Back to Basics:

Approaches to Developing Cash Flow Projections, Diversified Investment Strategies, and Earnings Projections

PFM Asset Management LLC

Presenter

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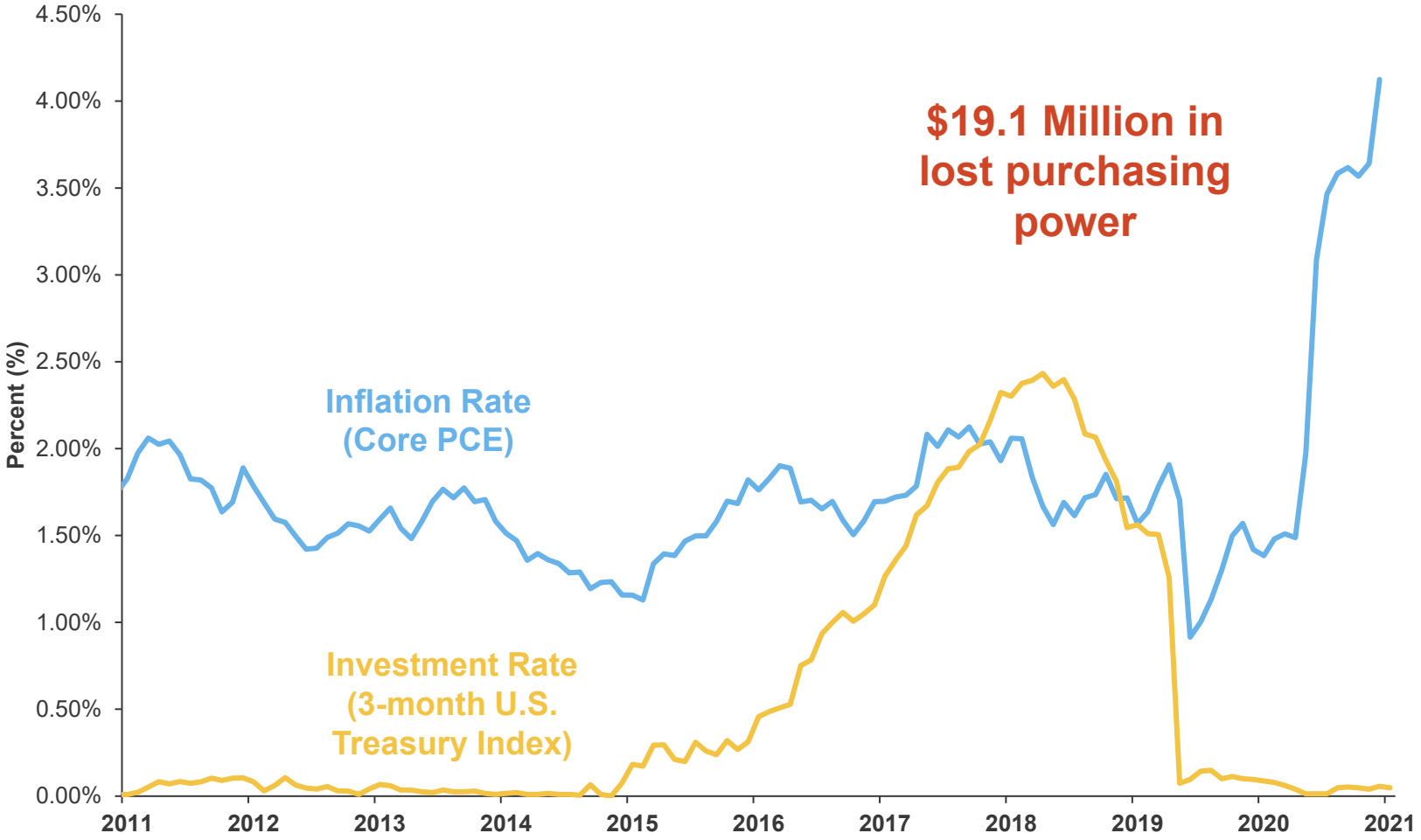
Back to Basics: Approaches to Developing Cash Flow Projections, Diversified Investment Strategies, and Earnings Projections

Over the last two years, cities and towns have experienced major changes to their cash flows due to COVID, stimulus funds, and economic changes. During this session, we will introduce and explore key considerations in developing cash flow projections, investment strategies for different types of funds (including bond proceeds), and earnings projection analyses.

Agenda

- Cash Flow Projections
- Diversified Investment Strategies
- Earnings Projections

Erosion Purchasing Power over 10 Years



Source: Bloomberg, as of November 30, 2021. Loss calculation is based on a starting portfolio size of $100,000,000 and a starting date of 10/31/2011. Yield is used as proxy for return for 3-month US Treasury Index

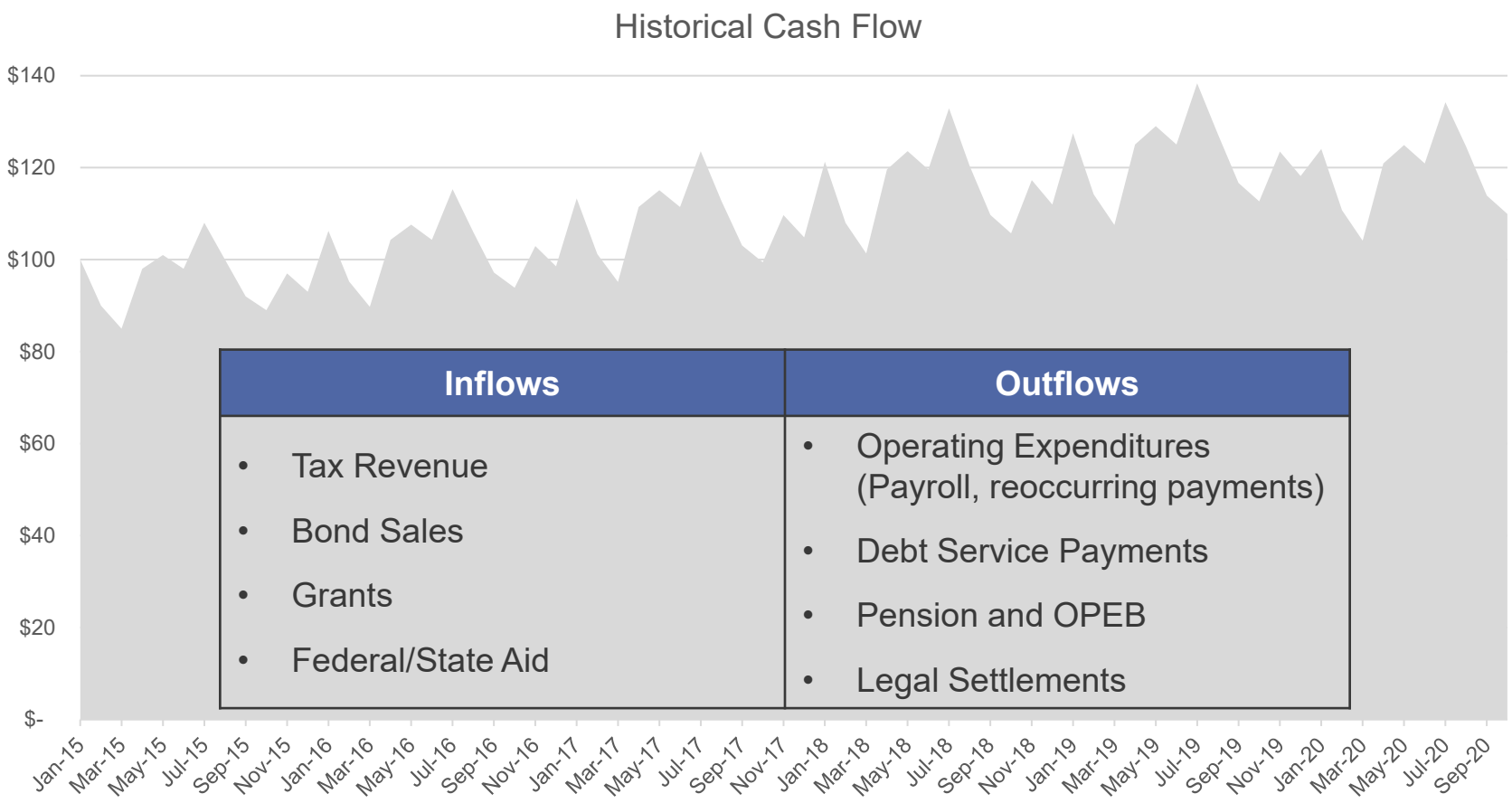
Cash Flow Projections

Cash Flow Projections – The Basics

- **Determines your liquidity needs**
  - Identify short term vs. long term
  - Short-term assets should be the primary source for near-term disbursements
  - Core assets are designed for long-term growth
- **Enhances cash management – better understanding of timing of revenues and expenditures**
  - Results in more effective cash flow management, e.g., stretching out accounts payables and speeding up collection of receivable to finance part of the operations internally
  - Seasonality of revenues/expenses
  - Forecasts potential deficits
  - Impact of the pandemic on tax collections
- **Identifies an optimal allocation of funds to maximize investment income**
  - Investment selection
  - Diversification

Cash Flow Data

Compiling historical cash flow data is the first step in developing a projection.

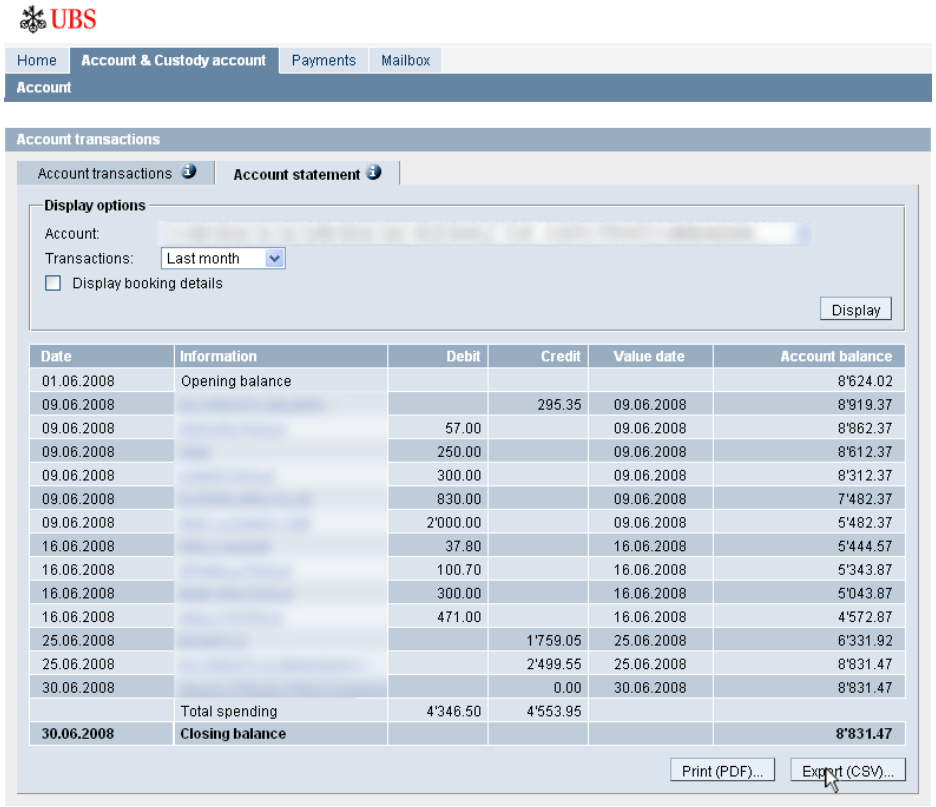


Inflows	Outflows
• Tax Revenue • Bond Sales • Grants • Federal/State Aid	• Operating Expenditures (Payroll, reoccurring payments) • Debt Service Payments • Pension and OPEB • Legal Settlements

FOR ILLUSTRATIVE PURPOSES ONLY

Typical Cash Flow Data Sources

- Bank statements
- General ledger balances
- Budgets
- Capital project spending
- Schedule of investments

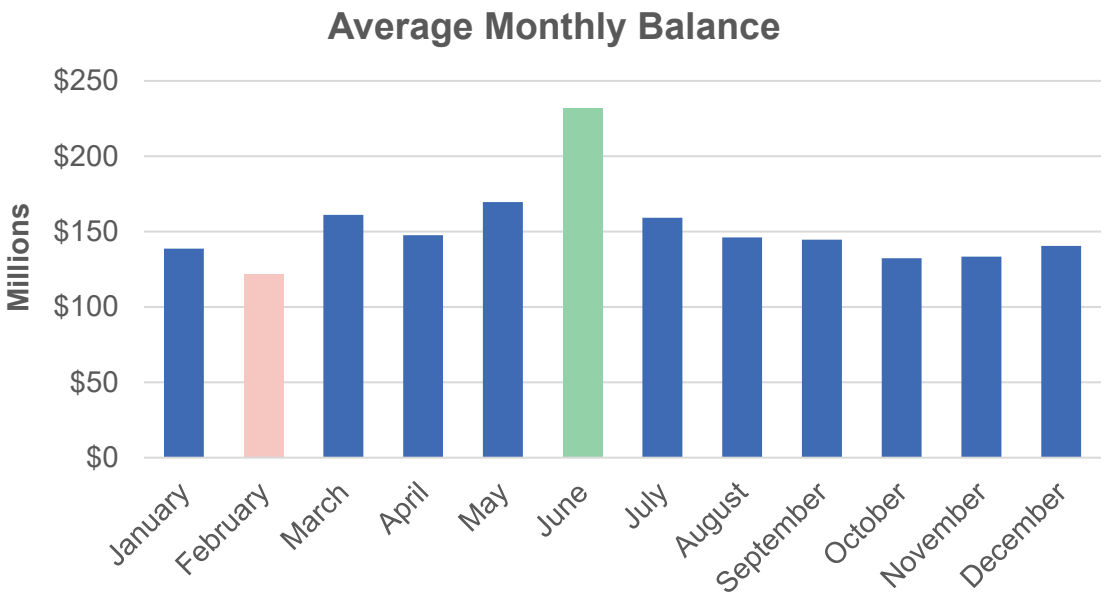


Future Cash Flow Factors

- Economic
  - Inflation
  - Sales Tax
  - Jobs
  - Housing
- Capital Projects
  - Debt issuance vs cash funding
- Acquisitions
  - Property
  - Facilities/Buildings
- Pension Funding Strategy

Cash Flow Seasonality

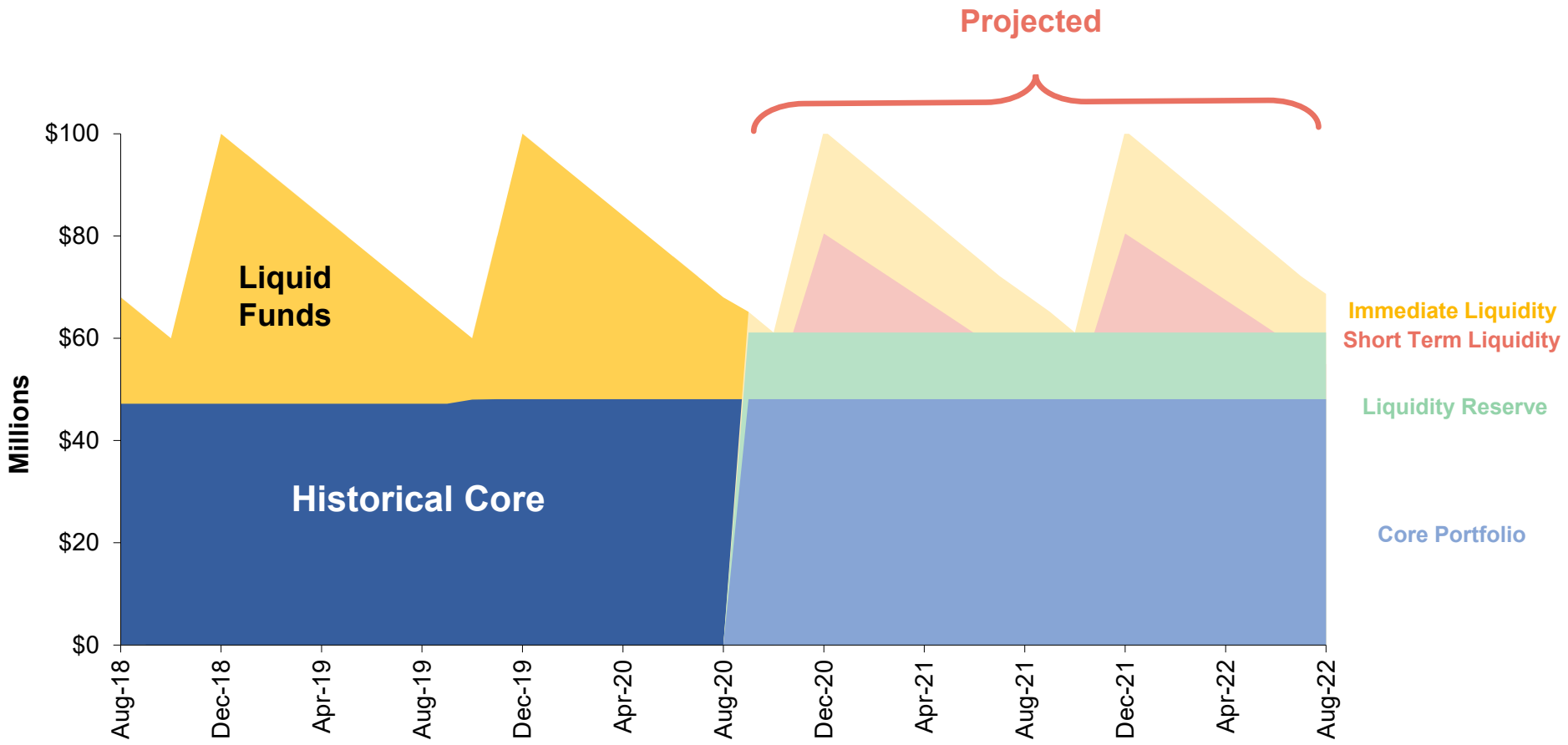
Month	Average Monthly Balance	Historical Factor
Average	$152,253,356	100.00%
January	$138,682,181	91.09%
February	$121,668,728	79.91%
March	$161,145,572	105.84%
April	$147,602,830	96.95%
May	$169,549,805	111.36%
June	$232,123,532	152.46%
July	$159,164,691	104.54%
August	$146,095,212	95.96%
September	$144,670,870	95.02%
October	$132,359,357	86.93%
November	$133,427,546	87.64%
December	$140,549,953	92.31%



For illustrative purposes only

Cash Flow Analysis Is Used to Optimize Portfolio Segmentation

Seasonality may be visible in cash flow analysis.



For illustrative purposes only

Bond Proceeds Cash Flow Projections

- General Obligation Bonds typically have one major fund
  - Project Fund

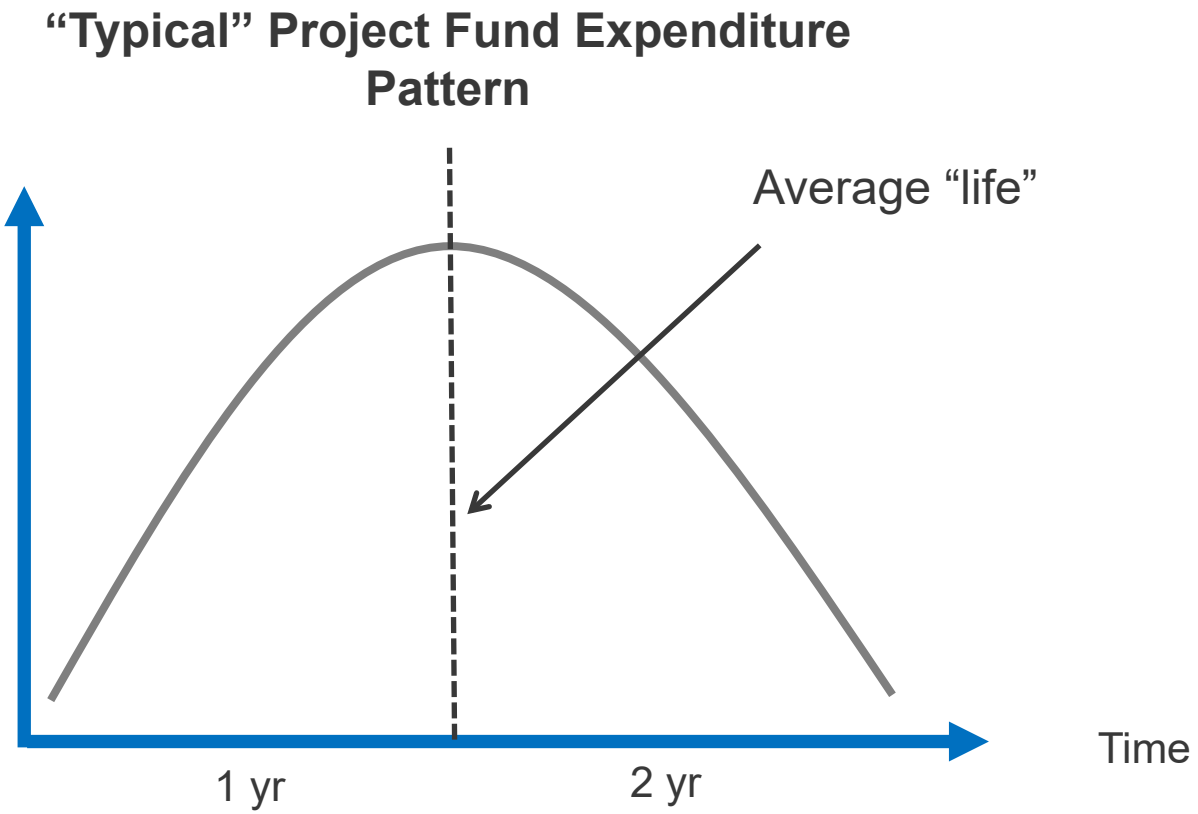
- Revenue Bonds may have multiple funds
  - Project Fund
  - Capitalized Interest (Cap-I) Fund
  - Debt Service Reserve Fund
  - Debt Service (P&I) Funds
  - Revenue Fund
  - Other Reserve Funds

Debt Funded

Funded by project revenues or other sources

General Project Fund Structure

- Project proceeds typically spent within 3 years
- Average life is approximately 1–1 ½ years



Project Fund Cash Flow Factors

- **Strength of draw schedule**
  - Number of projects
  - Estimated completion
  - Ability to update projections
- Payment Approach
  - Invoiced
  - Reimbursement
- Liquidity Cushion (if any)

Key Cash Flow Analysis Takeaways

Develop Strong Process

- Utilize broad set of data sources
- Update analysis on a regular basis
- Identify historical trends and patterns
- Avoid getting bogged down in forecasting “exact” amounts

Benefits of Cash Flow Analysis

- Helps ensure adequate liquidity
- Aids in financial overall planning
- Opens up investment opportunities across the yield curve
- Potential to increase investment income

Diversified Investment Strategies

Portfolio Segmentation and Strategy Considerations

Portfolio Segment	Strategy Consideration	Potential Characteristics
Immediate Liquidity	Daily Liquidity	• Bank operating cash • Money Market Funds • Local Government Investment Pools (LGIPs)
Short-Term Liquidity	Maturity matched to expenditures (3 –12 Months)	• Maturities matched to know cash flow needs (i.e., debt service, construction, etc.) • Commercial paper, LGIP
Liquidity Reserve	Short Duration Target (6 Months – 2 Year Duration)	• Highly liquid securities - Securities/sectors with active secondary markets - Limited structure/optionality risk • Allocation to high-quality, diversified credit securities to maximize the income potential of short duration needs • Commercial paper, corporate notes
Core Portfolio	Longer Duration Target (1 – 3, 1 – 5 years)	• Diversified across high-quality asset classes • Realize the benefits of a positively sloped yield curve • Greater focus on income generation (lower liquidity profile) - Corporate notes, MBS, federal agencies

Active vs. Passive Management Styles

Active Management

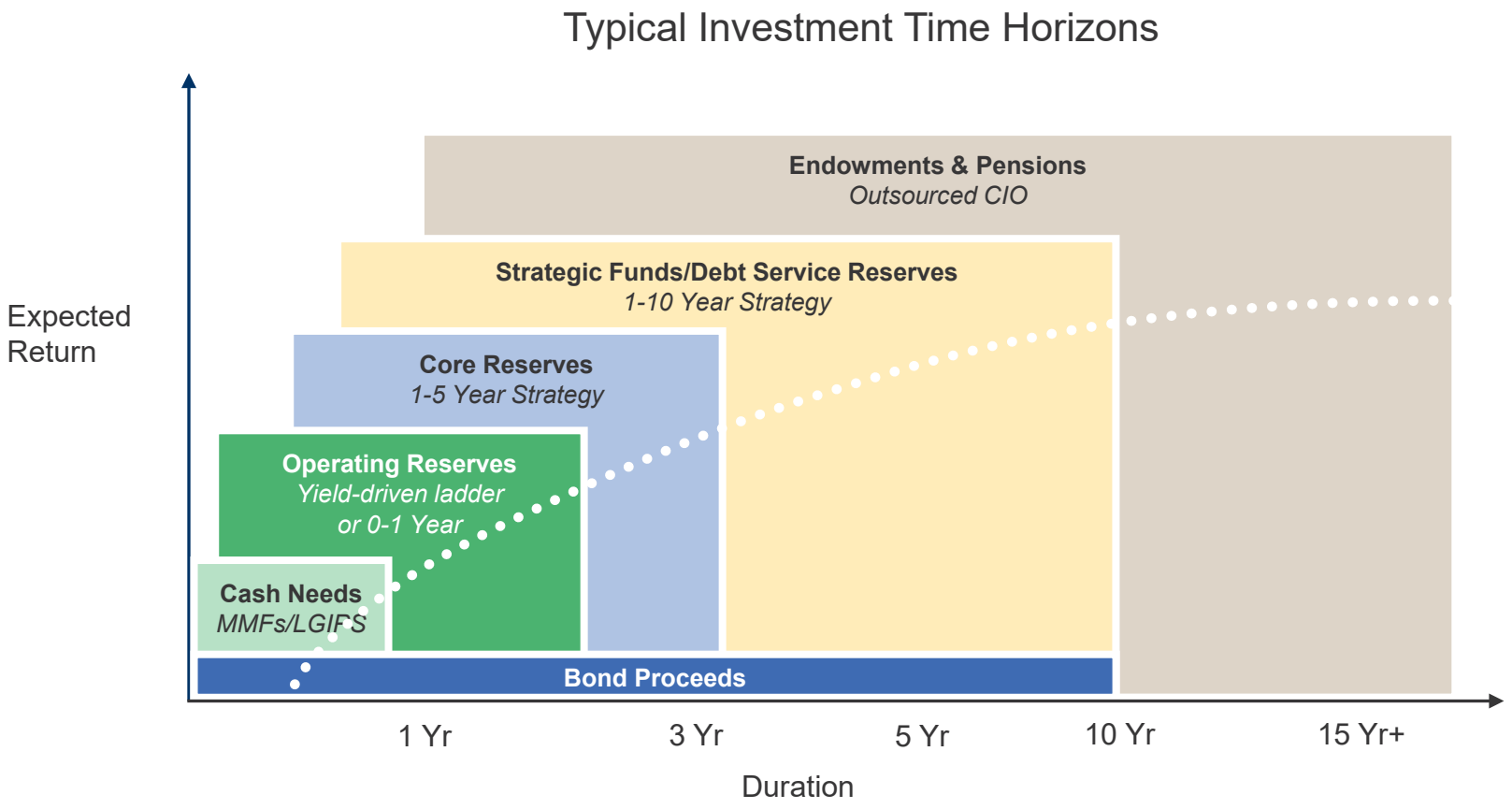
- Buy with intent to hold to maturity
- May sell before maturity to:
  - Enhance earnings/returns
  - Reduce risk
  - Adapt to changing cash flows or market conditions
- Active Management Strategies:
  - Sector trades
  - Duration trades
  - Roll down

Passive/Buy and Hold Strategy

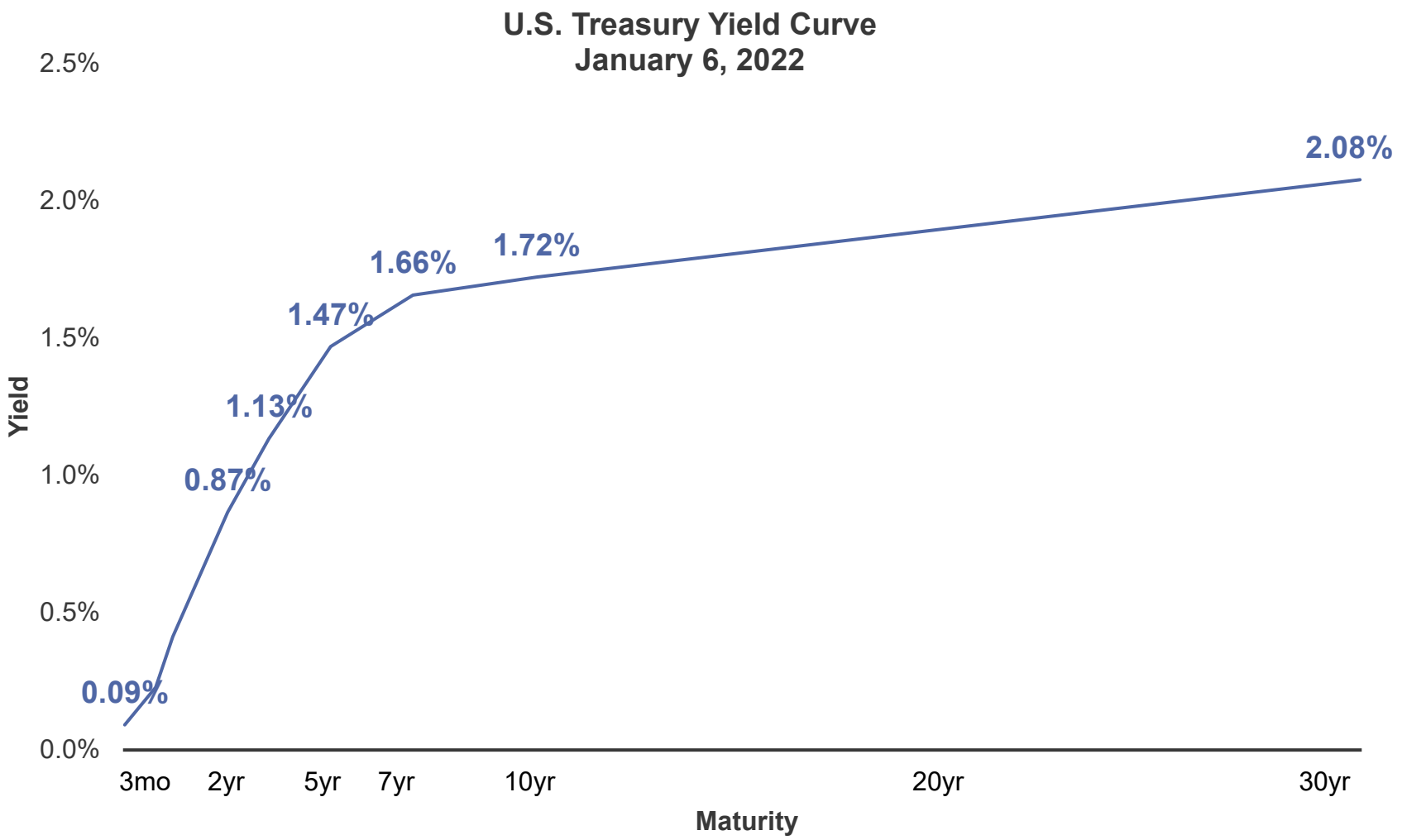
- Static approach
- Purchases made when securities mature or are called
- Representative options include:
  - Bank deposits/MMFs/LGIP
  - One-time purchase of fixed-income portfolio
  - Structured investment

Optimal management style is largely dependent on type of funds.

Optimizing Value of the Yield Curve



Current Yield Curve

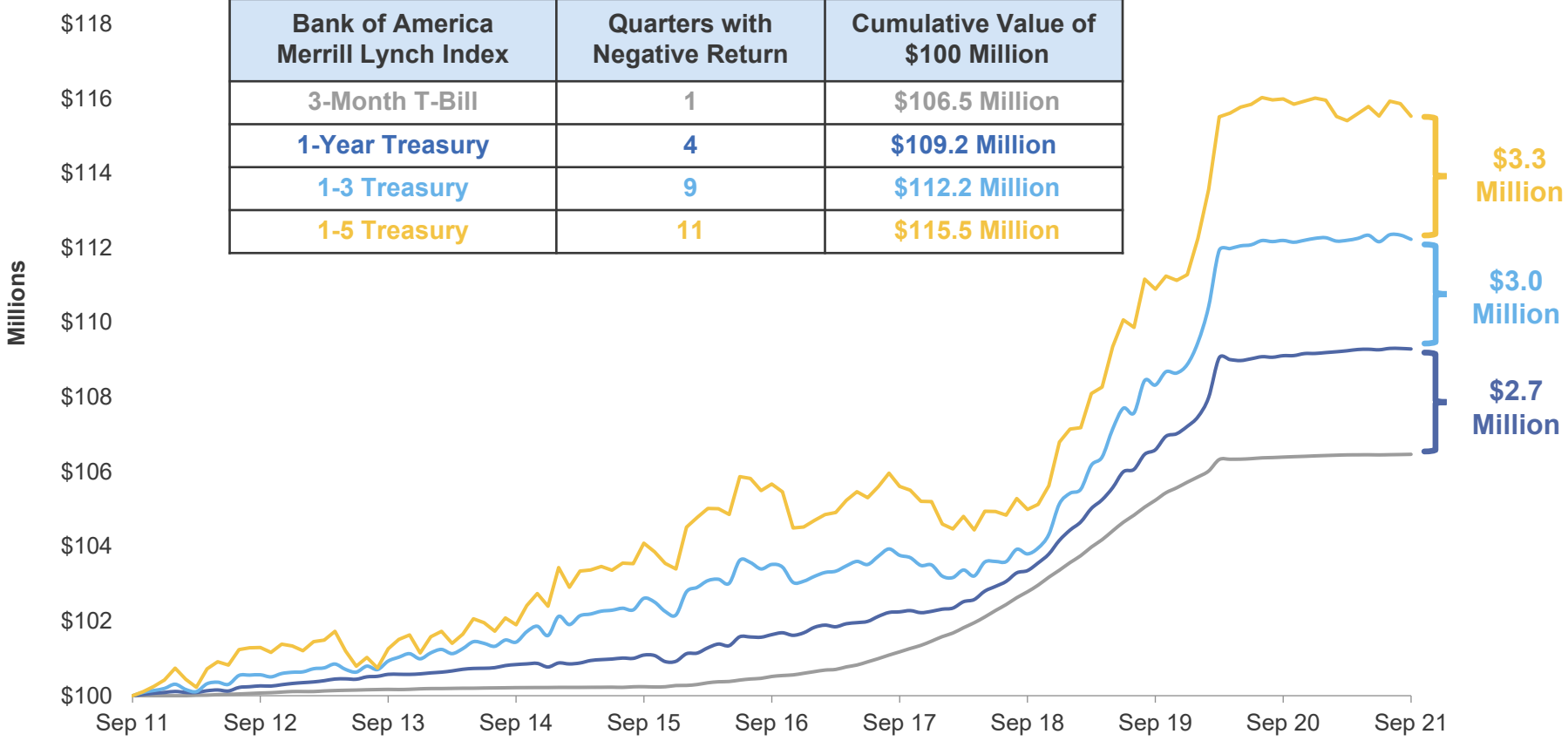


Source: Bloomberg, as of 01/06/2022.

Benefits of Increased Duration

Growth of $100,000,000 Invested 10 Years Prior

Negative Quarters (10 years ended September 30, 2021)		
Bank of America Merrill Lynch Index	**Quarters with Negative Return**	**Cumulative Value of $100 Million**
3-Month T-Bill	1	$106.5 Million
1-Year Treasury	4	$109.2 Million
1-3 Treasury	9	$112.2 Million
1-5 Treasury	11	$115.5 Million



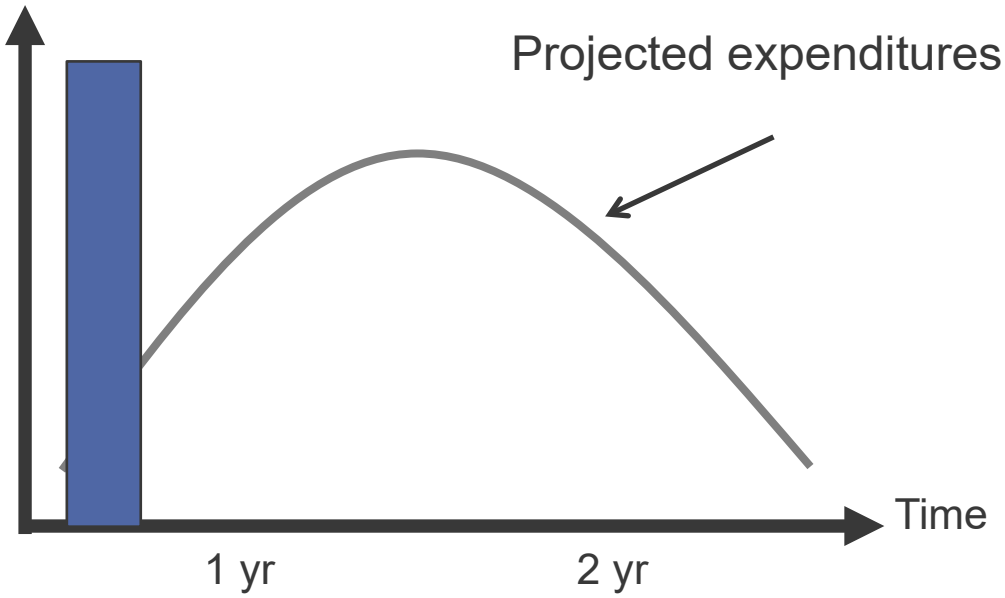
Source: Bloomberg as of September 30, 2021.

Bond Proceeds: Uncertain Draw Schedule

- Analyze historical capital spending patterns
- Structure investments around conservative estimates
- Build in additional liquidity
- Invest in securities that can be easily liquidated
- Rebalance based on changes in cash flows and/or market conditions

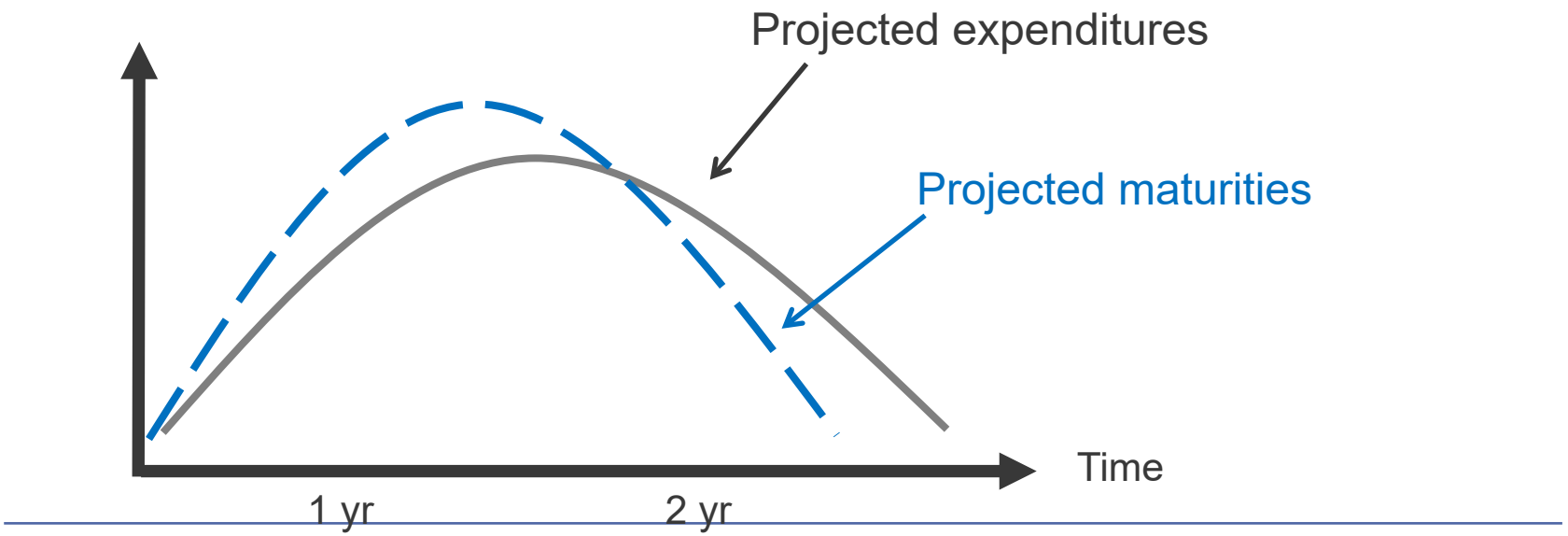
Bond Proceeds: Liquidity Strategy

- Convenient
- Typically overnight liquidity
- Rate dependent
- Inherently taking view that rates **will** rise during construction period



Bond Proceeds: Portfolio Strategy

- Laddered to match project fund schedule
- Fixed rate of interest for life of the security
- Reinvestment risk if draw schedule is delayed
- Interest rate risk if security must be sold prior to maturity
- Inherently taking view that rates **will not** rise *quickly* during construction period



Key Diversified Investment Strategy Takeaways

- Cash flow data and the current investment environment are the foundation for a diversified investment strategy.
- Develop a specific investment plan for each type of funds.
- Using a combination of active/passive and liquidity/securities can increase investment earnings.

Earnings Projections

Earnings Projections – The Basics

Purpose of the earnings projection:

- Primary use: budgeting and cash flow tool
- Reasonable expectation of monthly earnings
- Comparison to actual earnings and updated at regular intervals
- Provides a secondary performance metric
- Ultimately, allows for the monitoring of achieving investment income objectives

PFMAM Earnings Projection Model Approach:

- Portfolio holdings are used to project monthly interest earnings (accrual basis)
- Historical net cash flows can be used to adjust expected monthly earnings
- Securities that are called or matured and cumulative net cash flows (if applicable) are reinvested at assumed rates
- Assumes no deposits or withdraws from the portfolio

Sample Earnings Projection

Sample Accrual Basis Earnings Report
Fiscal Years 2019-2021
Investment Portfolio - Accrual Basis Earnings Estimates

	INVESTMENT PORTFOLIO			
Date	Month-End Amortized Cost Value	Portfolio YTM at Cost[1]	Accrual Basis Portfolio Fixed Earnings[2]	Assumed Reinvestment Rate[3,4,5]
Jul-19	$28,030,546	2.44%	$57,490	
Aug-19	$27,088,520	2.45%	$56,748	
Sep-19	$26,246,835	2.44%	$54,883	
Oct-19	$27,161,599	2.39%	$55,950	
Nov-19	$27,175,545	2.38%	$54,279	
Dec-19	$27,290,679	2.23%	$65,180	
Jan-20	$27,344,645	2.21%	$55,153	
Feb-20	$27,428,739	2.17%	$57,540	
Mar-20	$27,477,464	2.10%	$61,557	
Apr-20			$47,345	0.23%
May-20			$48,923	0.24%
Jun-20			$47,345	0.25%
		FY 19-20 Total	$662,392	
Jul-20			$48,151	0.26%
Aug-20			$47,386	0.27%
Sep-20			$45,857	0.27%
Oct-20			$46,642	0.28%
Nov-20			$44,681	0.28%
Dec-20			$46,170	0.29%
Jan-21			$46,074	0.29%
Feb-21			$40,817	0.30%
Mar-21			$43,855	0.31%
Apr-21			$40,640	0.31%
May-21			$39,781	0.33%
Jun-21			$37,408	0.34%
		FY 20-21 Total	$527,461	

Assumptions

1. Portfolio yield to maturity (YTM) at cost from 7/1/19 – 3/31/20 based on actual portfolio YTM at cost.

2. Accrual basis earnings from 7/1/19 – 3/31/20 based on actual portfolio earnings; periods thereafter are projected.

3. Projected portfolio earnings assume accrual basis earnings at the "Assumed Reinvestment Rate" for that particular month.

4. The "Assumed Reinvestment Rates" reflect estimates of the forward rates of the 2-Year U.S. Treasury Note as of 4/14/2020 produced by Bloomberg.

5. Actual yields could vary significantly in the future.

Basic Earnings Calculation

Portfolio Holdings

- Earnings projections utilize the actual starting portfolio composition as a baseline for the fiscal year's projections.

Earnings

- For each security, the par amount and the original yield to maturity are used to determine that month's earnings.

Callable securities

- Securities that are callable and trading at a premium are assumed to be called/mature on their next call date. Callable securities trading at a discount are assumed to be held to maturity.

				INVESTMENT PERIODS					
				1/01/13-1/31/13	2/01/13-2/28/13	3/01/13-3/31/13	4/01/13-4/30/13	5/01/13-5/31/13	6/01/13-6/30/13
SECURITY TYPE	PAR AMOUNT	ORIGINAL YTM	MATURITY DATE	MONTHLY EARNINGS	MONTHLY EARNINGS	MONTHLY EARNINGS	MONTHLY EARNINGS	MONTHLY EARNINGS	MONTHLY EARNINGS
U.S. Treasury Note	780,000	0.40%	12/31/2013	263	237	263	254	263	254
U.S. Treasury Note	460,000	1.90%	3/31/2014	742	670	742	718	742	718

Reinvestment Assumptions

- Many different sources of reinvestment assumptions, examples include:
  - Forward rates
  - Fed's Quarterly Estimates (Dot Plot)
  - Economist surveys
  - Fed Funds Futures
  - Current rates + spread
  - Historic averages of indices/securities

- Considerations for choosing reinvestment assumptions:
  - Type of funds (investment horizon)
  - Alignment with portfolio permitted investments
  - Time horizon of earnings projection

The longer the time horizon of an earnings projection, the more influence reinvestment assumptions have on its results

Treasury Forward Rate Curve

- Calculated, market expectation of a Treasury yield that, theoretically, will occur in the future, usually a few months (or even a few years) from the time of calculation.

Treasury Actives Curve

Forward Curve Analysis

Graph

Curve Date 01/11/22 Market Mid Back Test 01/11/22 « Curve List

Horizon Curve | Implied Forwards

Horizon Curve Dates

1 Mo Projected | 1 Yr Projected

07/11/22 Dt Projected | 9 Mo Projected

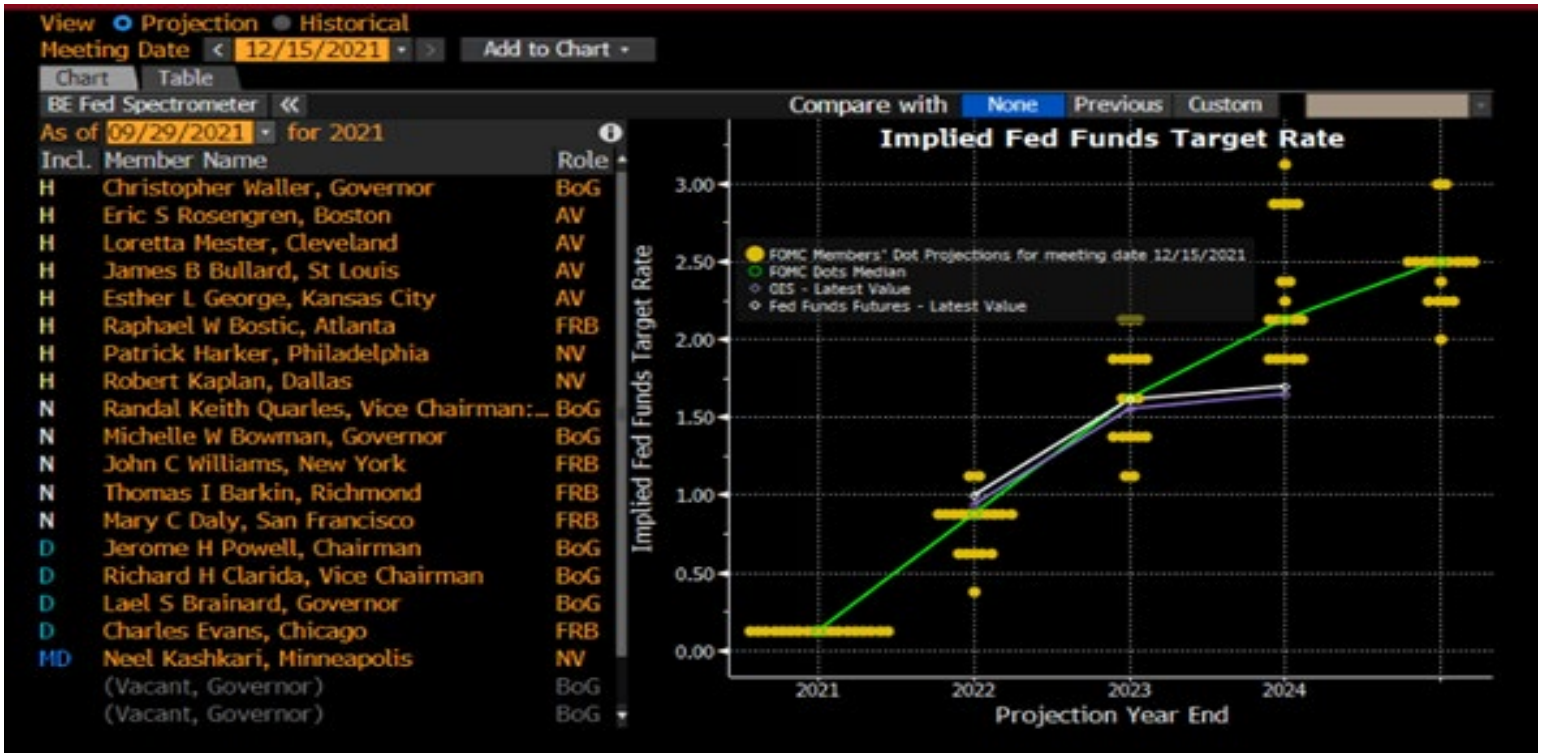
	US Treasury Actives Curve (REF)			
Tenor	Spot	1 Mo (P)	1 Yr (P)	07/11/2022 (P)
1 Mo	0.04259	0.07436	1.40153	0.60141
2 Mo	0.05730	0.14894	1.37942	0.62035
3 Mo	0.11215	0.23960	1.38780	0.61981
6 Mo	0.27413	0.37009	1.38257	0.68134
9 Mo	0.39037	0.45818	1.38940	0.91290
1 Yr	0.47739	0.59632	1.40700	1.03075
2 Yr	0.93937	1.01617	1.62517	1.32592
3 Yr	1.23796	1.29259	1.75190	1.52474
4 Yr	1.42625	1.46816	1.81648	1.64417
5 Yr	1.54005	1.57664	1.88360	1.73046
7 Yr	1.70995	1.73373	1.92589	1.83151
9 Yr	1.75189	1.77061	1.93411	1.84822
10 Yr	1.77637	1.79854	1.99490	1.89548
12 Yr	1.89966	1.91887	2.08461	2.00015
15 Yr	2.02151	2.03704	2.17383	2.10439
20 Yr	2.13713	2.14735	2.23194	2.19001
30 Yr	2.08750	2.09499	2.15747	2.12664
50 Yr	2.04800	2.05339	2.09816	2.07609

Source: Bloomberg

Fed's Quarterly Estimates (Dot Plot)

Percent

Variable	Median[1]					Central Tendency[2]					Range[3]				
	2021	2022	2023	2024	Longer run	2021	2022	2023	2024	Longer run	2021	2022	2023	2024	Longer run
Memo: Projected appropriate policy path															
Federal funds rate	0.1	0.9	1.6	2.1	2.5	0.1	0.6–0.9	1.4–1.9	1.9–2.9	2.3–2.5	0.1	0.4–1.1	1.1–2.1	1.9–3.1	2.0–3.0
September projection	0.1	0.3	1.0	1.8	2.5	0.1	0.1–0.4	0.4–1.1	0.9–2.1	2.3–2.5	0.1	0.1–0.6	0.1–1.6	0.6–2.6	2.0–3.0



Source: Federal Reserve and Bloomberg, December 2021 Estimates.

Economist Surveys

United States
Fed Tgt Upper Bound

Market Yield 0.25

Recent Updates
B. Kasman
J. Hatzius

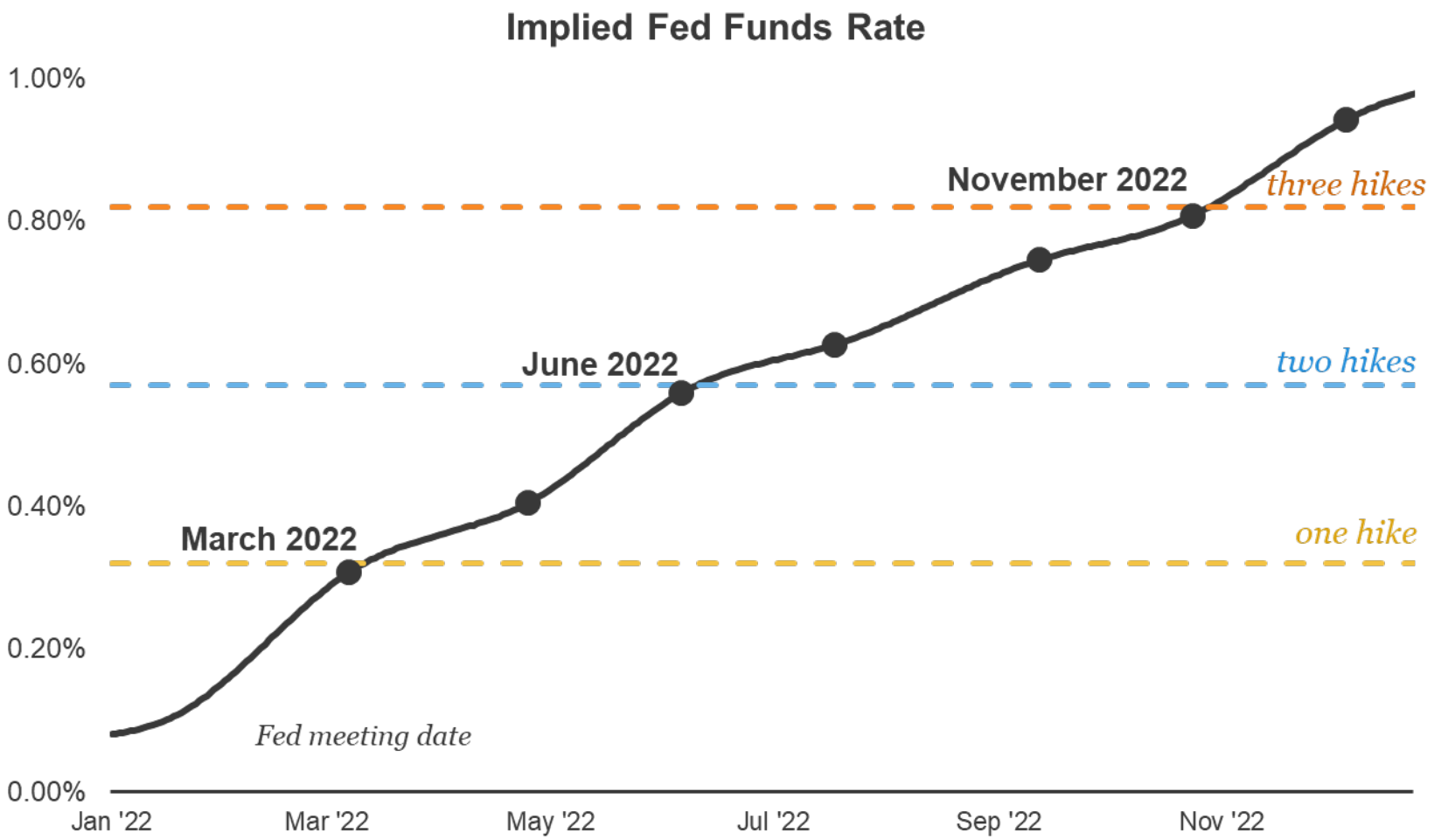
	Q1 22	Q2 22	Q3 22	Q4 22	Q1 23	Q2 23	Q3 23	Q4 23	Q1 24	Q2 24
Bloomberg Wgt Avg	0.35	0.45	0.65	0.85	1.05	1.20	1.40	1.55	1.70	
Median Forecast	0.25	0.50	0.50	0.75	1.00	1.25	1.50	1.50	1.75	
Average Forecast	0.26	0.39	0.58	0.78	1.00	1.18	1.37	1.56	1.70	
High Forecast	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.00	2.25	
Low Forecast	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	
Responses	67	67	66	68	59	57	56	59	42	
Dec. Survey Median	0.25	0.50	0.50	0.75	1.00	1.25	1.38	1.50	1.75	
Nov. Survey Median	0.25	0.25	0.25	0.50	0.75	0.75	1.00	1.25	1.25	
Change in Medians	0.00	0.25	0.25	0.25	0.25	0.50	0.38	0.25	0.50	

Source: Bloomberg as of 1/11/22

1	WSJ Economic Survey October 2021		Federal Funds Rate (Midpoint of the Range)						
2	Name:	Organization:	Dec 2021	June 2022	Dec 2022	June 2023	Dec 2023	June 2024	Dec 2024
54	Lynn Reaser	Point Loma Nazarene University	0.125	0.125	0.375	0.625	1.125	1.625	1.875
55	Belinda Román	St. Mary's University College of Arts, Hum	0.125	0.250	0.300	0.400	0.500	0.600	0.750
56	Alfredo A. Romero	North Carolina A&T State University Willi	0.125	0.125	0.125	0.125	0.125	0.125	0.125
57	Brett Ryan/Matthew Luzzetti	Deutsche Bank Securities, Inc.	0.125	0.125	0.375	0.625	1.125	1.625	1.875
58	Ian Shepherdson	Pantheon Macroeconomics	0.125	0.125	0.625	1.125	1.375	1.625	1.875
59	Allen Sinai	Decision Economics Inc.	0.125	0.125	0.500	0.870	1.130	1.630	2.000
60	James F. Smith	EconForecaster LLC	0.125	0.125	0.375	0.625	0.875	1.125	1.375
61	Sean M. Snaith	University of Central Florida	0.125	0.125	0.125	0.125	0.375	0.625	0.625
62	Sung Won Sohn	SS Economics	0.125	0.125	0.375	0.625	0.875	1.125	1.375
63	Stephen Stanley	Amherst Pierpont Securities	0.125	0.375	0.875	1.375	1.875	2.125	2.625
64	Susan M. Sterne	Economic Analysis Associates Inc.	0.130	0.350	0.650	1.350	1.350	1.650	2.000
65	Carlton M. Strong*	JPMorgan							
66	James Sweeney	Credit Suisse	0.125	0.125	0.125	0.125	0.625		
67	Kevin Swift	Catawba College	0.125	0.125	0.375	0.375	0.875	1.125	1.125
68	Diane Swonk	Grant Thorton	0.125	0.125	0.375	0.825	1.675	1.675	1.325
69	Carl Tannenbaum	Northern Trust	0.125	0.125	0.125	0.375	0.625	0.875	1.125
70	Christopher Thornberg	UC Riverside School of Business Center fo	0.125	0.125	2.000	3.000	3.000	3.000	3.000
71	Luke Tilley	Wilmington Trust Investment Advisors	0.125	0.125	1.625				
72	Nicholas Van Ness	Credit Agricole CIB	0.125	0.125	0.125				
73	Jordan Vickers	Eaton Corp.	0.125	0.125	0.625	1.125	1.375	1.625	1.625
74	Brian S. Wesbury/Robert Stein	First Trust Advisors LP	0.125	0.125	0.125	0.375	0.625		
75	Lawrence Yun	National Association of Realtors	0.125	0.375	0.625	1.125	1.625	1.875	1.875
76	Ellen Zentner	Morgan Stanley	0.125	0.125	0.125	0.375	0.625		
77									
78		**October 2021**	**0.125**	**0.146**	**0.340**	**0.610**	**0.944**	**1.301**	**1.558**

Source: WSJ Survey of Economists, October 2021

Fed Fund Futures



Source: Bloomberg, WIRP as of 1/10/2022. Rate hikes are based on an assumed rate move of 25 basis points (0.25%).

Key Earnings Projection Takeaways

- Determine appropriate earnings model methodology.
- Ensure reinvestment assumption data aligns with the portfolio strategy.
- Earnings projections can provide an additional benchmark and tool for financial planning.

Questions?

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