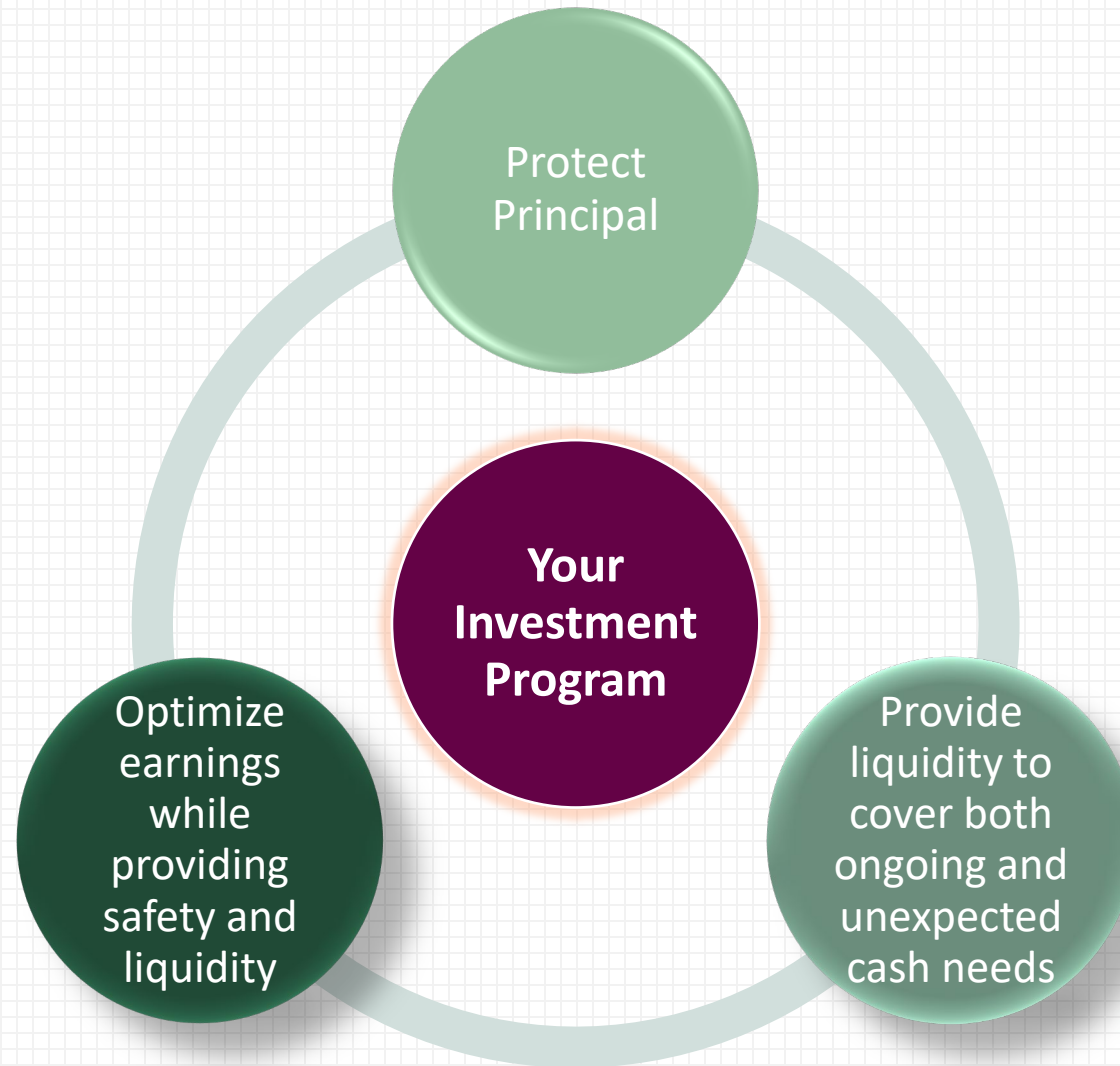
Reduce
unnecessary
liquidity

Safety and
liquidity are
more important
than return



Now What Do You Do With It?

Meet Your Code-Mandated Objectives



Meet Your Code-Mandated Objectives

Based on cash flow analysis, California Government Code, and the Investment policy, these decisions must be made:

Portfolio Duration

Constraining portfolio duration relative to a benchmark

Sector Allocation

Strategic allocations to key sectors, with value-based rotation

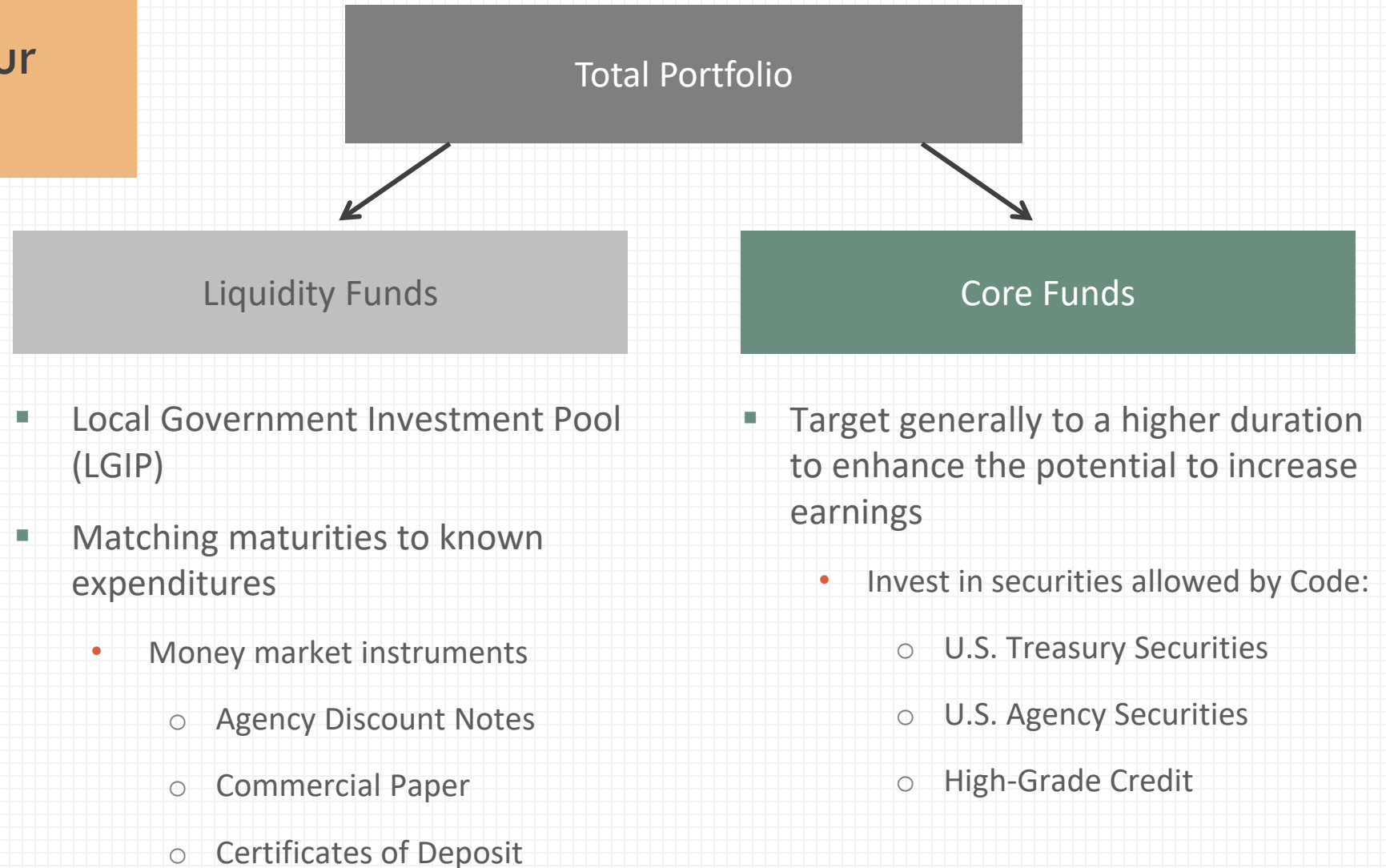
Term Structure

Positioning securities along the yield curve to capture value across maturities

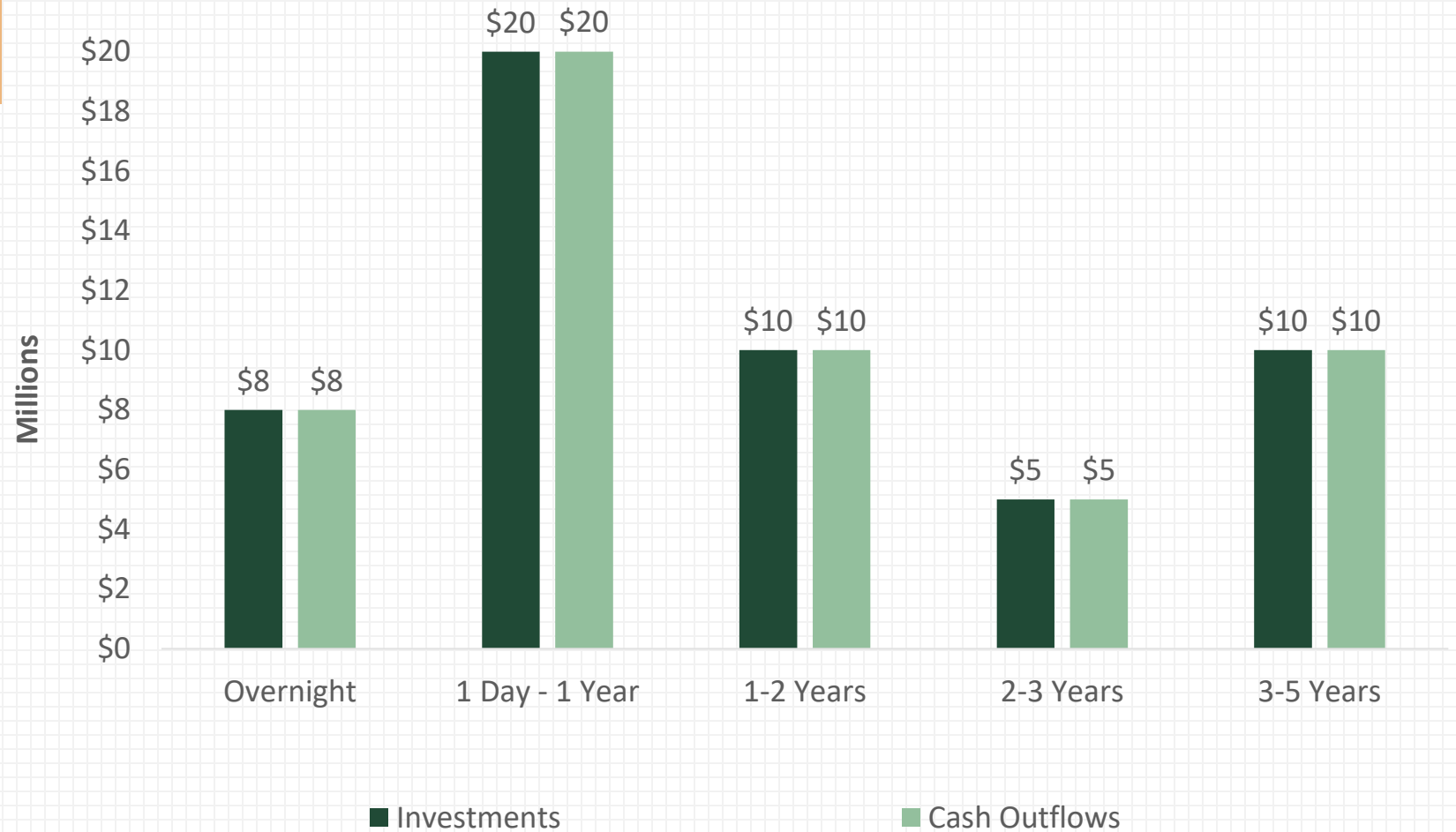
Security Selection

Selecting undervalued bonds offering the greatest potential for risk-adjusted return

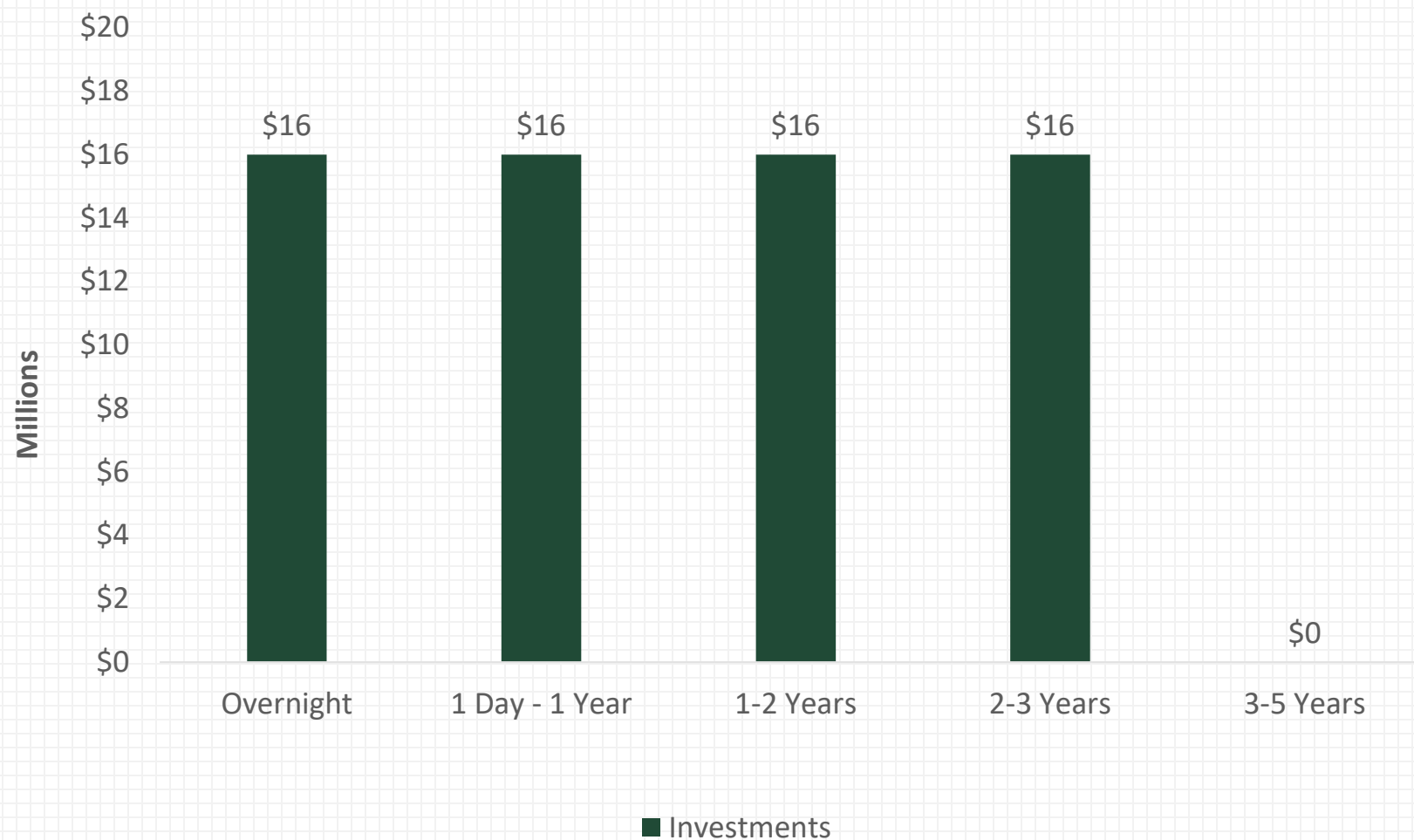
Structuring Your Funds



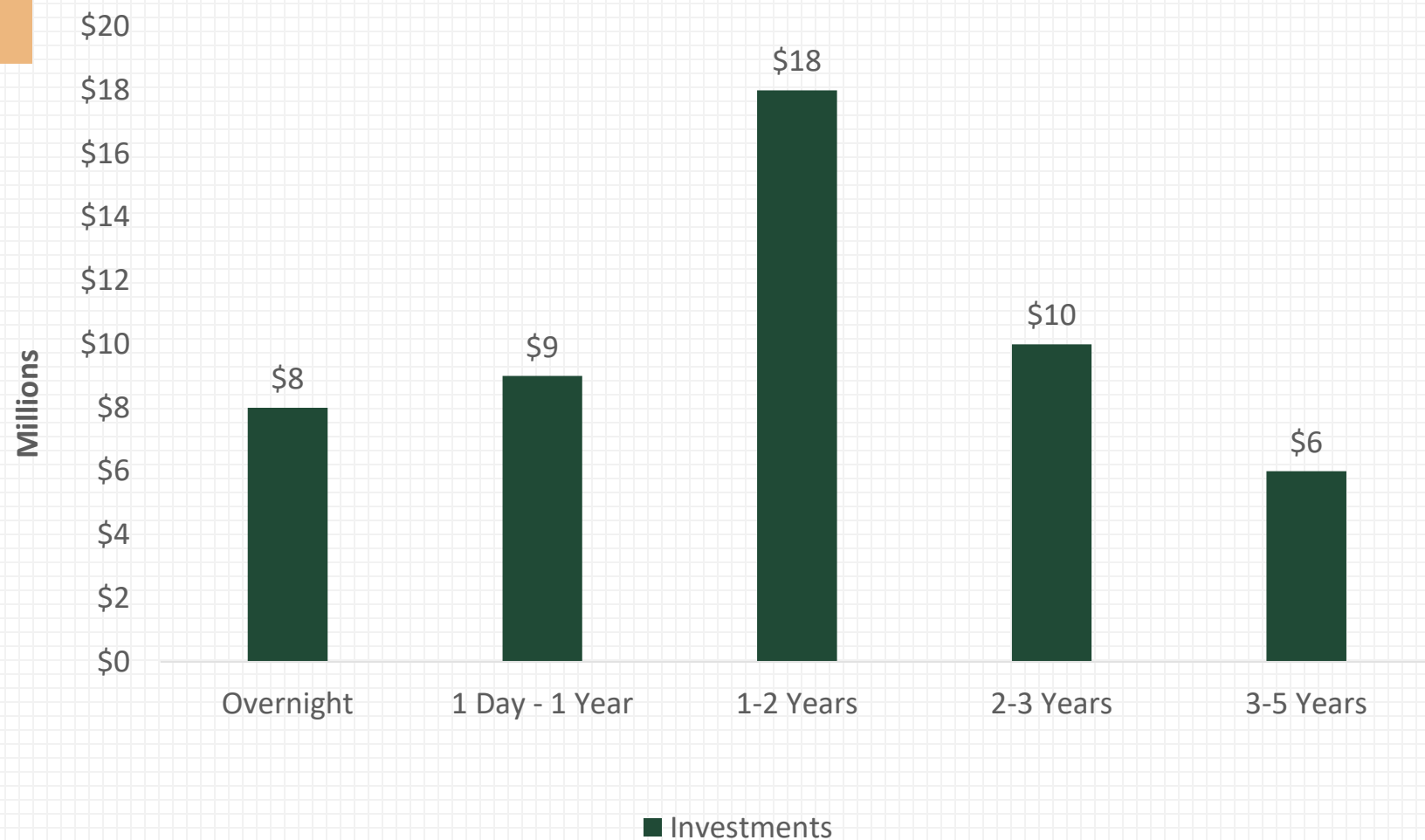
Matching Cash Flows Maturity Structure



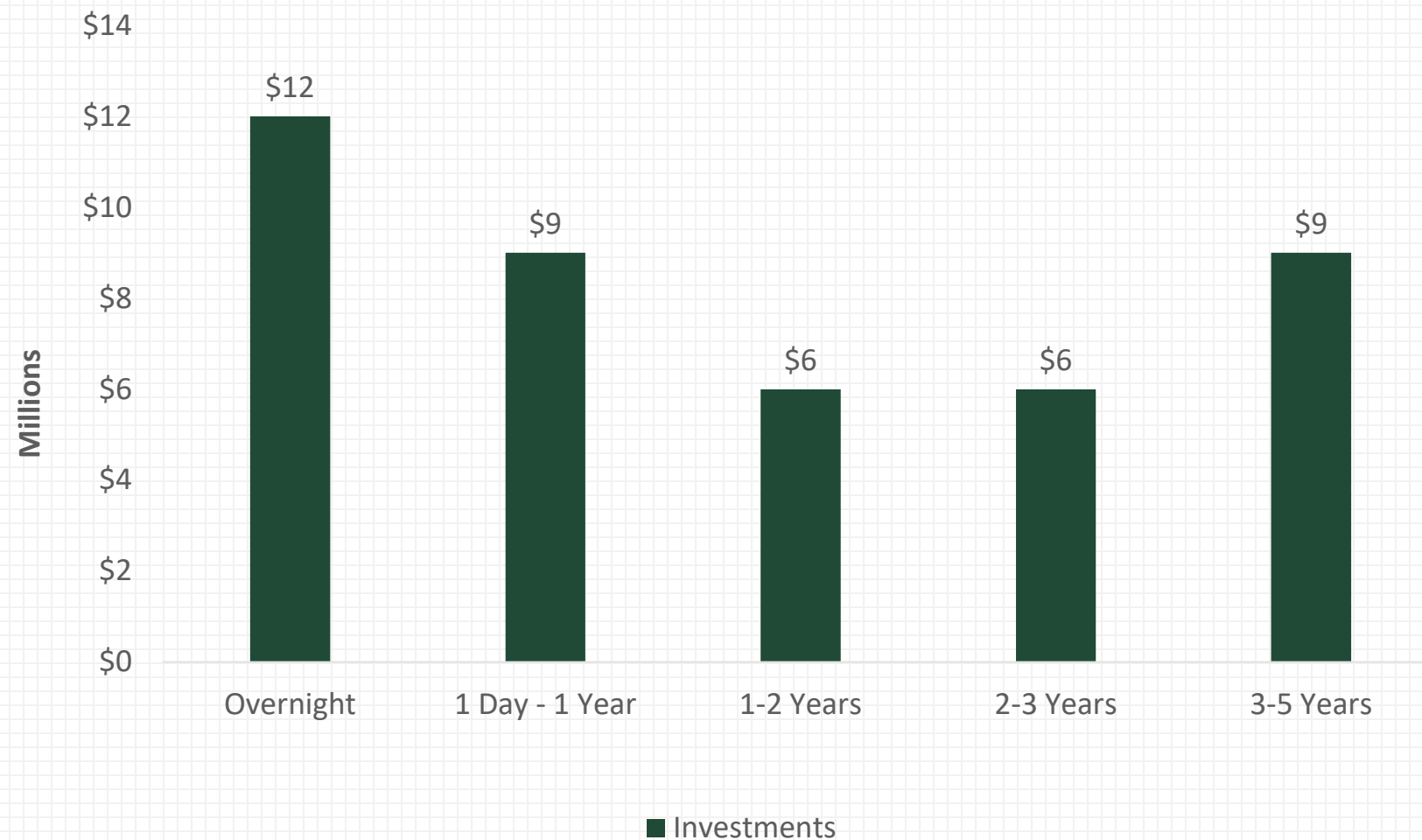
Laddered Maturity Structure



Bullet Maturity Structure



Barbell Maturity Structure



Longer duration targets are associated with higher return and volatility

Annual Benchmark Study
Period Ending December 31, 2019

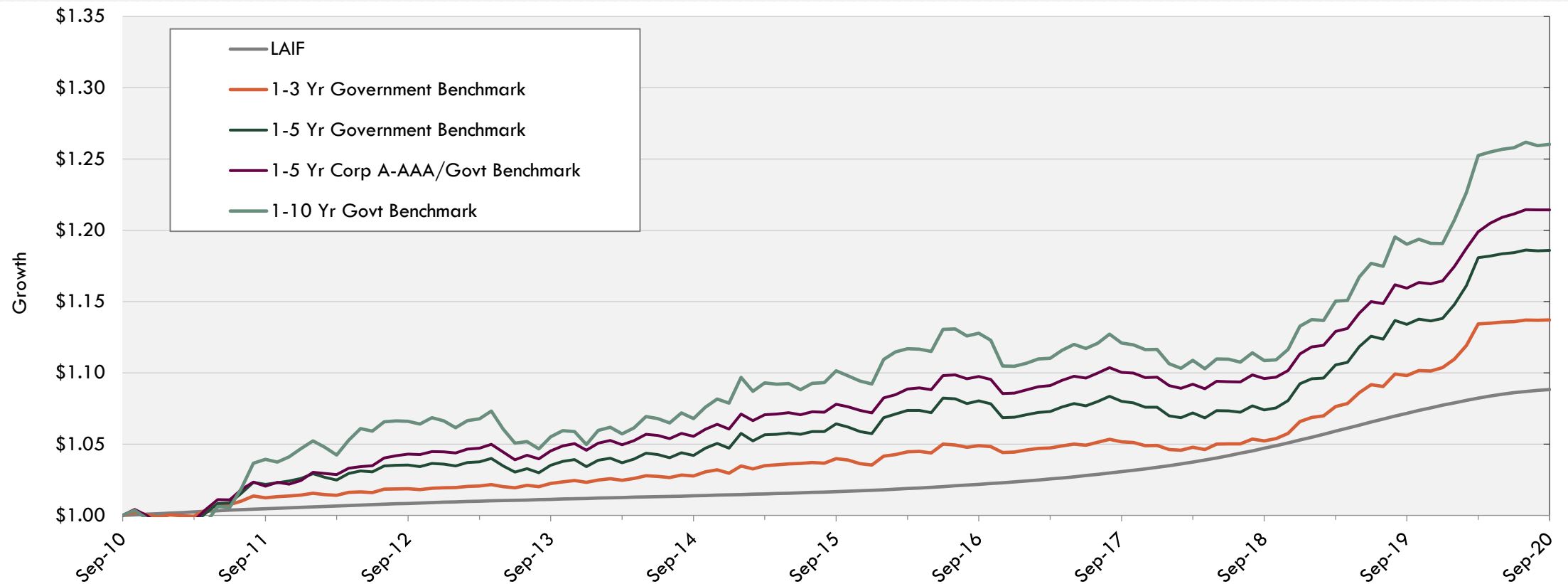
	ICE BAML 1-3 Yr. US Treasury/Agency	ICE BAML 1-5 Yr. US Treasury/Agency	ICE BAML US Issuers 1-5 Yr. AAA-A US Corporate/Government	ICE BAML 1-10 Yr. US Treasury/Agency
0-6 months			0.01%	
6-12 months				
1-3 years	100.00%	61.35%	60.62%	43.51%
3-5 years		38.65%	39.37%	27.41%
5-10 years				29.09%
Treasury	96.44%	96.81%	84.88%	97.39%
Agency	3.56%	3.20%	2.86%	2.61%
Corporate			12.27%	
Modified Duration 12/31/2018	1.86	2.59	2.59	3.69
10 Year Annualized Total Return	1.24%	1.71%	1.87%	2.41%
10 Year Standard Deviation	0.98%	1.35%	1.36%	2.43%
Sharpe Ratio	0.67	0.83	0.95	0.76
Qualitative Risk Objective	12/31/1988 – 12/31/2019	12/31/1988 – 12/31/2019	12/31/1996 – 12/31/2019	12/31/1988 – 12/31/2019
Negative Quarterly Return Occurrences	13	23	15	33
2 Consecutive Negative Quarterly Return Occurrences	2	3	3	7
Negative Return For Year Occurrences	0	2	1	3
Worst Year Total Return	0.37%	-0.63%	-0.01%	-1.61%

Source: ICE BAML Indices.

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.

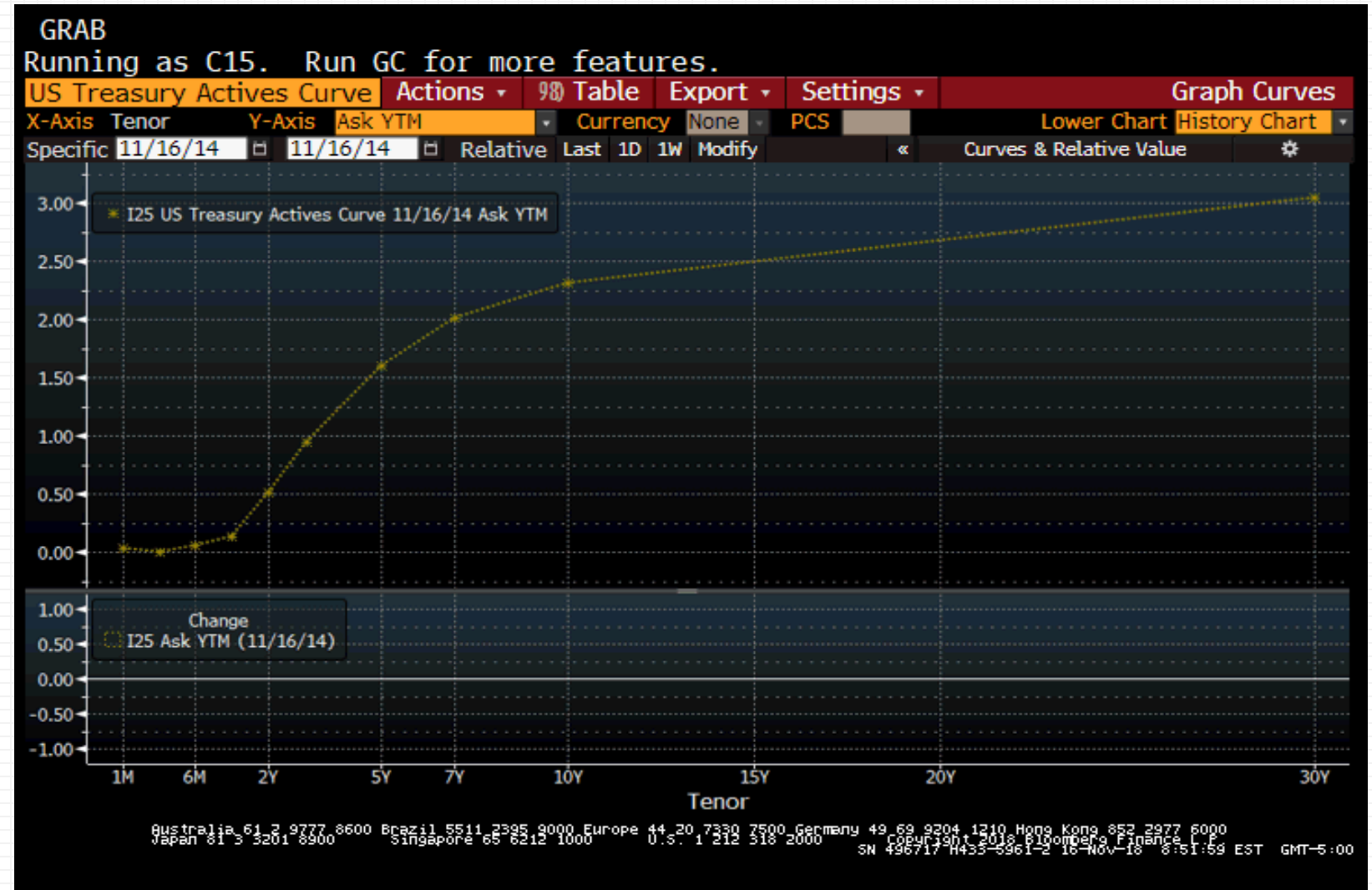
Benchmark Comparison

Value on 9/30/2020 of \$200 million invested 9/30/2010		
	9/30/2020	Annualized Return
LAIF	\$217,650,288	0.85%
1-3 Yr Government Benchmark	\$227,424,300	1.29%
1-5 Yr Government Benchmark	\$237,167,819	1.72%
1-5 Yr Corp A-AAA/Govt Benchmark	\$242,853,962	1.96%
1-10 Yr Govt Benchmark	\$252,051,305	2.34%

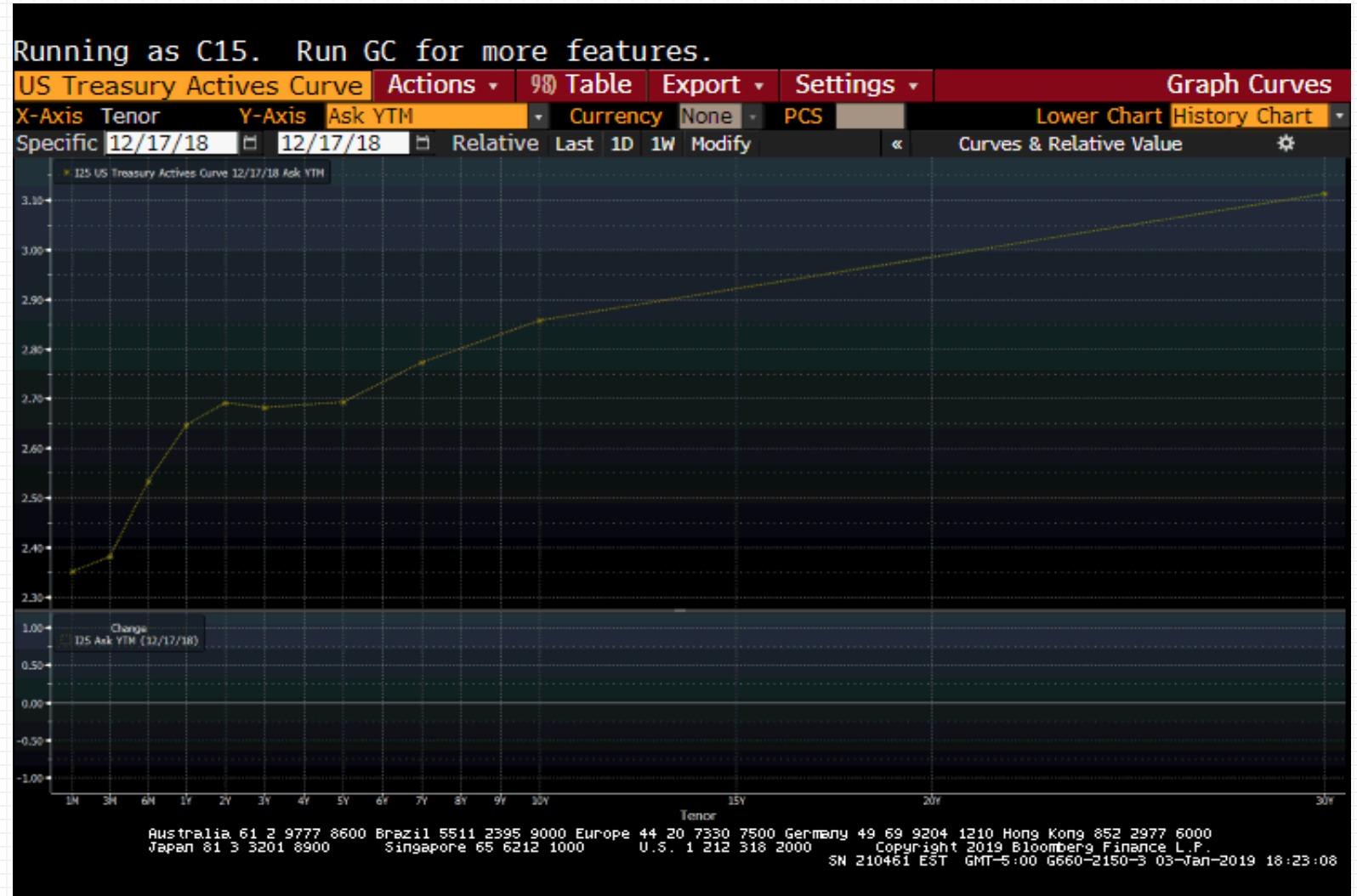


Source: LAIF and ICE BAML Indices as of 09/30/2020. LAIF returns include an administrative fee charged to investors by the California State Treasurer. Index returns assume reinvestment of all distributions. Historical performance results for investment indexes generally do not reflect the deduction of 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. Please see disclosures at the end of this presentation.

Normal Yield Curve



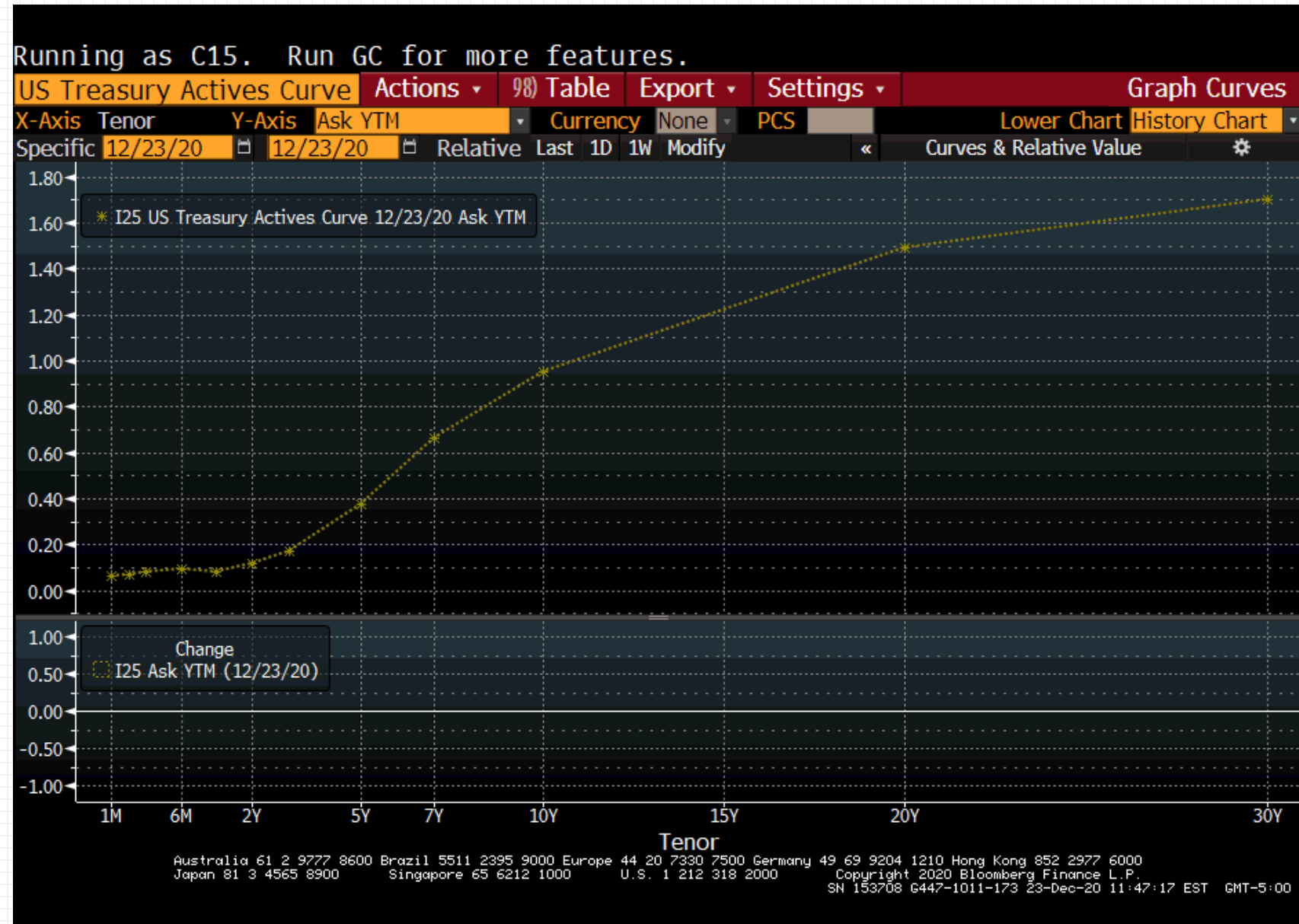
Flattening Yield Curve



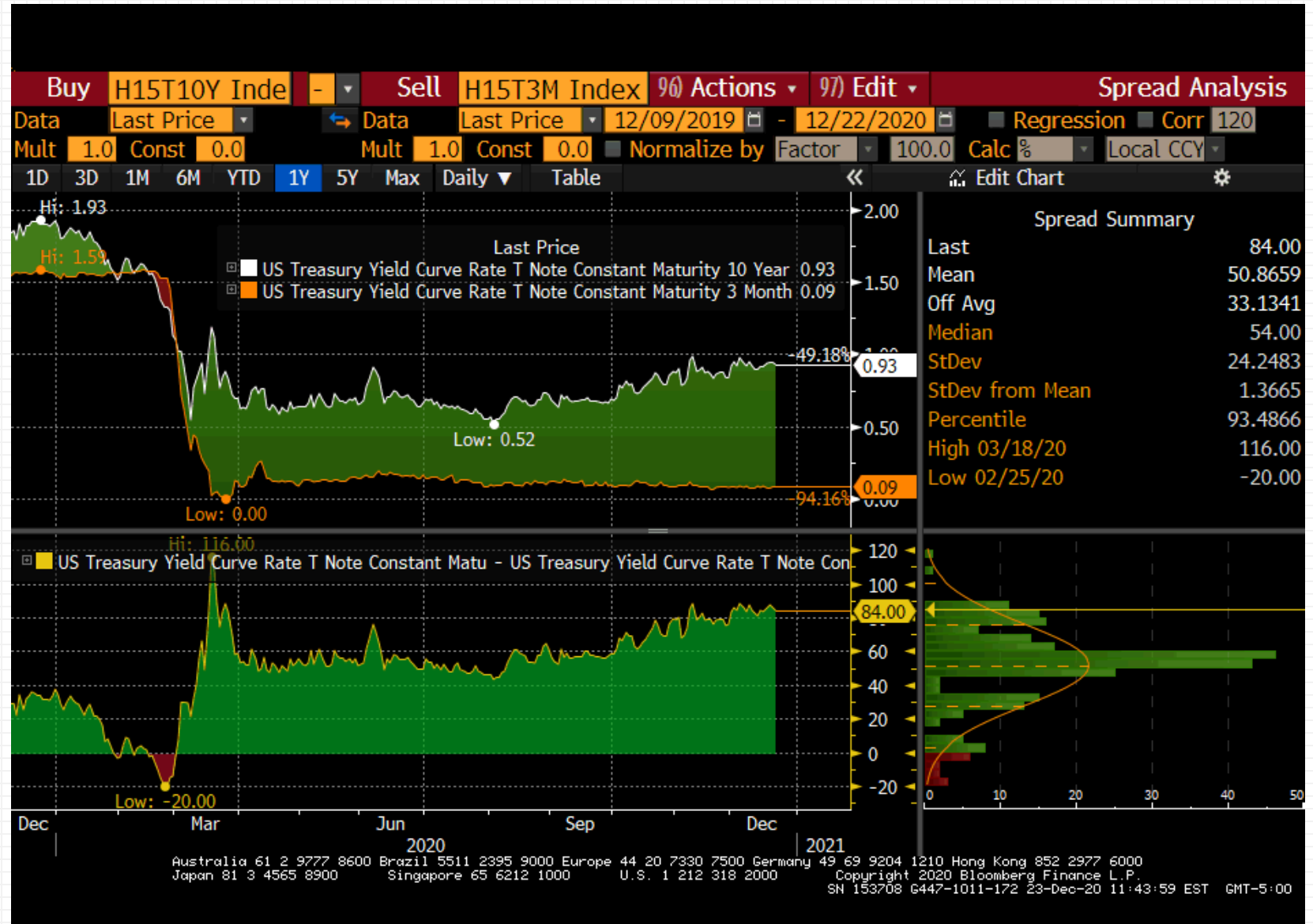
Inverted Yield Curve



Yield Curve Today



Yield Spread Between 3-Month and 10-Year Treasury Securities



Yield Levels

As of December 21, 2019

LAIF	3 MO TSY	6 MO TSY	1 YR TSY	2 YR TSY	3 YR TSY	5 YR TSY	10 YR TSY
2.04%	1.56%	1.56%	1.51%	1.63%	1.66%	1.73%	1.92%

As of December 21, 2020

LAIF	3 MO TSY	6 MO TSY	1 YR TSY	2 YR TSY	3 YR TSY	5 YR TSY	10 YR TSY
0.57%	0.08%	0.09%	0.09%	0.12%	0.18%	0.38%	0.38%

Assuming a long-term time horizon, what is the main risk of keeping funds invested one year or less?

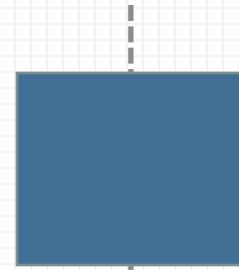


Case Studies

Destination City Battling Lower Revenues

Revenue Profile:

- TOT: 28%
- Fees/Charges: 24%
- Property Tax: 15%
- Sales Tax: 11%



Quickly recognized coronavirus would negatively impact reserves

Portfolio

Portfolio balances were maintained at same levels for many years

Liquidity

Liquidity quickly ran low

Actions

Liquidated funds from investment portfolio in increments to meet cash demands

Destination City Battling Lower Revenues

Revenue Profile:

- TOT: 28%
- Fees/Charges: 24%
- Property Tax: 15%
- Sales Tax: 11%

?

What steps could have been taken to mitigate the drain on reserves?

?

Given fall in interest rates b/c COVID, what was the optimal place for their cash?

?

What might be a good step for them to shore up reserves in the future?

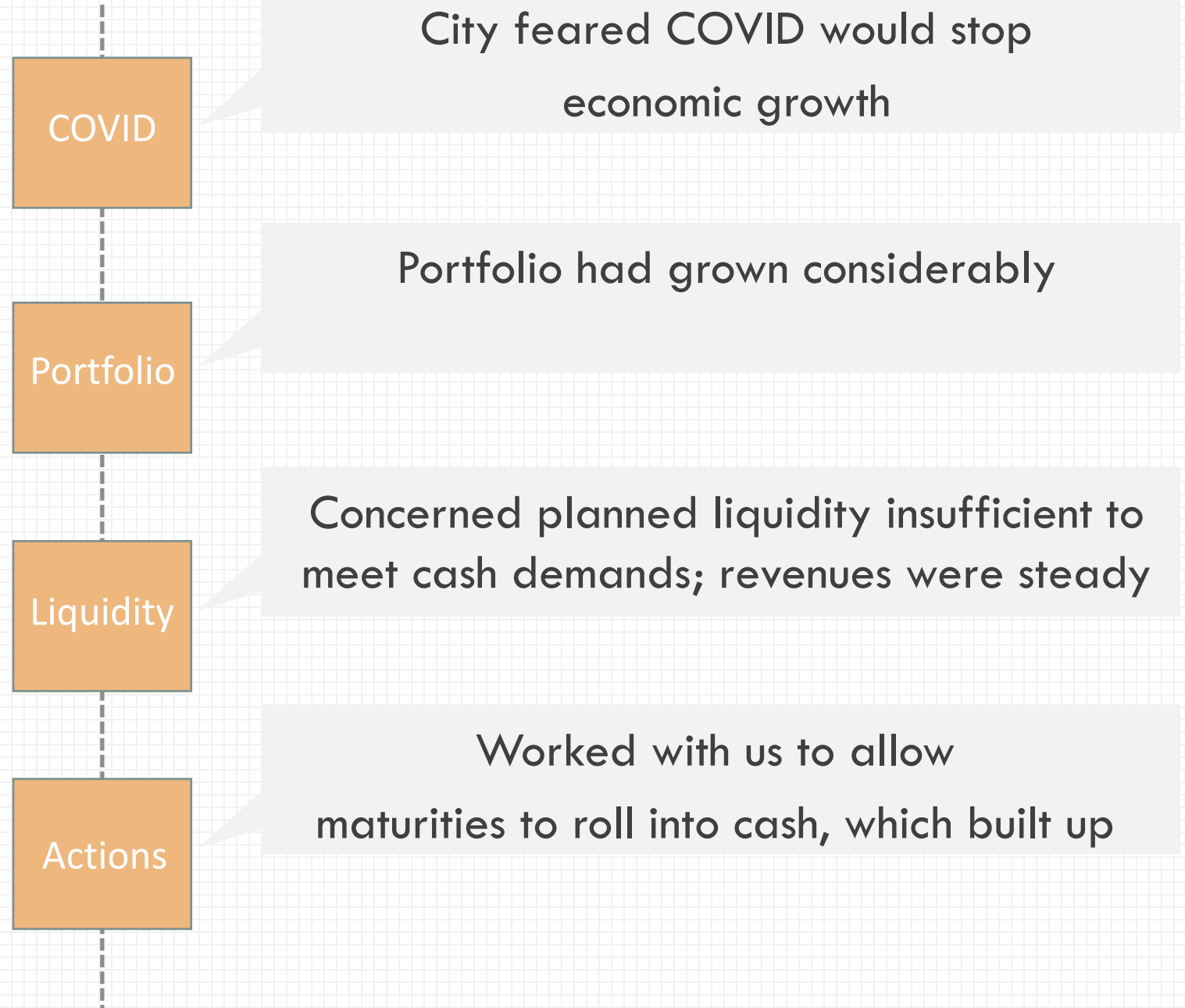
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Any other final thoughts?

Central Valley City Revenues Hitting Highs

Revenue Profile:

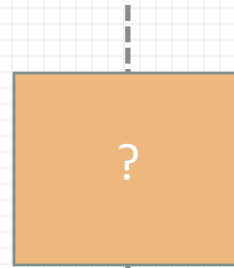
- Charges for services: 48%
- Property Tax: 20%
- Transfer In: 10%



Central Valley City Revenues Hitting Highs

Revenue Profile:

- Charges for services: 48%
- Property Tax: 20%
- Transfer In: 10%



Were they too conservative?



How should excess cash have been addressed?



Any changes to portfolio structure?



Any other recommended actions?

Disclosures

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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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Economic factors, market conditions and investment strategies will affect the performance of any portfolio and there are no assurances that it will match or outperform any particular benchmark. The data contained in this presentation is the property of those providers, which was obtained from sources believed to be reliable, but are subject to change at any time at the provider's discretion. Unless otherwise noted, Chandler is the source of data contained in this presentation.

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.

Disclosures

ICE BAML 1 Year US Treasury Note Index

The ICE BAML 1-Year US Treasury Note Index is comprised of a single issue purchased at the beginning of the month and held for a full month. At the end of the month that issue is sold and rolled into a newly selected issue. The issue selected at each month-end rebalancing is the outstanding two-year Treasury note that matures closest to, but not beyond, one year from the rebalancing date. (Index: GC03. Please visit www.mlindex.ml.com for more information).

ICE BAML 1-3 Year US Treasury Index

The ICE BAML 1-3 Year US Treasury Index tracks the performance of US dollar denominated sovereign debt publicly issued by the US government in its domestic market. Qualifying securities must have at least one year remaining term to final maturity and less than three years remaining term to final maturity, a fixed coupon schedule and a minimum amount outstanding of \$1 billion. Qualifying securities must have at least 18 months to final maturity at the time of issuance. (Index: G1O2. Please visit www.mlindex.ml.com for more information).

ICE BAML 1-3 Year US Treasury & Agency Index

The ICE BAML 1-3 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 three 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. (Index: G1A0. Please visit www.mlindex.ml.com for more information).

ICE BAML US 1-5 Year Treasury Index

The ICE BAML US 1-5 Year Treasury Index tracks the performance of US dollar denominated sovereign debt publicly issued by the US government in its domestic market. Qualifying securities must have at least one year remaining term to final maturity and less than five years remaining term to final maturity, a fixed coupon schedule and a minimum amount outstanding of \$1 billion. Qualifying securities must have at least 18 months to final maturity at the time of issuance. (Index: GVQ0. Please visit www.mlindex.ml.com for more information).

ICE BAML 1-5 Year US Treasury & Agency Index

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. (Index: GVA0. Please visit www.mlindex.ml.com for more information).

ICE BAML 3-5 Year US Treasury Index

The ICE BAML 3-5 Year US Treasury Index tracks the performance of US dollar denominated sovereign debt publicly issued by the US government in its domestic market. Qualifying securities must have at least three years remaining term to final maturity and less than five years remaining term to final maturity, a fixed coupon schedule and a minimum amount outstanding of \$1 billion. Qualifying securities must have at least three years to final maturity at the time of issuance. (Index: G2O2. Please visit www.mlindex.ml.com for more information).

Disclosures

ICE BAML 1-10 Year US Treasury & Agency Index


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. (Index: G5A0. Please visit www.mlindex.ml.com for more information).

LAIF

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.

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THANK YOU

We look forward to your participation in the next webinar in this series, *Investment Accounting, Disclosure, and Reporting*.