

ADVANCED PUBLIC FUNDS INVESTING: THE ANALYTICS OF INVESTMENT SELECTION JANUARY 22-23, 2025 COSTA MESA, CA

# **SESSION ONE** Portfolio Management Principles

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ADVANCED PUBLIC FUNDS INVESTING | January 22–23, 2025



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# Successful investing is about managing risk not avoiding it

– Benjamin Graham



## **Learning Outcomes**

- Participants will learn who was the most successful investor of all time.
- Participants will gain valuable insights into how the Prudent Investor Standard of Care significantly influences Public Fund Investing practices.
- Participants will be introduced to the "political" aspects of investment policy surrounding core objectives and peer groups.
- Participants will be able to differentiate between two investment strategies suitable for a public fund investment portfolio.
- Participants will explore what constitutes acceptable interest rate and credit risk.

# The Code Prudent Investor Standard

## **Government Code - GOV § 53600.3**

all governing bodies of local agencies or persons authorized to make investment decisions on behalf of those local agencies investing public funds pursuant to this chapter <u>are trustees and therefore fiduciaries subject</u> <u>to the prudent investor standard.</u>

## **History - Prudent Person Rule**

In 1830, Judge Samuel Putnam formulated the Prudent Man Rule. He wrote as a judgement in Harvard vs Amory case:

"Do what you will, the capital is at hazard...All that can be required of a trustee to invest is that he shall conduct himself faithfully and exercise a sound discretion. He is to observe how men of prudence, discretion, and intelligence manage their own affairs... considering the probable income, as well as the probable safety of the capital to be invested."



*This is the earliest record of an attempt to establish prudent standards for investments.* 

## )f Care - Evolution

#### **Prudent Person**

Investments shall be made with judgment and care, under circumstances then prevailing, which persons of prudence, discretion and intelligence exercise in the management of their own affairs, not for speculation, but for investment, considering the probable safety of their capital as well as the probable income to be derived.

#### **Prudent Investor**

A U.S. law that sets the standard of fiduciary duty for those entrusted with the responsibility of managing others' money, such as trustees and estate administrators. It requires that a trustee weigh risk versus reward when making investment decisions, taking into account the income that may be generated by the investment as well as the probable safety of the invested capital.

Prudent investing entails considerably more than simply selecting legal securities.

## **Prudent Investor – What Changed?**

- 1. Entire portfolio is considered when determining prudence of investment. Fiduciary not held liable for losses as long as investments consistent with policy objectives
- **2.** Diversification is explicitly required as a duty for prudent fiduciary investing.
- 3. No category or type of investment is deemed inherently imprudent. Instead, *suitability* to portfolio needs are considered. However, speculation and outright risk taking is not sanctioned by the rule and remain subject to possible liability.
- 4. Fiduciary permitted to delegate investment mgmt. to third parties.

## Why is a Suitability Statement Needed?

Investment Reports are supposed to capture the various actions taken by the trustee or fiduciary regarding the overall investment portfolio. Ultimately Investment reports are disclosing not only the *Legal* test of "is portfolio in compliance with State Code and their Investment Policy" but also has a duty to report how the trustee / fiduciary decision making applied the Prudent Investor Standard in constructing and managing the portfolio. The Prudent Investor Standard speaks to both the Fiduciary Obligation as well as the Fiduciary's Stewardship.

## **Distinctions With A Difference**

#### **Fiduciary Obligation**

Refers to the legal and ethical duties that a fiduciary owes to the stakeholder i.e. citizens. Its primary focus is on legal compliance and ethical standards.

- **Duty of Loyalty:** act in sole interest of public fund
- **Duty of Care:** Acting with competence, diligence and prudence.
- **Duty of Good Faith:** Acting honestly and transparently
- **Duty of Full Disclosure:** Informing beneficiary of relevant information

#### Fiduciary Stewardship

Extends beyond legal obligations to emphasize a focus on ongoing responsibility for public funds under care.

#### **Core Principles:**

- Responsibility: Managing portfolio with foresight and accountability
- Sustainability: Investment strategies benefit both present and future stakeholders
- Leadership: Establishing standards for responsible performance i.e., <u>Suitability</u> <u>Benchmark</u>

## **Key Takeaways**

- 1. UPIA's most important change was that the standard of prudence would be applied to any investment in context of total portfolio rather than individual investments.
- A prudent investment will not always turn out to be a highly profitable investment; in addition, no one can predict with certainty what will happen with any investment decision.
- 3. More recently, the prudent man rule has been renamed the prudent person rule. This set of guidelines can also be applied where it is referred to as the prudent investor rule.

# California Code Government Code – GOV § 53600.5 Investment Policy Objectives

When investing, reinvesting, purchasing, acquiring, exchanging, selling, or managing public funds;

The **primary objective** of a trustee shall be to **safeguard the principal** of the funds under its control.

The **secondary objective** shall be to **meet the liquidity needs** of the depositor.

The <u>third objective</u> shall be to achieve a return on the funds under its control.

## **Investment Policy "Politics"**

### **Ensuring Investment Practice Follows Policy**

Peer Group Comparisons

**Preservation of Principal** 

## **Rank The Risk**



Income \_\_\_\_\_

What is the most frequent question asked about the portfolio?

If above is true, is investment practice following investment policy?

## Key Takeaways

When yield is the primary focus, *investment practice is not following investment policy*.

Therefore, investment decision-making should reflect not only an effort to comply with policy, i.e., legal but also suitable, i.e., investments bought or sold are filtered using the policy objectives in order of priority.

## The Tale Of Two Cities

Peer Groups Comparison

#### **City of Me**

- PM retires in 6 months
- Affluent community
- No Infrastructure needs
- All funds in LAIF or cash
- Portfolio yields 4.50%

#### City of Me-Too

- PM young MBA Finance
- New Community
- No surplus operating funds
- High infrastructure needs
- Portfolio yields 5.00%

# **The Tale Of Two Cities** *Peer Groups Comparison Logic*

#### **<u>City of Me</u>** versus <u>City of Me-Too</u>

- > If both are located in the same state of California
- > If both share the same goal of principal preservation
- If both have same investment policy objectives
- > If both have same portfolio size
- If both hold legal securities

Does City with a higher yield have a better PM?

# The Tale Of Two Cities

## Peer Group Performance Evaluation

#### **City of Me**

- Equals Benchmark
- Legal Holdings
- Safety: LAIF and Cash
- Liquidity: LAIF and Cash
- Income: 4.50%

#### **City of Me-Too**

- Beating Benchmark
- Legal Holdings
- Safety: All UST's / Agy's
- Liquidity: Portfolio Gains
- ➢ Income: 5.00%

# Tale of Two CitiesSituation Summary

City of Me: The retiring Treasurer is overseeing a City with no immediate infrastructure needs, large surpluses due to its large tax base and 100% of public funds invested in LAIF and/or Cash.

City of Me-Too: The young MBA Investment Officer's City has large infrastructure demands with all portfolio holdings between three- and five-year maturities.

# **City of Me** Stewardship Grade

- Treasurer chose to avoid GASB 31 mark-to-market losses and instead hide behind the Investment Policy Objective of Safety.
- Treasurer has all liquidity eggs in one basket, clearly violating Prudent Investor Standard that requires a fiduciary to construct a diversified portfolio.
- Apparently, no effort has been made to evaluate risk tolerance and investable liquidity (surplus).

## <u>City of Me</u> Stewardship Grade?

# **City of Me-Too** *Stewardship Grade*

- Outperformed his Peer's portfolio yield 5% to 4.5%
- Outperformed his and Peer's benchmark 5% to 4.5%
- Holds the view AAA US Treasuries as well as US Agencies assure the portfolio complies with Safety Objective.
- Investment Strategy is to use securities with gains to pay current obligations coming due.

## <u>City of Me-Too</u> Stewardship Grade?

## Key Takeaways

Public funds are unique! While they share the same state code, principal preservation goal and investment policy objectives of safety, liquidity and income, **they do not possess** the same risk tolerance, investment expertise and budget priorities.

There is only one "Peer Group" to compare a public funds fiduciary obligations to:

**Investment Policy "Politics"** 

# What is the Greatest Principal Threat?

Safety Liquidity Income

### Main Street versus Wall Street Speak

Which Bond Is Safest? Which Is The Most Liquid? Which Is Greatest Principal Threat?

Five-Year US Treasury Note yield 5.00% or Three-Year US Agency Note yield 5.00%

## Key Takeaways Safe Doesn't Mean Liquid

Policy

Practice

**Greatest Threat to Principal?** 

# What do you manage?

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I know you think you understand what you thought I said but I'm not sure you realize that what you heard is not what I meant.

– Alan Greenspan



**Investment Strategies** 

## **Investment Goals**

# **Investor Profile**

## **Investment Portfolio**

# What Is An Acceptable Level Of Interest Rate Risk?

Align your portfolio duration with your budget cycle — minimum eighteen months.

If you do not rely on portfolio income to meet the budget and assume you have allowed for obligations to be paid without resorting to the sale of an existing holding, then portfolio duration should be as **long as legally permissible**.

# What Is An Acceptable Level Of Credit Risk?

"Be the Code" – 30% with A or higher rating Comply with Prudent Investor Standard by diversifying portfolio with Medium Term Notes Take advantage of Muni's well. There are no percentage limits, and Muni's relative credit risk are considerable stronger than MTN's. Why Public Funds <u>Don't</u> Need In-House Credit Analysts or Investment Advisors <u>to Approve MTNs</u>

## **The Problem**

- Post-2008, larger public funds hired in-house credit analysts as a political response, not a substantive fix.
- Some public funds are intimidated into thinking they cannot invest in MTNs without similar resources.
- > This misconception:
  - \* Inhibits Diversification critical to complying with the Prudent Investor Standard.
  - \* **Deprives Taxpayers** of funds that could support public services.

## **Key Regulatory Protections**

Strict Regulations for MTNs (e.g., California Govt Code 53601)

- \* Rated A or higher by NRSROs
- \* **30% cap** of portfolio allocation
- \* Maturities of **5 years or less**
- These rules ensure fiduciary stewardship remains focused on the goal of principal preservation by minimizing not eliminating default risk.

## Flaws With In-House Credit Analysts Reasoning

- Hiring in-house credit analyst was a political strategy, not a solution to 2008 failures:
  - \* Real Issues: Misleading credit ratings, systemic corporate fraud, complex instruments (e.g., SIVs).
  - \* These issues are beyond the scope of an individual analyst.
- Larger public funds can afford this expense, some funds cannot.

# Why In-House Credit Analyst Or IA's Are Unnecessary

#### External Expertise is Sufficient:

- \* NRSRO credit ratings:
- \* Equity and credit analyst from Wall Street firms.

#### > Prudent Investor Rule:

\* Focuses on portfolio diversification

#### Cost Efficiencies

- \* Avoids duplicating existing resources
- \* Preserves taxpayer funds for public services

# Conclusion Empowering Some Public Funds

The post 2008 era has produced a more cautious and rigorous approach to ratings. Rating agencies have implemented stricter standards while reducing the previous conflicts of interest.

For public funds this means while vigilance is necessary, the combination of tougher regulations and diversified external resources provide sufficient safeguards for prudent investment decisions without the need of in-house credit analyst or Investment Advisory services
## Why An In-house Credit Analyst Is Unnecessary – CYA Tools

#### **Credit Rating**

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## Who Was The Most Successful Investor Of All Time?

## **QUESTIONS?**

## **BENJAMIN FINKELSTEIN** Managing Director Robert W. Baird & Co Bfinkelstein@rwbaird.com 281.381.2740





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# 15-MINUTE

# BREAK



## **SESSION TWO**

Duration and Asset/Liability Management (ALM): Practical Approach, Theory, and Case Study

#### JASON KLINGHOFFER, CFA Director, DCM, Mischler Financial Group

Principal, MaxQ Analytics

#### HUBIE WHITE, CFA, CTP

Chief Investment Officer Office of the Treasurer & Tax Collector City & County of San Francisco





When investing, reinvesting, purchasing, acquiring, exchanging, selling, or managing public funds, the primary objective of a trustee shall be to safeguard the principal of the funds under its control.

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## Suitability – Building a Plan with Purposeful Evaluation

In a room full of public fund managers, when asked the question, "In importance, how do you rank the objectives of safety, liquidity and income in the performance of your job?" most of the respondents would rank safety and liquidity combined at 80 percent to 90 percent. In light of the above example, why then would the typical performance evaluation be based on a portfolio's total return – or even a peer group comparison – given that, of the three policy objectives, return receives the lowest priority?

- 1) Performance Evaluation involves both qualitative and quantitative components to form the basis for reporting how well a manager is doing in meeting investment objectives.
- 2) Suitability is the one standard that can "specify performance measures as are appropriate for the nature and size of the public funds within the custody or the unit of local government"
- 3) The five "we's" of suitability sets a baseline for questions to be answered while developing a strategy.



## **Five Points of Suitability**

• Questions you should ask yourself to evaluate performance.



#### Liquidity

Is there adequate liquidity to meet operating expenses without the need to sell bonds before maturity?



#### Legal

Does the portfolio meet compliance and policy/statute constraints?

#### Duration

Is the portfolio exposed to an appropriate level of interest rate risk (duration) in the portfolio?

#### Allocation

Does the portfolio have a diversified asset allocation along type, structure and maturity timeframes?



#### Earnings

Is the portfolio earning a "market rate of return" through budgetary and economic cycles?







#### "Don't Beat the Market, Be the Market"

Harvard Endowment: Had 230 employees until 2017, Top 6 executives took home over \$40MM in compensation.

Lost to S&P index by over 100bp over last 20 years and almost 500Bp over past 10 years.

Lost to the S&P annually for the last 12 years straight.



Source: Harvard Management Company; The Harvard Crimson; www.HulbertRatings.com

#### 5 Takeaway's:

- Performance Persistance is Rare:
  - Harvard's few moments of glory have been dwarfed by it's failures.
- Overconfidence is an obstacle:
  - Those who have seen success get complacent and assume they are smarter than they really are.
- Reversion to the mean is powerful:
  - Sector outperformance comes and goes and is hard to predict.
- Many years of skill required to beat luck:
  - Statistically speaking, you would need many decades to understand if manager is superior.
- Indexes are hard to beat:
  - Harvard would have even lost out to a blended portfolio of 60% stocks, 40% US Bonds over last 20 years.

Source: Marketwatch - "What the Harvard Endowment's Below Average Grade Can Teach You About Index Funds and Your Investments", October 10, 2020



"Don't Beat the Market, Be the Market" (cont. 2 of 2)

#### What Does Nevada's \$35 Billion Fund Manager Do All Day? Nothing

Nevada goes passive to beat peers; BLT or tuna



Steve Edmundson, chief investment officer of the Nevada Public Employees' Retirement System, works alone in his Carson City office. PHOTO: JAMIE KINGHAM FOR THE WALL STREET JOURNAL



#### **Interest Rate Speculation**

#### Rates: Aug 1986 to Dec 2024 \$100MM Portfolio

The Truth About Flat Yield Curves

Speculate Holding 3Mo Tbill in Lieu of Longer Bond Dates Reviewed: 08/31/1986 To 12/31/2024 08/31/1986 Portfolio Size Start Date \$100,000,000.00 End Date 12/31/2024 **Buy 3MoTBill**  $\overline{\mathbf{v}}$ Number of Number of Average Performance Average Performance Average Spread of Average Average Observations Observations Times Times of Staying in Short of Staying in Short Shorter Bond to 3Mo TBill vs. % of Wins % of Losses Annual Basis Annual Basis Shorter Bond **Shorter Bond** Bond Over Period in **Bond Over Holding** Buy Bond at in Months in Years Point Win Point Loss **Basis Points Annually Decision Time** Wins Loses Period in Dollars Buy 2YrTsy 38.42 (112.26)(69.88) (\$1,397,624.73) (62.28) 461 109 23.64% 352 76.36% 66.97 Buy 5YrTsy (199.15)(185.61) (\$9,280,629.07) (129.16)461 38.42 27 5.86% 434 94.14% 32.01

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3Mo TBill vs.	Observations in Months	Observations in Years	Number of Times Shorter Bond Wins	% of Wins	Number of Times Shorter Bond Loses	% of Losses	Average Annual Basis Point Win	Average Annual Basis Point Loss	Average Performance of Staying in Short Bond Over Period in Basis Points Annually	Average Performance of Staying in Short Bond Over Holding Period in Dollars	Average Spread of Shorter Bond to Buy Bond at Decision Time
Buy 2YrTsy	43	3.58	3	6.98%	40	93.02%	45.17	(156.17)	(142.12)	(\$2,842,441.86)	21.12
Buy 5YrTsy	34	2.83	5	14.71%	29	85.29%	62.85	(273.56)	(224.09)	(\$11,204,264.71)	29.44



- Public entities generally exhibit predictive cash flows in both magnitude and timing.
- This allows public funds to create duration optimized (interest rate risk centric) allocations.
- Allocations should reflect the legal guidance of the investment policy and the desired weights of allowable sectors based on risk/reward and ALM preferences.
- Portfolio construction: Safety (IR Risk, credit), liquidity, diversified, legal, market rate of return.





## Being invested is more important than the allocation decision!

1.339%

Agency Callable

(0.295%)

Moving from Cash to two duration in Treasuries: *Pickup approx 30Bp Avg Yield* Moving from two duration in Treasuries to two duration in Agency Bullets *Pickup approx 7Bp Avg Yield* Moving from two duration in Agency Bullets to maturity matched Agency Callables:

Pickup approx 12Bp in Avg Yield

		Custom Model S Analysis Dates: I	itats Dec 31	1, 2014 -	Dec 31, 202	24					
	MODEL V	VEIGHTING		Ca	sh Proxy		Treasury	Agency	Bullet	A	gency Callable
LOUS	0	VERNIGHT CASH		100.00%	5						
G0QA		Treasury 0-1Yr				34	.00%				
H541	Agy	Composite 0-1Yr						32.00%		32.00	)%
G102	•	Treasury 1–3Yr				36	5.00%				
G1PB	A	Agy Bullet 1-3Yr						37.00%			
G1PC	Ag	y Callable 1–3Yr								37.00	)%
G2O2	•	Treasury 3-5Yr				30	0.00%				
G2PB	A	lgy Bullet 3–5Yr						31.00%			
G2PC	Aç	y Callable 3-5Yr								31.00	)%
MODEL	STATS	Annualized Total Return	Anr Price	nualized e Return	Annualized Income Retu	i rn	Annualized Std Dev Total Return	Avg Yield to Worst	Std Dev	/ Yld	Avg Eff Dur
Cash	Proxy	1.760%	0.	000%	1.760%		0.553%	1.725%	1.886	5%	0.003
Trea	sury	1.506%	(0.	.369%)	1.819%		1.641%	2.018%	1.595	5%	1.982
Agency	y Bullet	1.631%	(0.	.558%)	2.092%		1.575%	2.083%	1.592	2%	1.981

1.594%

1.407%

2.202%

1.658%

1.427



#### **Anatomy of Duration**

#### **MACAULAY DURATION**

Economist Frederick Macaulay proposed simple formula (1938) to measure the <u>time</u> required to recover the initial cost of the bond (present value).

Weights are given to the present value of each cash flow (coupon payment) at the applicable interest rate for the life of the bond (YTM) then divided by the market price.

#### [PV(CF1)\*p1+PV(CF2)\*p2...PV(CFn)\*Pn} / Market Price of Bond

Thus, Macaulay Duration states the time period within which the present value of the bond will be realized.

e.g. Current 5 Year Treasury has duration of 4.805.

The duration of a bond will always be less than its maturity period.

#### **MODIFIED DURATION**

Macaulay Duration was a good tool when it was conceived to compare bonds on a relative basis as to when an investor could expect to receive the cost of their investment back. The shorter the Macaulay Duration, the "less risk" was perceived by the investor since the PV of the bond would be received sooner.

However, Macaulay Duration's shortfall was its inability to measure risk associated with holding the bond during its existence. Macaulay Duration lacks the ability to measure changes in value as interest rates fluctuate.

To correct for this, the simple division of the Macaulay Duration by (1+YTM) will convert the Mac Duration from a <u>time-based</u> receipt of cash flows to the <u>approximate change</u> in price given a 100bp move in rates.

#### **EFFECTIVE DURATION**

Same as Modified Duration but accounts for prepayment risk in callables and amortizing product. Requires additional sophistication (OAS Model) to obtain.

Effective Duration **SHOULD ALWAYS** be used when a portfolio invests in callable or MBS type securities.



- We know modified duration measures the approximate change in value for a 100bp change in interest rates.
- Because Modified Duration has Macaulay Duration as an input, we know that TVM (time value of money) principles apply.
- Thus, we can show that in normal markets over long periods of time, the more duration we take on (risk), the more return we can achieve.
- Since earning a Market Rate of Return is a core objective (albeit a lower priority one), maximizing duration given safety and liquidity are taken care of is important. It will be the core determinant of how much income/return can be derived from the portfolio.
- Sector and structure profile is of secondary importance to duration.





#### Market Based – Curve(s)

- Manager uses a single or set of interest rate curves and measures risk/reward profile to establish duration.
- <u>Example</u>: A Treasury curve is used to remove credit risk and determine optimal spot on the curve over some period of time.
- Manager could also use a set of curves and based on sector and structure preference could weight each curve accordingly to get blended duration.



## Market Based Approach

#### Single or Multiple Curve Analysis

		Vo							RISK SELECTION										
		NQ.	lr	nterest Ra	te Risk /	Analysis		2024		Select	1.00Yr Tsy								
C .		ayu		nalysis D	ates: Ju	1 31, 2000	5 - Jul 31,	2021											
	OWERED	BYQUA	NIRIX																
	Annualized	Annualized	Annualized	Annualized Std Dev	Annualized Std Dev	Annualized Std Dev	Avg Yield	Avg Eff	TR Sharpe	YId Sharpe	Income	Price	Main Street	Yield/Edur % of	TR/Std Dev % of	Weighted	INDEX DATES		
	Return	Return	Return	Total Return	Price Return	Income Return	to Worst	Dur	Ratio	Ratio	Ratio	Ratio	Ratio	30Yr	30Yr	Rank	Start Date	7/3	1/06
3Mo Tsy	1.055%	1.055%		0.454%	0.454%	0.000%	0.946%	0.235						28.6% / 1.2%	15.2% / 3.1%		End Date	7/3	1/21
6Mo Tsy	1.355%	1.355%		0.539%	0.539%	0.000%	1.040%	0.484	0.556	0.065		0.556	0.193	31.5% / 2.5%	19.5% / 3.6%	9	RISK/REWA	ARD WEIGH	TING
9Mo Tsy	1.466%	0.684%	0.783%	0.629%	0.533%	0.211%	1.101%	0.735	0.641	0.110	0.355	0.278	0.206	33.3% / 3.8%	21.1% / 4.2%	3	TR Sharpe	Ratio	0.00%
1.00Yr Tsy	1.576%	0.013%	1.566%	0.719%	0.528%	0.422%	1.162%	0.986	0.725	0.155	0.711		0.219	35.2% / 5.1%	22.7% / 4.9%	1	YId Sharpe	Ratio	0.00%
1.25Yr Tsy	1.718%	0.217%	1.539%	0.873%	0.701%	0.411%	1.193%	1.225	0.747	0.182	0.608	0.000	0.208	36.1% / 6.3%	24.7% / 5.9%	2	Income Retu	rn Ratio	0.00%
1.50Yr Tsy	1.860%	0.422%	1.512%	1.028%	0.874%	0.400%	1.225%	1.463	0.770	0.210	0.506	0.000	0.197	37.1% / 7.5%	26.8% / 6.9%	7	Price Return	Ratio	0.00%
1.75Yr Tsy	2.002%	0.626%	1.486%	1.183%	1.047%	0.389%	1.256%	1.701	0.792	0.238	0.404	0.000	0.187	38.0% / 8.7%	28.8% / 8.0%	13	Main Street	Ratio	100.00%
2.00Yr Tsy	2.144%	0.830%	1.459%	1.338%	1.221%	0.377%	1.287%	1.939	0.814	0.265	0.302		0.176	39.0% / 10.0%	30.9% / 9.0%	20			
2.25Yr Tsy	2.305%	0.910%	1.565%	1.515%	1.400%	0.384%	1.334%	2.171	0.822	0.308	0.328	0.012	0.178	40.4% / 11.1%	33.2% / 10.2%	19			
2.50Yr Tsy	2.466%	0.990%	1.672%	1.691%	1.580%	0.391%	1.381%	2.403	0.831	0.351	0.354	0.023	0.180	41.8% / 12.3%	35.5% / 11.4%	18			
2.75Yr Tsy	2.626%	1.070%	1.778%	1.867%	1.760%	0.397%	1.427%	2.635	0.839	0.394	0.380	0.035	0.182	43.2% / 13.5%	37.8% / 12.6%	17			
3.00Yr Tsy	2.787%	1.151%	1.884%	2.044%	1.940%	0.404%	1.474%	2.866	0.847	0.437	0.406	0.047	0.184	44.6% / 14.7%	40.1% / 13.8%	16			
3.25Yr Tsy	2.929%	1.251%	1.959%	2.258%	2.158%	0.394%	1.528%	3.101	0.837	0.491	0.402	0.071	0.186	46.3% / 15.9%	42.2% / 15.3%	14			
3.50Yr Tsy	3.071%	1.351%	2.034%	2.473%	2.377%	0.384%	1.582%	3.336	0.826	0.544	0.399	0.095	0.189	47.9% / 17.1%	44.2% / 16.7%	12			
3.75Yr Tsy	3.213%	1.452%	2.108%	2.687%	2.595%	0.374%	1.636%	3.570	0.816	0.598	0.396	0.119	0.191	49.5% / 18.3%	46.3% / 18.2%	11			
4.00Yr Tsy	3.355%	1.552%	2.183%	2.902%	2.814%	0.364%	1.690%	3.805	0.805	0.652	0.393	0.143	0.193	51.2% / 19.5%	48.3% / 19.6%	10			
4.25Yr Tsy	3.497%	1.652%	2.258%	3.117%	3.033%	0.354%	1.744%	4.040	0.794	0.705	0.389	0.167	0.196	52.8% / 20.7%	50.4% / 21.1%	8			
4.50Yr Tsy	3.639%	1.753%	2.332%	3.331%	3.251%	0.344%	1.798%	4.274	0.784	0.759	0.386	0.191	0.198	54.4% / 21.9%	52.4% / 22.5%	6			
4.75Yr Tsy	3.781%	1.853%	2.407%	3.546%	3.470%	0.334%	1.852%	4.509	0.773	0.813	0.383	0.215	0.200	56.1% / 23.1%	54.4% / 24.0%	5			
5.00Yr Tsy	3.923%	1.954%	2.482%	3.760%	3.689%	0.324%	1.906%	4.744	0.763	0.867	0.379	0.239	0.202	57.7% / 24.4%	56.5% / 25.4%	4			
10.00Yr Tsy	4.761%	2.090%	3.375%	7.020%	6.968%	0.293%	2.594%	8.846	0.528	1.623	0.330	0.147	0.186	78.5% / 45.4%	68.6% / 47.4%	15			
30.00Yr Tsy	6.945%	3.482%	4.960%	14.802%	14.766%	0.265%	3.303%	19.478	0.398	2.514	0.264	0.164	0.121			21			

## **Market Based Approach**

Single or Multiple Curve Analysis

- Uses simple methodology by utilizing a single or multiple curves that are easily accessible.
- Risk/Reward is measured through principles like the Sharpe Ratio or a duration modified Sharpe Ratio and are relatively simple calculations.
- Does not capture true portfolio exposure (single curve used to measure duration, but portfolio is allocated across different sectors).
- Multiple curve approach requires sector allocation desires before duration established (chicken vs. egg).
- Mean-Variance Analysis possible, but requires sophistication and still optimizes market-based volatility to expected returns.
- **Does not** account for liabilities or cash flow needs of portfolio.



Market Based – Index Sets

- Manager uses a set of indices and measures risk/reward profiles accordingly (ICE/BAML, Lehman/Bloomberg, etc..).
- Like multiple curves, the manager could weight their preference of sectors and structures and determine the optimal blended duration for the portfolio.



## **Approaches for Determining Portfolio Duration**

arket Based	Appr ex Analys	oach		0 – 1Yr Agy Composite = .53 1 – 3Yr A-AAA Corporate = 1.93 Blended 50/50 Duration= 1.23								
		ÍCS ANTRIX	Static Inde Analysis D	tatic Index Stats analysis Dates: Nov 30, 2007 - Nov 30, 2019 End Date 1								
INDEX STATS 0-1	Annualized Total Return	Annualized Price Return	Annualized Income Return	Annualized Std Dev Total Return	Avg Yield to Worst	Std Dev Yld	Avg Eff Dur	TR Sharpe Ratio	Yld Sharpe Ratio	Main Street Ratio	Weighted Rank	
0-1 Treasury	0.925%	(1.137%)	1.843%	0.375%	0.767%	0.844%	0.515	0.644	0.180	0.296	4.0	
0-1 Agy Composite	1.105%	(1.385%)	2.178%	0.469%	0.915%	0.965%	0.530	0.899	0.310	0.565	3.0	
0–1 Supranational	1.395%	(1.565%)	2.553%	0.413%	1.315%	0.941%	0.539	1.724	0.743	1.298	2.0	
0-1 A-AAA Corp	1.848%	(2.162%)	3.300%	0.841%	1.782%	1.508%	0.525	1.385	0.773	2.221	1.0	
INDEX STATS 1-3	Annualized Total Return	Annualized Price Return	Annualized Income Return	Annualized Std Dev Total Return	Avg Yield to Worst	Std Dev Yld	Avg Eff Dur	TR Sharpe Ratio	Yld Sharpe Ratio	Main Street Ratio	Weighted Rank	
1-3 Treasury	1.629%	(0.396%)	1.948%	1.125%	1.051%	0.784%	1.865	0.841	0.556	0.234	6.0	
1–3 Agency Blt	1.993%	(0.587%)	2.440%	1.251%	1.233%	0.886%	1.835	1.047	0.697	0.337	4.0	
1-3 Agency Clb	1.515%	0.052%	1.471%	0.662%	1.279%	0.895%	1.169	1.257	0.742	0.568	2.0	
1-3 Municipal	1.902%	(2.674%)	3.614%	1.115%	1.159%	0.649%	1.805	1.093	0.838	0.301	5.0	
1–3 Supranational	2.329%	(0.411%)	2.636%	1.166%	1.576%	0.801%	1.935	1.412	1.200	0.497	3.0	
1–3 A–AAA Corp	2.682%	(1.089%)	3.419%	2.570%	2.318%	1.592%	1.930	0.778	1.070	0.882	1.0	

## **Market Based Approach**

#### Single or Multiple Index Analysis (cont. 2 of 3)

CHARACTERISTICS		ICE BAML 1-5 Year US Treasury & Agency Index
Average Maturity	2.53	2.67
Average Duration	2.31	2.54
Yield-to-Maturity	2.71%	2.52%
Average Quality*	AA	AAA
Average Coupon	1.99%	2.18%

Treasuries represent 96.5% of this index as of Aug 31, 2021

\*Composite quality based on S&P ratings. Index quality reflects S&P equivalent of composite/average of S&P, Moody's and Fitch ratings. Composite characteristics are supplemental information under GIPS and supplement the composite presentation herein.



Paper, Foreign Corporate, Municipal

Bonds and Negotiable CD.



34.8%

3-5 Years



Market Based – Index Sets

Single or Multiple Index Analysis (cont. 3 of 3)

- Uses simple methodology by utilizing a single or multiple indices that are easily accessible.
- Risk/Reward is measured through principles like the Sharpe Ratio or a duration modified Sharpe Ratio and are relatively simple calculations.
- Single Indices like the ICE BofAML 1-5 Tsy / Agy can be heavily weighted in one sector.
- Does not capture liquidity needs or actual allocation exposure of your portfolio (unless several indices are used with actual exposure weights).
- Multiple index approach requires sector allocation desires before duration established (chicken vs. egg)
- **Does** not account for liabilities or cash flow needs of portfolio.



#### **Cash Flow Based - ALM**

- Utilizes cash flow analysis to measure the timing and magnitude of liabilities.
- Uses immunization techniques utilized in the insurance and pension world to measure individual liability streams.
- These liability streams are combined and weighted to derive a total portfolio duration that will suffice to match the liability needs.





#### **CA Investment Primer – Portfolio Structuring**

"One of the most important objectives in the investment of public funds is ensuring that funds are available to fund an organization's cashflow needs. Investment officials **must** identify periods when cash will be needed from the portfolio and **invest funds to mature on those dates.** 

Furthermore, most investment officials will want to provide a cushion of cash to meet unexpected cash outlays. This cushion may be maintained in shortterm investments, money market funds, or in LAIF."

"In developing a portfolio structuring strategy, it is the investor's primary goal to balance the portfolio's safety and liquidity with the **secondary** goal of yield. Safety is achieved through careful selection and monitoring of high credit quality investments and **matching maturities of investments to cash needs**."





## **Cash Flow Based Approach**

**ALM Analysis** 

**Dedication Strategy**: Specialized fixed-income strategy designed to accommodate specific funding needs of the investor. They generally are classified as passive in nature, although it is possible to add some active management elements to them.





## Cash Flow Based Approach (cont. 2 of 15)

**ALM Analysis** 

<u>Immunization</u>: Aims to construct a portfolio that, over a specified horizon, will earn a predetermined return regardless of interest rate changes (duration focused). An increase in rates and the corresponding drop in investment value partially offset by an increase in re-investment rates (and vice-versa).

<u>**Cash Flow Matching:**</u> Provides the future funding of a liability stream from the coupon and matured principal payments of the portfolio (not duration focused). A simple accumulation of the coupon, reinvestment return and value at horizon will offset liability in full.

Neither strategy perfectly fits public treasury as public entities must focus on Duration as a primary risk metric and typically spend coupons as anticipated by their budget.



## Cash Flow Based Approach (cont. 3 of 15) ALM Analysis

<u>Combination Matching (also called horizon matching)</u>: Popular variation of multiple immunization and cash flow matching to fund liabilities by combining the two strategies. A portfolio is created that is duration-matched with the added constraint that it be cash flow-matched in the first few years, usually the first five years.

Since most public entities are policy constrained to five years and in, we can combine the strategies for the entire legal timeframe of the portfolio.



#### **Approaches for Determining Portfolio Duration**

Cash Flow Based Approach (cont. 4 of 15) ALM Analysis Step 1 – Liquidity Profile

Enter Receipts and Disbursements for 36 months (or desired length) to calculate Net Cash Flow per month over the last three years.

If data is difficult to obtain, a portfolio proxy can be used by utilizing the month over month change in book value of the portfolio as the net cash flow.

E		Cash F Sampl	Flow Entry e City	Update Data
	Date	Receipts	Expenditures	Net Flow
1	08/31/2018	\$24,471,632.81	\$26,953,467.16	(\$2,481,834.35)
2	09/30/2018	\$23,559,974.56	\$25,279,925.18	(\$1,719,950.62)
3	10/31/2018	\$30,230,063.91	\$32,487,689.44	(\$2,257,625.53)
4	11/30/2018	\$51,936,945.68	\$29,593,564.84	\$22,343,380.84
5	12/31/2018	\$24,127,233.19	\$36,589,847.89	(\$12,462,614.70)
6	01/31/2019	\$24,918,896.36	\$38,186,973.19	(\$13,268,076.83)
7	02/28/2019	\$25,734,823.79	\$29,043,844.20	(\$3,309,020.41)
8	03/31/2019	\$16,548,385.34	\$27,337,583.28	(\$10,789,197.94)
9	04/30/2019	\$20,508,348.59	\$29,534,947.01	(\$9,026,598.42)
10	05/31/2019	\$89,102,085.61	\$36,728,474.91	\$52,373,610.70
11	06/30/2019	\$45,733,196.26	\$41,057,162.97	\$4,676,033.29
12	07/31/2019	\$28,962,367.65	\$32,115,824.92	(\$3,153,457.27)
13	08/31/2019	\$27,149,309.89	\$30,267,442.20	(\$3,118,132.31)
14	09/30/2019	\$20,715,835.31	\$26,719,598.11	(\$6,003,762.80)
15	10/31/2019	\$26,003,560.74	\$32,235,031.27	(\$6,231,470.53)
16	11/30/2019	\$62,252,076.52	\$37,799,795.37	\$24,452,281.15
17	12/31/2019	\$29,319,020.67	\$40,322,210.03	(\$11,003,189.36)
18	01/31/2020	\$28,241,721.32	\$43,668,419.60	(\$15,426,698.28)
19	02/29/2020	\$31,291,231.95	\$34,078,791.63	(\$2,787,559.68)
20	03/31/2020	\$19,500,350.84	\$37,131,753.46	(\$17,631,402.62)
21	04/30/2020	\$16,677,064.70	\$26,304,041.58	(\$9,626,976.88)
22	05/31/2020	\$88,324,955.64	\$48,333,158.15	\$39,991,797.49
23	06/30/2020	\$52,111,610.18	\$46,363,012.78	\$5,748,597.40
24	07/31/2020	\$33,638,613.02	\$34,979,405.09	(\$1,340,792.07)
25	08/31/2020	\$28,346,100.41	\$31,194,182.34	(\$2,848,081.93)
26	09/30/2020	\$22,215,127.23	\$32,450,056.41	(\$10,234,929.18)
27	10/31/2020	\$20,081,784.50	\$35,741,768.07	(\$15,659,983.57)
28	11/30/2020	\$62,542,916.58	\$36,943,063.72	\$25,599,852.86
29	12/31/2020	\$30,429,99 <mark>6.3</mark> 4	\$42,419,717.79	(\$11,989,721.45)
30	01/31/2021	\$30,074,891.47	\$43,632,363.40	(\$13,557,471.93)
31	02/28/2021	\$31,592,189.05	\$34,700,203.72	(\$3,108,014.67)
32	03/31/2021	\$20,648,902.89	\$34,525,669.42	(\$13,876,766.53)
33	04/30/2021	\$30,150,467.58	\$37,415,760.79	(\$7,265,293.21)
34	05/31/2021	\$99.478.439.49	\$48,720,733.83	\$50,757,705.66

CDIAC

#### **Approaches for Determining Portfolio Duration**

Cash Flow Based Approach (cont. 5 of 15)
ALM Analysis
Step 1 – Liquidity Profile

Institution Name	Sample City
Portfolio Balance	\$300,000,000.00
Primary Liquidity	\$60,000,000.00
Analysis Date	07/31/2021



CDIAC

Cash Flow Based Approach (cont. 6 of 15)

#### ALM Analysis

Step 1 – Liquidity Profile

Liquidity Buffer	1.50
Liquidity %	17.50%

Dolling Liquidity Evoluction	3	36
Rolling Liquidity Evaluation	Value	Date
Minimum Balance	\$25,006,930.66	
Maximum Balance	\$90,023,564.27	
Maximum Drawdown	(\$34,993,069.34)	4/30/21
Required Liquidity		Multiplier
Strategic Primary Liquidity	\$34,993,069.34	1.00x / 11.7%
Strategic Book Liquidity	<u>\$34,993,069.34</u>	<u>1.00x / 11.7%</u>
Strategic Total Liquidity	\$69,986,138.68	2.00x / 23.3%
Actual Liquidity		<u>Multiplier</u>
Actual Primary Liquidity	\$60,000,000.00	1.71x / 20.0%
Actual Book Liquidity	<u>\$0.00</u>	<u>0.00x / 0.0%</u>
Actual Total Liquidity	\$60,000,000.00	1.71x / 20.0%
Investable Liquidity		<u>% Change</u>
Investable Primary Liquidity	\$25,006,930.66	41.68%
Investable Book Liquidity	(\$34,993,069.34)	N/A
Total Investable Liquidity	(\$9,986,138.68)	N/A



#### **Approaches for Determining Portfolio Duration**

## Cash Flow Based Approach

(cont. 7 of 15)

#### ALM Analysis Step 2 – Projected Cash Flows

Using your own assumptions or average/worst case cash flow projections, we can establish a liability ladder to measure against.

These projections are the net inflow and outflow expectations laddered over the policy limited timeframe of the portfolio.

Projected Flows	l Net Cash by Year	Worst Outflow	Average Outflow	User Outflow	
	August	(\$3,118,132.31)	(\$2,816,016.20)		*
1	September	(\$10,234,929.18)	(\$5,986,214.20)		
	October	(\$15,659,983.57)	(\$8,049,693.21)		
	November	\$22,343,380.84	\$24,131,838.28		
	December	(\$12,462,614.70)	(\$11,818,508.50)		
	January	(\$15,426,698.28)	(\$14,084,082.35)		
1	February	(\$3,309,020.41)	(\$3,068,198.25)		
	March	(\$17,631,402.62)	(\$14,099,122.36)		
	April	(\$9,626,976.88)	(\$8,639,622.84)		
	May	\$39,991,797.49	\$47,707,704.62		
	June	\$716,383.68	\$3,713,671.46		
	July	(\$3,153,457.27)	(\$732,993.54)		
	August	(\$3,118,132.31)	(\$2,816,016.20)		
	September	(\$10,234,929.18)	(\$5,986,214.20)		
	October	(\$15,659,983.57)	(\$8,049,693.21)		
	November	\$22,343,380.84	\$24,131,838.28		
	December	(\$12,462,614.70)	(\$11,818,508.50)		
2	January	(\$15,426,698.28)	(\$14,084,082.35)		
2	February	(\$3,309,020.41)	(\$3,068,198.25)		
	March	(\$17,631,402.62)	(\$14,099,122.36)		
	April	(\$9,626,976.88)	(\$8,639,622.84)		
	May	\$39,991,797.49	\$47,707,704.62		
	June	\$716,383.68	\$3,713,671.46		
	July	(\$3,153,457.27)	(\$732,993.54)		
	August	(\$3,118,132.31)	(\$2,816,016.20)		
	September	(\$10,234,929.18)	(\$5,986,214.20)		
	October	(\$15,659,983.57)	(\$8,049,693.21)		
	November	\$22,343,380.84	\$24,131,838.28		
	December	(\$12,462,614.70)	(\$11,818,508.50)		
2	January	(\$15,426,698.28)	(\$14,084,082.35)		
3	February	(\$3,309,020.41)	(\$3,068,198.25)		
	March	(\$17,631,402.62)	(\$14,099,122.36)		
	April	(\$9,626,976.88)	(\$8,639,622.84)		
	May	\$39,991,797.49	\$47,707,704.62		
	June	\$716,383.68	\$3,713,671.46		
	July	(\$3,153,457,27)	(\$732,993,54)		-



## Cash Flow Based Approach (cont. 8 of 15)

Year 1 Modified Monthly Duration =  $\frac{5.815}{(1+(Wtd Avg Tsy yield/12))=5.810}$ Year 1 Annualized Modified Duration = 5.810/12 = .484

#### **ALM Analysis**

#### **Step 3 – DCF/Duration Analysis of Cash Flows**

Dur Optimiza	ration ation Calcs	NetFlow	NegNetFlow	Hedge Security	PV Rate	Period	PV NegFlow	PV Factor	Weight	PeriodWt	
	August	(\$2,816,016.20)	(\$2,816,016.20)	3Mo Tsy	0.946%	1	\$2,813,797.84	0.999	4.08%	0.041	
	September	(\$5,986,214.20)	(\$5,986,214.20)	3Mo Tsy	0.946%	2	\$5,976,786.48	0.998	8.67%	0.173	
	October	(\$8,049,693.21)	(\$8,049,693.21)	3Mo Tsy	0.946%	3	\$8,030,684.44	0.998	11.65%	0.349	
	November	\$24,131,838.28									
	December	(\$11,818,508.50)	(\$11,818,508.50)	6Mo Tsy	1.040%	5	\$11,767,443.55	0.996	17.07%	0.853	Macaulay Dur = Sun
1	January	(\$14,084,082.35)	(\$14,084,082.35)	6Mo Tsy	1.040%	6	\$14,011,089.19	0.995	20.32%	1.219	PeriodWt = 5.815
1	February	(\$3,068,198.25)	(\$3,068,198.25)	9Mo Tsy	1.101%	7	\$3,048,568.85	0.994	4.42%	0.310	
	March	(\$14,099,122.36)	(\$14,099,122.36)	9Mo Tsy	1.101%	8	\$13,996,081.63	0.993	20.30%	1.624	
	April	(\$8,639,622.84)	(\$8,639,622.84)	9Mo Tsy	1.101%	9	\$8,568,621.70	0.992	12.43%	1.119	
	May	\$47,707,704.62									
	June	\$3,713,671.46									
	July	(\$732,993.54)	(\$732,993.54)	1.00Yr Tsy	1.162%	12	\$724,530.44	0.988	1.05%	0.126	
	August	(\$2,816,016.20)	(\$2,816,016.20)	1.25Yr Tsy	1.193%	13	\$2,779,866.49	0.987	4.09%	0.531	
	September	(\$5,986,214.20)	(\$5,986,214.20)	1.25Yr Tsy	1.193%	14	\$5,903,497.88	0.986	8.68%	1.215	
	October	(\$8,049,693.21)	(\$8,049,693.21)	1.25Yr Tsy	1.193%	15	\$7,930,578.28	0.985	11.66%	1.748	
	November	\$24,131,838.28									
	December	(\$11,818,508.50)	(\$11,818,508.50)	1.50Yr Tsy	1.225%	17	\$11,615,346.67	0.983	17.07%	2.902	Macaulay Dur - Sun
2	January	(\$14,084,082.35)	(\$14,084,082.35)	1.50Yr Tsy	1.225%	18	\$13,827,863.69	0.982	20.32%	3.658	Iviacaulay Dul – Sull
2	February	(\$3,068,198.25)	(\$3,068,198.25)	1.75Yr Tsy	1.256%	19	\$3,007,817.97	0.980	4.42%	0.840	PeriodWt = 17.814
	March	(\$14,099,122.36)	(\$14,099,122.36)	1.75Yr Tsy	1.256%	20	\$13,807,209.12	0.979	20.29%	4.059	
	April	(\$8,639,622.84)	(\$8,639,622.84)	1.75Yr Tsy	1.256%	21	\$8,451,898.98	0.978	12.42%	2.609	
	May	\$47,707,704.62									
	June	\$3,713,671.46									
	July	(\$732,993.54)	(\$732,993.54)	2.00Yr Tsy	1.287%	24	\$714,372.32	<del>0.9</del> 75	1.05%	0.252	
70				1							CDIAC

Year 2 Modified Monthly Duration = 17.814/(1+(Wtd Avg Tsy yield/12))=17.795 Year 2 Annualized Mod Duration = 17.795/12 = 1.483

Cash Flow Based Approach (cont. 9 of 15)

**ALM Analysis** 

#### Step 3 – DCF/Duration Analysis of Cash Flows

Once the annualized duration's are calculated, we now weight each year based on our preference of coverage of each year's total liabilities.

Duration Optimization Values by Year								
1	Annualized Duration	0.484						
2	Annualized Duration	1.483						
3	Annualized Duration	2.481						
4	Annualized Duration	3.480						
5	Annualized Duration	4.477						



#### **Approaches for Determining Portfolio Duration**

Cash Flow Based Approach (cont. 10 of 15) ALM Analysis

Step 3 – DCF/Duration Analysis of Cash Flows

The total immunization weights for each year should create a portfolio that is 100% immunized relative to the portfolio size.

Portfolio Size	\$300,000,000.00						
Immunized Portfolio	\$299,992,155.11						
Percent Immunized	100.00%						
Immunization Weight							
Year 1		90.00%					
Year 2		70.50%					
Year 3		70.00%					
Year 4		70.00%					
Year 5		70.00%					




#### **Approaches for Determining Portfolio Duration**



CDIAC

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#### **Approaches for Determining Portfolio Duration**





#### **Approaches for Determining Portfolio Duration**

Cash Flow Based Approach (cont. 13 of 15) ALM Analysis

Step 3 – DCF/Duration Analysis of Cash Flows





#### Cash Flow Based Approach (cont. 14 of 15)

#### **ALM Analysis**

		NetFlow	PV NegFlow	Assets Needed	1Yr Liquidity Change	1Yr Liquidity Rolling Balance
	August	(\$2,816,016.20)	\$2,813,797.84	\$2,532,418	(\$281,380)	\$52,218,620
	September	(\$5,986,214.20)	\$5,976,786.48	\$5,379,108	(\$597,679)	\$51,620,942
	October	(\$8,049,693.21)	\$8,030,684.44	\$7,227,616	(\$803,068)	\$50,817,873
	November	\$24,131,838.28			\$1,682,127	\$52,500,000
	December	(\$11,818,508.50)	\$11,767,443.55	\$10,590,699	(\$1,176,744)	\$51,323,256
1	January	(\$14,084,082.35)	\$14,011,089.19	\$12,609,980	(\$1,401,109)	\$49,922,147
1	February	(\$3,068,198.25)	\$3,048,568.85	\$2,743,712	(\$304,857)	\$49,617,290
	March	(\$14,099,122.36)	\$13,996,081.63	\$12,596,473	(\$1,399,608)	\$48,217,682
	April	(\$8,639,622.84)	\$8,568,621.70	\$7,711,760	(\$856,862)	\$47,360,820
	May	\$47,707,704.62			\$5,139,180	\$52,500,000
	June	\$3,713,671.46				\$52,500,000
	July	(\$732,993.54)	\$724,530.44	\$652,077	(\$72,453)	\$52,427,547
	August	(\$2,816,016.20)	\$2,779,866.49	\$1,959,806		
	September	(\$5,986,214.20)	\$5,903,497.88	\$4,161,966		
	October	(\$8,049,693.21)	\$7,930,578.28	\$5,591,058		
	November	\$24,131,838.28				
	December	(\$11,818,508.50)	\$11,615,346.67	\$8,188,819		
2	January	(\$14,084,082.35)	\$13,827,863.69	\$9,748,644		
2	February	(\$3,068,198.25)	\$3,007,817.97	\$2,120,512		
	March	(\$14,099,122.36)	\$13,807,209.12	\$9,734,082		
	April	(\$8,639,622.84)	\$8,451,898.98	\$5,958,589		
	May	\$47,707,704.62				
	June	\$3,713,671.46				
	July	(\$732,993.54)	\$714,372.32	\$503,632		
	August	(\$2,816,016.20)	\$2,738,872.78	\$1,917,211		
	September	(\$5,986,214.20)	\$5,815,759.42	\$4,071,032		
	October	(\$8,049,693.21)	\$7,811,797.51	\$5,468,258		
	November	\$24,131,838.28				
	December	(\$11,818,508.50)	\$11,430,879.00	\$8,001,615		
3	January	(\$14,084,082.35)	\$13,606,489.65	\$9,524,543		
0	February	(\$3,068,198.25)	\$2,957,182.76	\$2,070,028		
	March	(\$14,099,122.36)	\$13,572,833.72	\$9,500,984		
	April	(\$8,639,622.84)	\$8,307,243.38	\$5,815,070		
	May	\$47,707,704.62				
	June	\$3,713,671.46				
	July	(\$732,993.54)	\$701,302.90	\$490,912		



#### Cash Flow Based Approach (cont. 15 of 15)

**ALM Analysis** 





#### CCSF Investment Pool

- CCSF Investment Pool currently is \$16.0 billion
- Many different participants both discretionary and non-discretionary with 13 major participants
- Monthly apportionment to each participant
- Consists of operating reserves and bond issuance proceeds

Investment Strategy

- Focus is on Safety of Principal and Liquidity return is considered after the first two mandates are satisfied
- Emphasis on Asset/Liability Management matching asset maturities with cash outflows
- Maintaining a consistent average maturity consistent with cashflow profile not market timing
- Income generation is key not total return



#### Case Study: City and County of San Francisco (cont. 3 of 13)





#### Case Study: City and County of San Francisco (cont. 4 of 13)

#### **Historic Monthly Net Cash Flows**





#### Case Study: City and County of San Francisco (cont. 5 of 13)

#### **Historic Monthly Net Cash Flows By Year**

F	low Selection Type			
Historical Net Cash Flow by Year	2022	2023	2024	
January	(\$439,872,611.00)	(\$458,300,095.42)	(\$578,173,942.23)	
February	(\$16,209,979.34)	(\$175,564,278.95)	\$448,920,642.27	
March	\$302,531,367.33	\$1,199,815,397.87	(\$172,783,085.66)	
April	\$1,016,711,651.48	\$1,794,556,009.34	\$882,388,597.46	
May	\$120,346,417.41	(\$135,693,701.05)	(\$2,593,056.93)	
June	(\$167,005,356.90)	(\$621,177,196.91)	(\$104,551,113.68)	
July	(\$605,180,069.90)	(\$1,056,587,419.46)	(\$646,609,328.27)	
August	(\$558,558,396.91)	(\$165,758,497.24)	(\$58,834,843.17)	
September	(\$299,599,809.30)	\$124,100,271.43	(\$167,079,177.05)	
October	(\$134,221,025.12)	(\$230,792,042.69)	\$173,721,190.05	
November	\$543,970,916.97	\$86,464,242.78	\$408,359,971.65	
December	\$1,028,851,841.11	\$931,058,986.32	\$454,705,371.20	



#### Case Study: City and County of San Francisco (cont. 6 of 13)

#### **Projected Cash Flows**

\$454,705,371.20

\$804,872,066.21

Projecte Flows	d Net Cash s by Year	Worst Outflow	Average Outflow	User Outflow	Projecter	d Net Cash by Year	Worst Outflow	Average Outflow	User Outflow
	January	(\$578,173,942.23)	(\$492,115,549.55)			January	(\$578,173,942,23)	(\$492,115,549,55)	
	February	(\$175,564,278.95)	\$85,715,461.33			Eebruary	(\$175 564 278 95)	\$85,715,461,33	
	March	(\$172,783,085.66)	\$443,187,893.18			March	(\$172,783,085,66)	\$443 187 893 18	
	April	\$882,388,597.46	\$1,231,218,752.76			Angil	\$992 399 507 44	\$1.021.019.750.76	
	May	(\$135,693,701.05)	(\$5,980,113.52)			April	(\$125,000,077,40	(¢E 000 112 E2)	
1	June	(\$621,177,196.91)	(\$297,577,889.16)			iviay	(\$135,693,701.05)	(\$5,700,115.52)	
1	July	(\$1,056,587,419.46)	(\$769,458,939.21)		4	June	(\$621,177,196.91)	(\$297,577,889.16)	
	August	(\$558,558,396.91)	(\$261,050,579.11)			July	(\$1,056,587,419.46)	(\$769,458,939.21)	
	September	(\$299,599,809.30)	(\$114,192,904.97)			August	(\$558,558,396.91)	(\$261,050,579.11)	
	October	(\$230,792,042.69)	(\$63,763,959.25)			September	(\$299,599,809.30)	(\$114,192,904.97)	
	November	\$86,464,242.78	\$346,265,043.80			October	(\$230,792,042.69)	(\$63,763,959.25)	
	December	\$454,705,371.20	\$804,872,066.21			November	\$86,464,242.78	\$346,265,043.80	
	January	(\$578,173,942.23)	(\$492,115,549.55)			December	\$454,705,371.20	\$804,872,066.21	
	February	(\$175,564,278.95)	\$85,715,461.33			January	(\$578,173,942,23)	(\$492.115.549.55)	
	March	(\$172,783,085.66)	\$443,187,893.18			February	(\$175,564,278,95)	\$85,715,461,33	
	April	\$882,388,597.46	\$1,231,218,752.76			March	(\$172 783 085 66)	\$443 187 893 18	
	May	(\$135,693,701.05)	(\$5,980,113.52)			Angil	\$992 399 507 46	\$1 221 218 752 76	
_	June	(\$621,177,196.91)	(\$297,577,889.16)			April	(\$125,000,077,40	(\$E 000 112 E2)	
2	July	(\$1,056,587,419.46)	(\$769,458,939.21)			l∿lay	(\$135,693,701.05)	(\$5,960,113.52)	
	August	(\$558,558,396.91)	(\$261,050,579.11)		5	June	(\$021,177,196.91)	(\$297,577,889.16)	
	September	(\$299,599,809.30)	(\$114,192,904.97)			July	(\$1,056,587,419.46)	(\$769,458,939.21)	
	October	(\$230,792,042.69)	(\$63,763,959.25)			August	(\$558,558,396.91)	(\$261,050,579.11)	
	November	\$86,464,242.78	\$346,265,043.80			September	(\$299,599,809.30)	(\$114,192,904.97)	
	December	\$454,705,371.20	\$804,872,066.21			October	(\$230,792,042.69)	(\$63,763,959.25)	
	January	(\$578,173,942.23)	(\$492,115,549.55)			November	\$86,464,242.78	\$346,265,043.80	
	February	(\$175,564,278.95)	\$85,715,461.33			December	\$454,705,371.20	\$804,872,066.21	
	March	(\$172,783,085.66)	\$443,187,893.18						
	April	\$882,388,597.46	\$1,231,218,752.76						
	May	(\$135,693,701.05)	(\$5,980,113.52)						
	June	(\$621,177,196.91)	(\$297,577,889.16)						
3	July	(\$1,056,587,419.46)	(\$769,458,939.21)						
	August	(\$558,558,396.91)	(\$261,050,579.11)						
	September	(\$299,599,809.30)	(\$114,192,904.97)						
	October	(\$230,792,042.69)	(\$63,763,959.25)						
	November	\$86,464,242.78	\$346,265,043.80						



December

#### Case Study: City and County of San Francisco (cont. 7 of 13)

#### **Worst Outflow Scenario**



Duration Optimization

C C	Duration Estimation and Allocation Bucket	Ap	pro	ximation	
Portfolio Size	\$16,890,243,867.88	*		3Mo Tsy	0.232
Immunized Portfolio	\$16 880 035 702 81	1		6Mo Tsy	0.477
minulized Fortfolio	\$10,007,735,702.01	-		9Mo Tsy	0.724
Percent Immunized	100.00%			1.00Yr Tsy	0.970
Starting Liquidity	\$1,351,219,509.43			1.25Yr Tsy	1.202
1Yr Min Liquidity	\$1,351,219,509,43			1.50Yr Tsy	1.434
Weighted Average	¥1,001,217,507710			1.75Yr Tsy	1.666
Cash Flow Duration	2.04			2.00Yr Tsy	1.898
Cash (Liquidity Profile)	8.00%			2.25Yr Tsy	2.114
0-1Yr	22.20%	H		2.50Yr Tsy	2.330
				2.75Yr Tsy	2.546
1-3Yr	41.88%			3.00Yr Tsy	2.762
3-5Yr	27.92%	•		3.25Yr Tsy	2.977

INDEX DATES						
Start Date 1/31/22						
End Date	12/31/24					
Outflow Selection						
OutFlow Selection Worst Outflow						
Maximum Maturity (Yrs)	5.00					
Immunizati	on Weight					
Year 1	100.00%	•				
Year 2	100.00%					
Year 3	100.00%					
Year 4	75.00%					
Year 5	68.20%	-				

#### Case Study: City and County of San Francisco (cont. 8 of 13)

#### **Worst Outflow Scenario**

	Duration Optimization Values by Year								
	Sum Present Value of Outflows	\$3,749,836,286.83		Sum Present Value of Outflows	\$3,348,695,612.97				
	Sum of Asset Matched Present Values	\$3,749,836,286.83		Sum of Asset Matched Present Values	\$2,511,521,709.73				
1	Asset Matched Weight in Portfolio	22.201%	4	Asset Matched Weight in Portfolio	14.870%				
	Annualized Duration	0.491		Annualized Duration	3.481				
	Weighted Duration	0.109		Weighted Duration	0.518				
	Sum Present Value of Outflows	\$3,601,097,818.14		Sum Present Value of Outflows	\$3,232,395,622.16				
	Sum of Asset Matched Present Values	\$3,601,097,818.14		Sum of Asset Matched Present Values	\$2,204,493,814.31				
2	Asset Matched Weight in Portfolio	21.321%	5	Asset Matched Weight in Portfolio	13.052%				
	Annualized Duration	1.487		Annualized Duration	4.479				
	Weighted Duration	0.317		Weighted Duration	0.585				
	Sum Present Value of Outflows	\$3,471,766,564.37							
	Sum of Asset Matched Present Values	\$3,471,766,564.37							
3	Asset Matched Weight in Portfolio	20.555%							
	Annualized Duration	2.484							
	Weighted Duration	0.511							



#### Case Study: City and County of San Francisco (cont. 9 of 13)

#### **Worst Outflow Scenario**

				CF Duration & Maturity Buckets	Values
				Weighted Average Cash Flow Duration	on 2.04
	nahotics	City and Count	y of San Francisco	Cash	8.004%
A A	layucs			0-1Yr	22.197%
				1-3Yr	41.518%
				3-5Yr	28.282%
Month	Net Flow Expectation	Treasury	Rate		
January	(\$578,173,942.23)	1YR	4.28%		
February	(\$175,564,278.95)	2YR	4.37%	Immunization Timeframe	Weight
March	(\$172,783,085.66)	3YR	4.48%	0-1Yr	100.00%
April	\$882,388,597.46	4YR	4.57%	1_2Vr	100 00%
May	(\$135,693,701.05)	5YR	4.60%	1-211	100.0070
June	(\$621,177,196.91)			2-3Yr	100.00%
July	(\$1,056,587,419.46)	Portfolio Inputs	Value	3-4Yr	81.00%
August	(\$558,558,396.91)	Portfolio Size	\$16,890,243,867.88	1.5Vr	68 / 5%
September	(\$299,599,809.30)	Starting Liquidity	\$1,351,219,509.43	4-511	08.4570
October	(\$230,792,042.69)			Percent Immunized	100.00%
November	\$86,464,242.78				
December	\$454,705,371.20				



#### Case Study: City and County of San Francisco (cont. 10 of 13)

#### **Worst Outflow Scenario**

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Duration Optimization Year One	Values
Sum PV of Outflows	\$3,749,058,574.14
Sum PV Immunized Assets	\$3,749,058,574.14
Asset Matched Weight in Portfolio	22.197%
Annual Liquidity Coverage Required	\$0.00
Annualized Duration	0.491
Weighted Duration	0.109
Duration Optimization Year Two	Values
Sum PV of Outflows	\$3,587,453,718.52
Sum PV Immunized Assets	\$3,587,453,718.52
Asset Matched Weight in Portfolio	21.240%
Annual Liquidity Coverage Required	\$0.00
Annualized Duration	1.487
Weighted Duration	0.316
Duration Optimization Year Three	Values
Sum PV of Outflows	\$3,424,963,043.56
Sum PV Immunized Assets	\$3,424,963,043.56
Asset Matched Weight in Portfolio	20.278%
Annual Liquidity Coverage Required	\$0.00
Annualized Duration	2.483
Weighted Duration	0.503

Duration Optimization Year Four	Values
Sum PV of Outflows	\$3,264,945,110.67
Sum PV Immunized Assets	\$2,644,605,539.64
Asset Matched Weight in Portfolio	15.658%
Annual Liquidity Coverage Required	\$620,339,571.03
Annualized Duration	3.479
Weighted Duration	0.545
<b>Duration Optimization Year Five</b>	Values
Duration Optimization Year Five Sum PV of Outflows	Values \$3,115,180,942.42
Duration Optimization Year Five Sum PV of Outflows Sum PV Immunized Assets	Values \$3,115,180,942.42 \$2,132,341,355.09
Duration Optimization Year Five Sum PV of Outflows Sum PV Immunized Assets Asset Matched Weight in Portfolio	Values \$3,115,180,942.42 \$2,132,341,355.09 12.625%
Duration Optimization Year Five Sum PV of Outflows Sum PV Immunized Assets Asset Matched Weight in Portfolio Annual Liquidity Coverage Required	Values        \$3,115,180,942.42        \$2,132,341,355.09        12.625%        \$982,839,587.33
Duration Optimization Year Five Sum PV of Outflows Sum PV Immunized Assets Asset Matched Weight in Portfolio Annual Liquidity Coverage Required Annualized Duration	Values        \$3,115,180,942.42        \$2,132,341,355.09        12.625%        \$982,839,587.33        4.475

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#### Case Study: City and County of San Francisco (cont. 11 of 13)

#### Asset-Liability Ladder (\$MM)



#### Case Study: City and County of San Francisco (cont. 12 of 13)

**Cash Flow Schedule** 



#### Case Study: City and County of San Francisco (cont. 13 of 13)

**Immunization List** 



#### Cash Flow Based Approach

**ALM Analysis** 

#### Step 4 – Sector/Maturity Allocation

INDEX STATS	Annualized Total Return	Annualized Price Return	Annualized Income Return	Annualized Std Dev Total Return	Avg Yield to Worst	Std Dev Yld	Avg Eff Dur	TR Sharpe Ratio	Yld Sharpe Ratio	Main Stree Ratio <sub>च</sub>	Weighted Rank
1-3 A-AAA Corp	3.010%	(0.769%)	3.476%	2.427%	2.415%	1.750%	1.914	0.805	0.840	0.768	1.0
1-3 Agency Clb	1.827%	0.148%	1.711%	0.715%	1.537%	1.399%	1.143	1.080	0.423	0.517	2.0
1–3 Supranational	2.762%	(0.119%)	2.842%	1.213%	1.774%	1.276%	1.921	1.408	0.649	0.431	3.0
1-3 Agency Blt	2.418%	(0.253%)	2.593%	1.277%	1.468%	1.376%	1.832	1.067	0.379	0.285	4.0
1–3 Municipal	2.103%	(2.500%)	3.529%	1.111%	1.310%	0.962%	1.811	0.943	0.379	0.201	5.0
1–3 Treasury	2.133%	(0.061%)	2.178%	1.240%	1.291%	1.291%	1.856	0.869	0.267	0.186	6.0
3-5 A-AAA Corp	4.280%	0.312%	4.100%	3.698%	2.948%	1.515%	3.665	0.872	1.321	0.546	1.0
3-5 Agency Clb	2.361%	0.099%	2.289%	1.406%	1.932%	1.315%	2.048	0.929	0.750	0.482	2.0
3–5 Supranational	4.323%	0.999%	3.706%	2.495%	2.397%	1.191%	3.712	1.310	1.218	0.391	3.0
3–5 Agency Blt	3.983%	0.816%	3.466%	2.676%	1.936%	1.245%	3.685	1.094	0.795	0.269	4.0
3–5 Municipal	3.228%	(1.204%)	3.906%	2.388%	1.717%	0.905%	3.416	0.910	0.852	0.226	5.0
3-5 Treasury	3.602%	0.980%	2.933%	2.918%	1.714%	1.146%	3.793	0.873	0.670	0.203	6.0



#### **Cash Flow Based**

#### Apphoalts

#### Step 4 – Sector/Maturity Allocation

MODEL WEIGHTING		Target Allocation		Agy and Credit		Agency Portfolio		io	Treasury Portfolio			
LOUS	(	OVERNIGHT CA	SH	17.50	)%	17.50%		17.50%			17.50%	
G0QA	Treasury 0-1Yr									20.	68%	
H541	Agy Composite 0–1Yr		)–1Yr	10.68%		10	68%		20.68%			
C01A	US	Corp A-AAA (	0–1Yr	10.00	)%	10	00%					
G102		Treasury 1–3	Yr								31.	61%
G1PB		Agy Bullet 1–3	Yr	11.61	L%	21	61%		31.61%			
G1PC	A	gy Callable 1-	3Yr	10.00	)%							
C110	US	Corp A-AAA	L–3Yr	10.00	)%	10.	00%					
G2O 2		Treasury 3-5	Yr								30.	21%
G2PB	G2PB Agy Bullet 3–5Yr		Yr	15.21	L%	25.21%		30.21%				
G2PC	A	gy Callable 3-	5Yr	10.00	)%							
C210	US	Corp A-AAA	3–5Yr	5.00	5.00% 5.00%							
MODEL	STATS	Annualized Total Return	Annualized Price Return	Annualized Income Return	Annualize Std Dev Total Retu	ed Avg V Yield t urn Wors	o Std Dev Y	Avg Id Eff Dur	TR Sharpe Ratio	Yld Sharpe Ratio	Main Street Ratio	Weighted Rank
Target Al	location	2.372%	(0.252%)	2.548%	1.091%	5 1.719	6 1.417%	1.57	5 1.207	0.545	0.490	1
Agy and	Credit	2.594%	(0.219%)	2.743%	1.275%	5 1.712	6 1.410%	1.80	1.207	0.543	0.424	2
Agency P	ortfolio	2.452%	(0.076%)	2.506%	1.284%	1.491	6 1.387%	1.80	2 1.087	0.393	0.302	3
Treasury	Portfolio	2.218%	0.090%	2.151%	1.350%	1.337	6 1.306%	1.83	0.861	0.300	0.213	4

91 *\*ICE/BAML Index Data - July 2006 to July 2021* 

#### Cash Flow Based Approach (cont. 2 of 2) ALM Analysis

- Uses institution's actual cash flow data to measure future liabilities and derive duration needs
- Eliminates bias and idiosyncratic problems that public entities can have with market-based approaches (liquidity, sector and structure differences).
- Ensures each institution's duration is unique and not peer or market related.
- Places emphasis on timing and magnitude of investments relative to liabilities versus market-based optimizations for the masses.
- Does require more data and effort to establish the projected liability stream and involves calculations that may not be familiar.
- There are opportunity costs associated by limiting the investment universe to any particular timeframe, however it can be argued that maintaining a stable duration and limiting cash balances can more than offset any costs associated with security selection constraints (without this process, cash balances tend to be higher and more conservative securities are purchased due to uncertainty).



#### Disclosure

This presentation is for informational purposes only. All information is assumed to be correct, but the accuracy has not been confirmed and therefore is not guaranteed to be correct. Information is obtained from third party sources that may or may not be verified. The information presented should not be used in making any investment decisions and is not a recommendation to buy, sell, implement, or change any securities or investment strategy, function, or process.

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Many factors affect performance including changes in market conditions and interest rates and in response to other economic, political, or financial developments. Investment involves risk including the possible loss of principal. No assurance can be given that the performance objectives of a given strategy will be achieved. Past performance is not an indicator of future performance or results. Any financial and/or investment decision may incur losses.



# **QUESTIONS?**



#### JASON KLINGHOFFER, CFA

Director, DCM, Mischler Financial Group Principal, MaxQ Analytics

#### HUBIE WHITE, CFA, CTP

Chief Investment Officer Office of the Treasurer & Tax Collector City & County of San Francisco





# LUNCHEON



# **SESSION THREE**

Understanding and Managing Risk in Public Investing

**RICK PHILLIPS** Chief Investment Strategist Meeder Public Funds

ADVANCED PUBLIC FUNDS INVESTING | January 22–23, 2025







### risk 1 of 2 noun

'risk **∢**»

2

Synonyms of risk >

- : possibility of loss or injury : PERIL
  - : someone or something that creates or suggests a hazard
- **a** : the chance of loss or the perils to the subject matter of an insurance contract
  *also* : the degree of probability of such loss
  - **b** : a person or thing that is a specified hazard to an insurer
  - c : an insurance hazard from a specified cause or source

SOURCE: MERRIAM-WEBSTER.COM

**Entries Near** 



**RISK** means more things can happen than will happen. The range of future outcomes is the impenetrable mystery all investors must face. Investors must shape all portfolio decisions around that simple but powerful truth. If we do not know the future, decision errors and surprises are inevitable. As a result, managing investment portfolios is ultimately about managing risk, or preparing for uncertainty, and unexpected outcomes.



SOURCE: MANAGING INVESTMENT PORTFOLIOS: A DYNAMIC PROCESS (CFA INSTITUTE INVESTMENT SERIES - KINDLE LOCATION 179). WILEY. KINDLE EDITION



# Risk comes from not knowing what you're doing. 4 WARREN BUFFET

SOURCE: WARREN BUFFET, AZ QUOTES

99



## Longer Duration has Generated more Investment Income Over the Long Run



Average Monthly Treasury Yields 1977 to Present



SOURCE: BLOOMBERG, MONTH-END CLOSING YIELDS, 2Y INTERPOLATED 1963-1976, 7Y INTERPOLATED 1963-1969

## A Detailed Asset/Liability Matching Model (aka: Cash Flow Model) is a Must



MEEDER

#### Target average of \$160M in overnight liquidity = 2% of \$8B portfolio

SOURCE: MEEDER PUBLIC FUNDS

FOR INFORMATIONAL PURPOSES ONLY. SEE IMPORTANT DISCLOSURES AT THE END OF THE PRESENTATION



# Unique

Being the only one of its kind; unlike anything else. The income generated by a state/local government investment program is the only source of revenue that is received without charging fees or taxes to their citizenry.

SOURCE: OXFORD DICTIONARY, RICK PHILLIPS



# Safety Liquidity ncome



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### Public Fund Investment Considerations

The Investment Primer is intended to guide the development and management of an investment program while maintaining an appropriate balance among safety, liquidity and yield considerations

- Preservation of principal (or safety) is the first and most important consideration of public fund investment.
- Public agencies address the safety consideration through the implementation of an investment program that controls exposure to many risks, including those related to principal loss through excess exposure to market or credit risk.





UPDATED DECEMBER 2009 • CDIAC No. 09-02



SOURCE: CDIAC



# Risk

 Not having a suitable amount of interest rate risk/duration...pursuant to your cash flow metrics/model Not hitting your investment income budget



Maturity	Avg Yield	Avg Dur	Modified Sharp Ratio	% Yield of 10Yr	% Risk of 10Yr
3M T-Bill	4.50%	0.25		77%	3%
6M T-Bill	4.67%	0.50	0.34	80%	6%
1Y T-Bill	4.81%	1.00	0.30	82%	12%
2Y T-Note	5.12%	1.82	0.34	87%	22%
3Y T-Note	5.30%	2.79	0.28	90%	34%
5Y T-Note	5.54%	4.61	0.22	94%	56%
7Y T-Note	5.70%	6.36	0.19	97%	77%
10Y T-Note	5.86%	8.22	0.17	100%	100%



2Y vs. 6M = +45 BPs 2Y vs. 1Y = +31 BPs

SOURCE: BLOOMBERG, MONTH-END CLOSING YIELDS, 2Y INTERPOLATED 1963-1976, 7Y INTERPOLATED 1963-1969

## Rate History: A Very Long Rate History



MEEDER

SOURCES: GOLDMAN SACHS, GLOBAL FINANCIAL DATABASE, ARBOR RESEARCH, BLOOMBERG. 1790 TO 1831: BRITISH CONSOLS; 1831 TO 1919: HIGH-GRADE LONG-TERM RAILROAD; 1919 TO DATE: 10-YR TREASURIES.


## Risks

Timing the market
Relying on specific economic/market indicators and/or "experts" to time the market/economy



## The point of studying economics is so as not to be fooled by economists.

SOURCE: JOAN ROBINSON, AZ QUOTES

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#### Bloomberg Survey for 2-Yr T-Note Yield MEEDER as of 9/19/24



Chart Analysts For	recast Histogram	Export	Dis	claime	r			Boi	nd Yiel	d Fore	casts: /	Analysts
United States			Q3 24	Q4 24	Q1 25	Q2 25	Q3 25	Q4 25	Q1 26	Q2 26	Q3 26	Q4 26
US 2-Year	Bloomberg Wgt Avg		3.83	3.82	3.66	3.52	3.37	3.26	3.14	3.14	3.22	3.21
	Implied Forward Yield	d b	3.55	3.37	3.26	3.24	3.24	3.27	3.31	3.35	3.38	3.41
	Median Forecast		4.05	3.90	3.62	3.48	3.33	3.30	3.20	3.20	3.25	3.28
	Average Forecast		4.09	3.90	3.70	3.54	3.38	3.26	3.14	3.14	3.22	3.21
Market Yield 3.58	High Forecast		4.65	4.65	4.70	4.80	4.80	4.70	4.15	3.90	3.65	3.50
	Low Forecast		3.40	2.90	2.70	2.40	2.15	1.90	1.90	1.90	2.70	2.64
Recent Updates	Responses		42	42	42	42	38	37	21	21	19	18
J. Bryson	Aug. Survey Median		4.05	3.90	3.62	3.48	3.38	3.30	3.20	3.20	3.24	3.25
	Jul. Survey Median		4.50	4.23	4.00	3.80	3.60	3.51	3.43	3.32	3.30	3.30
	Change in Medians		-0.45	-0.33	-0.38	-0.32	-0.23	-0.21	-0.22	-0.11	-0.06	-0.05
Firm Name	↑Analyst	As of	Q3 24	Q4 24	Q1 25	Q2 25	Q3 25	Q4 25	Q1 26	Q2 26	Q3 26	Q4 26
1) Bank of America Corp	o M. Gapen	08/23	3.85	3.60	3.45	3.30	3.30	3.30				
2) Bank of Montreal	D. Porter	08/23	3.97	3.79	3.60	3.42	3.24	3.06	2.88	3 2.97	3.06	3.16
3) Barclays PLC	A. Pradhan	08/23	4.00	3.90	3.80	3.75						
4) Bayerische Landesbar	nk M. Bucher	08/23	4.50	4.40	4.30	4.20						
5) Bloomberg Intelligen	ce - I I. Jersey	08/23	4.05	3.78	3.52	3.30	3.10	3.10				
6 Canadian Imperial Ba	nk of A. Shenfeld	08/23	4.20	3.95	3.55	3.35	3.25	3.30				
7) Comerica Inc	W. Adams	08/23	4.41	3.94	3.39	3.10	2.75	2.39	2.43	2.55	2.70	2.64
8 Commerzbank AG	Research	08/23	4.00	3.60	3.50	3.40	3.50					
9 Dai-ichi Life Research	h Inst S. Katsurahata	08/23	4.09	3.58	3.58	3.46	3.18	3.20	3.20	3.20	3.20	3.32
10 Desjardins Securities	Inc J. Jean	08/23	4.10	3.90	3.70	3.50	3.35	3.20	3.05	3.00	3.00	3.00
11) Fannie Mae	D. Duncan	08/23	4.13	3.96	3.85	3.78	3.74	3.71				
12) First Trust Advisors L	P B. Wesbury	08/23	4.05	3.78	3.50	3.23	2.95	2.68				
13) HSBC Holdings PLC	S. Major	08/23	3.40	2.90	2.70	2.40	2.15	1.90	1.90	1.90		
14) Helaba Bank	P. Franke	08/23	3.90	3.85	3.75	3.60	3.50	3.30				

SOURCE: BLOOMBERG, AS 9/19/24

#### Bloomberg Survey for 2Yr T-Note Yield MEEDER as of 1/13/25



Chart Analysts Fo	recast Histogram	Export	: Dis	claime	r			Boi	nd Yiel	d Fored	casts: /	Analysi	ts
United States			Q1 25	Q2 25	Q3 25	Q4 25	Q1 26	Q2 26	Q3 26	Q4 26	Q1 27	Q2 27	
US 2-Year 🔹	Bloomberg Wgt Avg		4.04	3.90	3.80	3.74	3.60	3.55	3.52	3.55	3.46		
	Implied Forward Yield	d	4.42	4.46	4.53	4.59	4.62	4.65	4.67	4.70	4.71		
	Median Forecast		4.00	3.82	3.75	3.70	3.52	3.50	3.52	3.52	3.50		
	Average Forecast		4.01	3.87	3.77	3.69	3.56	3.52	3.49	3.52	3.47		
Market Yield 4.38	High Forecast		4.40	4.50	4.70	4.85	4.50	4.52	4.61	4.76	4.23		
	Low Forecast		3.38	3.35	3.10	2.85	2.85	2.80	2.80	2.80	2.85		
Recent Updates	Responses		43	43	43	44	33	32	29	29	20		
I. Jersey													
W. Adams	Dec. Survey Median		4.00	3.84	3.74	3.70	3.51	3.50	3.55	3.53	3.50		
	Nov. Survey Median		4.00	3.77	3.60	3.44	3.37	3.34	3.30	3.35	3.30		
	Change in Medians		0.00	0.06	0.13	0.27	0.14	0.17	0.25	0.17	0.20		
Firm Name	Analyst	As of	Q1 25	Q2 25	Q3 25	Q4 251	Q1 26	Q2 26	Q3 26	Q4 26	Q1 27	Q2 27	•
1) RBC Financial Group	Research	12/17	4.40	4.50	4.70	4.85							
2) Bloomberg Intelligen	ice - I I. Jersey	01/07	4.14	4.28	4.31	4.49	4.50	4.52	4.61	4.76			
3) Stifel Financial Corp	L. Piegza	12/17	4.28	4.35	4.25	4.28	4.30	4.35					
4) Intesa Sanpaolo SpA	C. Manenti	12/17	4.15	4.06	4.13	4.20							
5) Commerzbank AG	Research	12/17	4.00	3.90	4.00	4.10	4.10						
6) Nomura Securities Co	o Ltd Research	12/17	4.10	4.10	4.10	4.00	4.00	3.95					
7) Evercore ISI	E. Hyman	12/17	4.10	3.90	3.80	4.00							
8) UniCredit SpA	H. Bandholz	12/17	4.25	4.20	4.10	4.00							
9) Bank of America Cor	p A. Bhave	12/17	4.00	4.00	4.00	4.00							
10) Fannie Mae	M. Palim	12/17	4.03	4.01	4.00	3.99	3.99	4.00	4.01	4.02			
11) Regions Financial Co	rp R. Moody	12/17	4.02	3.98	3.96	3.94	3.71	3.62	3.58	3.54	3.52		
12) ING Groep NV	J. Knightley	12/17	3.95	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90		
13) First Trust Advisors L	P B. Wesbury	12/17	4.18	4.03	4.00	3.85							
14) Scotia Capital Inc	D. Holt	12/17	4.00	3.90	3.85	3.80	3.75	3.75	3.75	3.70			

SOURCE: BLOOMBERG, AS 1/13/25

### **Fed's Preferred Yield Curve**





SOURCE: FEDERAL RESERVE BANK OF NEW YORK

## Since 1968, a Recession Followed an Inverted Yield Curve (10y-3m) 8 for 8 Times



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SOURCE: BLOOMBERG

## U.S. Treasury Note Yields (%)



By Monthly Maturities (0-7 Years)



SOURCE: BLOOMBERG AS OF 1/13/25

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### Since 1968, Aa Recession Followed a -5 MEEDER or Worse LEI...8 for 8 Times

**Conference Board Leading Economic Index YoY % Change** 



SOURCE: BLOOMBERG

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## Risks

 Credit
Relying only upon the rating agencies



Moody's		Sa	&P	Fitch			
Long-Term	Short-Term	Long-Term	Short-Term	Long-Term	Short-Term		
Aaa		AAA		AAA	Λ 1.		
Aa1		AA+	Λ 1.	AA+			
Aa2	Aa2		A-1+	AA	A-1+		
Aa3	P-1	AA-		AA-			
A1		A+	Λ 1	A+	Λ 1		
A2		А	A-1	А	A-1		
A3	DЭ	A-	A 2	A-	A 0		
Baa1	P-2	BBB+	A-2	BBB+	A-2		
Baa2		BBB	A 2	BBB	A 2		
Baa3	P-3	BBB-	A-3	BBB-	A-3		

SOURCE: MOODY'S, S&P, FITCH



### 1-5Y AA-AAA Corporate vs. 1-5Y Treasury: Total Return Values



SOURCE: BLOOMBERG



## 1-5Y AA-AAA Corporate vs. 1-5Y Treasury: Spread



SOURCE: BLOOMBERG

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#### Date Range Ц Frequency Weekly 12/31/1999 12/27/2024 Start End High Low StDev Annl StDev Currency Avg 82 50 629 33 98 84 Enter Index> iovt OAS **1**M QTD **10** YTD **1**Y 31 5Y 10Y Max 51) Data Chart 52) Spread 53) Correlation 54) Data Table



SOURCE: BLOOMBERG

99) Download

Index

CV10

\ttribute

MTD

## 1-5 Year A-AAA Rated Corporate Bond **Spread to Treasuries**



60

ICE Bond Indices: Index Charts/Tables



## Risk

 Having too much negative convexity (aka: callables)

## **Index Return Values**



June 2000 to Present



SOURCE: BLOOMBERG AS OF 12/31/24

## **Effective Duration**



1-5 YR AGY Bullets vs. Callables



#### AVERAGE EFFECTIVE DURATIONS

- Bullets 2.35
- Callables 1.57

SOURCE: BLOOMBERG AS OF 12/31/24





SOURCE: BLOOMBERG



## Risk

## Benchmarking performance

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## Important Benchmark Characteristics

#### To be relevant, benchmarks should reflect the general characteristics of a portfolio's

- Duration/maturity
- Sector allocations
- Turnover

#### THREE TYPES OF BENCHMARKING

- Weighted yield
- Book rate of return
- Total rate of return



## **Book Return and Total Return Details**



#### CITY COUNCIL

#### Book Return =

- + Accrued/Received Interest
- +/- Amortization of Premiums/Discounts
- +/- Realized Gains/Losses

Average Daily Book Balance for the Period

#### Total Return =

- + Accrued/Received Interest
- +/- Realized/Gains Losses
- +/- Unrealized Gains/Losses

Average Daily Book Balance for the Period



RRISKK

#### Under Total Return

 Gains/losses are treated the same as income

#### GASB 31

 It's similar to running the market value changes of your home through your checking account

SOURCE: MEEDER PUBLIC FUNDS

### **Communication is Key!**





Lost?

6

I have good news: We outperformed the index. We lost 2%, and the index lost 3%.

SOURCE: GOOGLE, MEEDER PUBLIC FUNDS

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DRTANT DISCLOSURES AT THE END OF THE PRESENTATION.

**ALLEY** 

1000

Lost?

## Book Return vs. Total Return: Budget Stability...Good Luck Budgeting Total Return

ICE BofA 2 Yr T-Note Index Book Return vs Total Return



SOURCE: BLOOMBERG

## **QUESTIONS?**

**RICK PHILLIPS** Chief Investment Strategist Meeder Public Funds

### **Disclosures**

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meederpublicfunds.com 866.633.3371



## 15-MINUTE

# BREAK



## **SESSION FOUR** Investment Options: Liquidity Funds



#### WILL GOLDTHWAIT

Client Portfolio Manager State Street Global Advisors

MATT PAULIN Finance Director & Treasurer City of Elk Grove



#### ADVANCED PUBLIC FUNDS INVESTING | January 22-23, 2025



## **Session Details**

This session will include a detailed analysis of investment options considered to be liquid, such as pooled money accounts, money market funds, and California's Local Agency Investment Fund (LAIF). The speakers will include discussion of fund and risk attributes and accounting practices used in these vehicles. Additionally, there will be discussion of how your liquidity vehicle could perform through various economic and market cycles.

## Goals of the Presentation

- Recognize the type of liquidity needed to accomplish the three primary objectives for a public agency portfolio
- Understand the tension and tradeoffs of investing for higher liquidity vs. higher yield
- Identify the advantages and disadvantages of the different types of structures that offer more or less liquidity
- Analyze the key strategy attributes to avoid challenges through various market environments and support an agency's cash flow needs

### Cash Flows



For illustrative purpose only

## How Does a Liquidity Pool or Money Market Fund Work?



## What Can They Invest In?

- US Treasury Debt
- Government Agency Debt
- Commercial Paper (corporate, bank, asset-backed)
- Certificates of Deposit (bank)
- Debentures and Medium-Term Notes (corporate, bank)
- Repurchase Agreements (Reverse Repurchase Agreements)

#### Fixed Rate or Floating Rate – Discounted or Interest Bearing

### Amortized Cost Accounting



For illustrative purpose only

## Attributes – What To Look For

- •Weighted Average Maturity (WAM)
- •Weighted Average Life (WAL)
- Legal Final Maturity
- Concentration and Diversification
- Liquidity Levels Daily, Weekly, Monthly, Quarterly What Counts Towards Liquidity
- •Market Rate of Return 1-day, 7-day, 30-day Yield

## Rules: Is There a Standard?

- •Weighted Average Maturity 60 days
- •Weighted Average Life 120 days
- •Legal Final Maturity 397 days
- •Concentration and Diversification 5% per name
- •Liquidity Levels Daily, Weekly, Monthly, Quarterly What Counts Towards Liquidity – 10%, 25%, 30%, 50%

## Operations

- How to access the fund direct or portal, manually or electronically
- When does the fund close
- Are there any limits on redemptions we don't like limits

#### Is the process easy? We like easy

## Disclosures and Transparency

- •Website Disclosure
- Regulatory Disclosure
- Yield, WAM, WAL, Liquidity, Shareholder Activity
- Holdings

### **Ask Questions!**
## Credit Ratings

### •Why do funds or pools have ratings?

- •How are funds rated AAA when all the assets are not?
- •Are all credit rating agencies the same?

## Yield vs. Total Return



## What Are Some of The Biggest Risks

- Default or impairment delay of repayment
- Duration interest rate shock
- Banking Crisis (2008)
- Liquidity Crisis (2020)
- Single Name (2023)

# Summary

- $\checkmark$  Understand a money market fund and liquidity pool
- $\checkmark\,$  Understand how to evaluate your investment options
- $\checkmark\,$  Knowing what is owned
- $\checkmark\,$  And what the risks are
- $\checkmark\,$  Holding the manager accountable

## **QUESTIONS?**



#### WILL GOLDTHWAIT

Client Portfolio Manager State Street Global Advisors

MATT PAULIN Finance Director & Treasurer City of Elk Grove





## THANK YOU

Please complete the seminar evaluation and leave it on your table.

#### **UPCOMING CDIAC EVENTS**

Municipal Market Disclosure April 8 – 9, 2025 | Costa Mesa, CA

For more information, visit: treasurer.ca.gov/CDIAC/seminars

### UPCOMING STATE TREASURER'S OFFICE EVENTS

2025 Local Agency Investment Fund (LAIF) Webinar February 13, 2025 | Webinar

For more information, visit: https://tinyurl.com/25LAIFWeb