CHIEF INVESTMENT OFFICE

Fixed Income Strategy

Liquidity Strategies — Optimizing Tiers of Cash, Vehicles, Yield and Risk

April 2023

SUMMARY

- There is no single “best” vehicle for managing cash.
- Tiering cash can be helpful in choosing between vehicles.
- Matching the “right” tier with the “right” vehicle can help overall yield productivity on cash balances.

View the CIO Viewpoint ▶ View the CIO Asset Allocation Guidelines ▶

ASSET CLASS WEIGHTINGS

Asset Class	Underweight		Neutral		Overweight
Global Fixed Income			●		
U.S. Governments				●	
U.S. Mortgages			●		
U.S. Corporates			●		
High Yield		●			
U.S. Investment-grade Tax Exempt		●			
U.S. High Yield Tax Exempt		●			
International Fixed Income			●		

These Chief Investment Office (CIO) views relate to fully-diversified, multi-asset class portfolio and use the asset class breakdown of the CIO “High Tax/Balanced” Allocation. Source: Global Wealth & Investment Management Investment Strategy Committee as of April 4, 2023.

FIXED INCOME U.S. RATES FORECAST

(% end of period)	Spot	2Q23	3Q23	4Q23
Fed Funds Range	4.83	5.00–5.25	5.00–5.25	5.00–5.25
2-Year T-Note	3.97	4.00	3.75	3.50
5-Year T-Note	3.50	3.60	3.45	3.40
10-Year T-Note	3.44	3.50	3.35	3.25
30-Year T-Bond	3.69	3.70	3.55	3.40

Source: BofA Global Research U.S. Rates Research; April 14, 2023; spot price as of that date. Note: Federal funds rate forecasts are model expectations; other values are for market rates. The forecasts in the table above are the baseline view from BofA Global Research team. The Global Wealth & Investment Management (GWIM) Investment Strategy Committee (ISC) may make adjustments to this view over the course of the year and can express upside/downside to these forecasts. **There can be no assurance that the forecasts will be achieved. Economic or financial forecasts are inherently limited and should not be relied on as indicators of future investment outcomes.**

FIXED INCOME AT A GLANCE

Rates Markets	31-Mar	28-Feb	Change
Fed Funds rate	4.88%	4.63%	+25 bps
3-month Treasury Bills	4.75%	4.81%	-6 bps
U.S. 2-year Note	4.03%	4.82%	-79 bps
U.S. 5-year Note	3.58%	4.18%	-61 bps
U.S. 10-year Note	3.47%	3.92%	-45 bps
U.S. 30-year Note	3.65%	3.92%	-27 bps
FF / 10s Curve	-141 bps	-70 bps	-70 bps
2s / 10s Curve	-56 bps	-90 bps	+34 bps
German 10-year	2.29%	2.65%	-36 bps
UK 10-year	3.49%	3.83%	-34 bps
Japanese 10-year	0.33%	0.50%	-17 bps

Credit Markets	31-Mar	28-Feb	Change
U.S. Investment Grade (Spread)	+138 bps	+124 bps	+14 bps
U.S. High Yield (Spread)	+455 bps	+412 bps	+43 bps
U.S. High Yield (Yield)	8.52%	8.63%	-11 bps
Emerging Markets (U.S.$, Spread)	+358 bps	+325 bps	+33 bps
10-year AAA Municipal	2.28%	2.64%	-36 bps
10-year Muni / Treasury Ratio	65.6%	67.3%	-1.7%

Index Returns	1-month	12-months	Year-to-Date
U.S. Treasury	2.9%	-4.5%	3.0%
U.S. MBS	1.9%	-4.9%	2.5%
U.S. ABS	1.3%	0.4%	1.9%
U.S. CMBS	0.0%	-4.7%	1.0%
U.S. Corporate	2.8%	-5.6%	3.5%
U.S. High Yield	1.1%	-3.3%	3.6%
U.S. Leveraged Loans	0.0%	2.5%	3.3%
U.S. Municipals	2.2%	0.3%	2.8%
U.S. Municipal High Yield	1.6%	-4.5%	2.7%

Bps refers to basis points. Source: Bloomberg. Data as of March 31, 2023 and subject to change. **Past performance is no guarantee of future results. Please refer to the end of the document for asset class proxies and index definitions.**

Since the Federal Reserve (Fed) began raising rates in March 2022, yields on cash have become much more attractive. This provides an opportune time to highlight our views on cash and how, now and over a complete market cycle, liquidity can be considered and managed.

Cash management is too often simply considered a short-term subset of the Fixed Income market. We maintain that it is actually a distinct asset class that should prioritize principal preservation first, liquidity second, and yield productivity third. In times of market stress, however, these priorities may—and often must—change, with maximizing liquidity being the most important. Especially true during the ongoing stress in the banking industry, liquidity matters only when it matters—and then it's the only thing that matters.

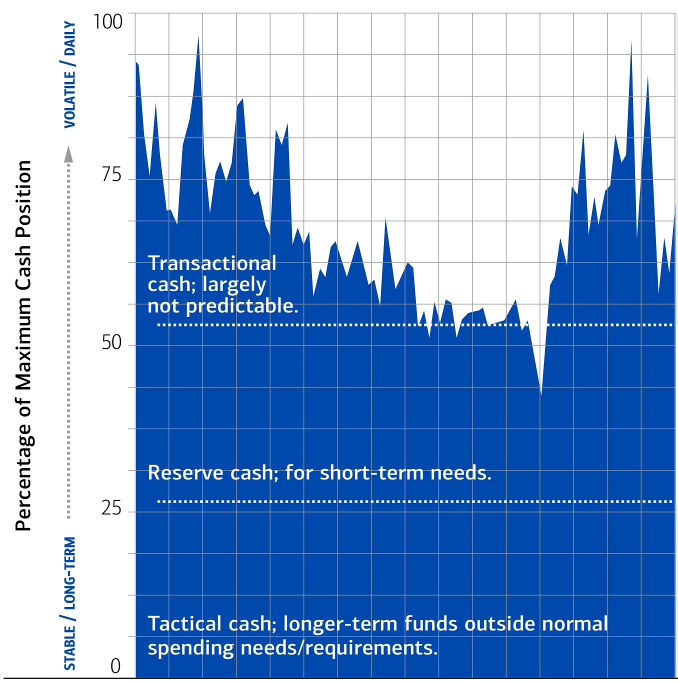
As the market continues the process of reembracing risk following the failure of several banks, a return to normalcy in the cash space may be reemerging. This piece is meant to address a way to think about the management of cash over the longer term in a fashion that could produce some additional yield in compensation for prudently taking on some additional credit and/or liquidity risk. We acknowledge that there is no "free lunch", as yield only can be added along with the assumption of additional risk, but a framework around cash management can compartmentalize this added risk into manageable pieces so that the client can be compensated for the additional risk.

It's too easy to think of cash as the broad investment allocation that requires no analysis or planning, as if to say, "I have one pile of cash, and I need to do one thing with it." While that may be true for some, it may not be true for others. Cash is not one thing, and there is no one vehicle that can best serve that one thing.

Cash Tiering

To the extent that cash sources and uses can be analyzed and segmented, it's possible/probable that a "tiering" of cash can be determined. We think about such tiering in a fashion best displayed by Exhibit 1:

Exhibit 1: Segmenting Cash—U.S. Liquidity Products.



Typical cash management & investment solutions (not limited to):

Transactional Cash	• Interest Bearing Demand Deposit Account (IBDDA) • Money Market Mutual Funds (MMMF)
Reserve Cash	• IBDDA • MMMF • Short Term Certificates of Deposit (CDs) • U.S. Treasury Bills • Variable Rate Demand Note (VRDN) / Taxable/Muni Commercial Paper
Tactical Cash	• MMMF • U.S. Treasury Bills / Notes • U.S. Agency Notes • Certificates of Deposit • Corporate Bonds • Municipal Securities • Asset-Backed Securities

The blue area represents the total amount of cash and its fluctuations over any given time frame. The white dotted lines show how such a cash pattern might be segmented into tiers, with some (as in the uppermost section) showing great fluctuation over time, and some (as in the bottommost sections) showing little to none. What can and "should" be done with the upper tier of cash might very well be different from what is done with the lower tier(s). The more variable upper tier would likely benefit from a vehicle suitable to that cash pattern, while the lowest tier would likely benefit from a different vehicle more suited to it.

Source: Chief Investment Office. INFORMTIONAL PURPOSES ONLY. Note: Cash balances in blue illustrate hypothetical flows, intended to demonstrate that certain tiers of cash are more stable than others; Aside from IBDDAs, not all checking accounts are interest bearing.

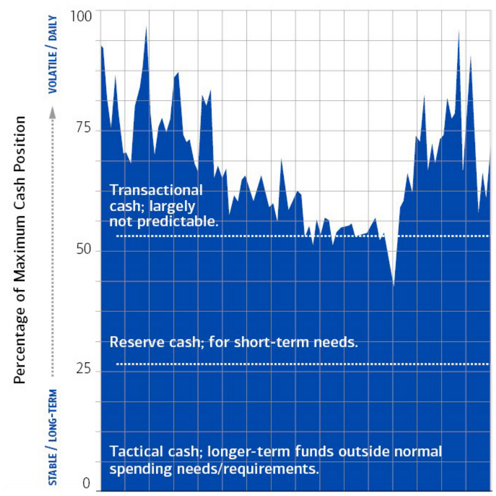
There are many vehicles with which cash may be managed. In our nomenclature, these different vehicles comprise a "cash continuum." Importantly, we maintain that there is no single "best" cash vehicle that fits all cash management needs, but there are some vehicles that are more conducive than others to managing different tiers of cash. Each of these vehicles has both good and bad features—some are instantly more liquid, some produce this liquidity by the realization of more/fewer/no realized gains or losses, some entail the assumption of more/less risk, and some are more expensive in terms of fees. But prudently matching the "right" tiers with the "right" vehicles, we maintain, can result in greater yield productivity while managing the assumption of great risk.

The Cash Continuum—Commonly Used Cash Vehicles

Given the amount of cash that individuals, corporations, philanthropic enterprises, and others generate and move back and forth amongst each other, it's no surprise that there are a lot of vehicles designed for holding and managing this cash. As discussed above, given that not all cash is always serving the same purpose in terms of the cash-tiering concept, the range of these cash vehicles has developed to a continuum of vehicles ranging from those best serving what we call transactional cash to those better serving deeper, more permanent tiers.

The hierarchy of objectives in cash management is generally seen as principal preservation first, liquidity second, and yield generation third. The vehicles comprising the continuum have differing features that are better suited to some of these objectives than others, with some that maximize principal preservation, others that maximize liquidity, and some that are more yield productive at the slight expense of either of those other objectives. The age-old concept of risk and reward lies at the heart of the continuum—yield productivity can only be enhanced if more risk is assumed. As we've seen in the Exhibit 1, however, deeper cash tiers can perhaps contemplate sacrificing some measure of principal preservation and/or liquidity in the pursuit of higher yield, as an example, as cash in this tier does not need to be as readily accessible.

Exhibit 1: Segmenting Cash—U.S. Liquidity Products.



Source: Chief Investment Office. INFORMTIONAL PURPOSES ONLY. Note: Cash balances in blue illustrate hypothetical flows, intended to demonstrate that certain tiers of cash are more stable than others; Aside from IBDDAs, not all checking accounts are interest bearing.

Setting the most conservative end of the continuum is a bank account, a commonly used cash vehicle, whether that's an IBDDA or—tying cash up for a time (assuming some liquidity risk)—a certificate of deposit. The IBDDA offers a classic combination of "safety" (if the depositor is comfortable with the credit condition of the bank) and unimpeded access to the balances—moreover, cash can be deposited and withdrawn with no transaction fees or gain/loss considerations. This all comes, of course, at the expense of yield—lower risk/lower yield.

As an investor moves out the continuum, MMMFs are abundant. In their most conservative form—funds investing only in Treasury or government securities, both with and without the use of repurchase agreements, or "repos"—principal preservation is high, liquidity is excellent (with the only real constraint being the limitation of access to balances subject to fund cut-off times later in the day), and yields are generally a bit higher, over the long run, than an IBDDA. Some MMFs also invest in non-Treasury/non-governmental securities such as commercial paper (in the case of so-called "prime funds") or tax-exempt municipal securities of different types (in the case of "muni funds"). Here, there is more credit risk, and there can be market conditions when liquidity might be compromised and compensating for that is yield that is generally higher still.

Finally, at the most risk-seeking and yield-productive end of the continuum are what we call managed solutions, and these take the form of a separately managed account (SMA) and a commingled managed portfolio (a bond fund). We suggest that an SMA provides a bit more flexibility to the client in that the SMA's characteristics can change over time in concert with the always-unfolding macroeconomic outlook, market dynamics, and changes in client cash needs and risk preferences. At the same time, investing in a bond fund, which is designed to deliver a certain set of risk/reward characteristics, can be both easy and yield productive.

The above list of vehicles is not exhaustive, but it is largely representative. Exhibit 2 is useful in summarizing the various pros and cons of each vehicle.

Exhibit 2: Comparison of Cash Solutions.

	Earnings Credit Rate (ECR) Deposits	Interest Bearing Demand Deposit Account (IBDDA)	Traditional Treasury/ Government Money Market Funds (MMFs)	Client-Directed	Prime MMFs	Managed Solutions
Yield Opportunities	Generally Lower Yield					Generally Higher Yield
Liquidity	Unimpeded access but balance required depending on banking needs	Unimpeded immediate access	Unimpeded immediate access subject to fund end-of-day cut-off times	Normal market settlement considerations varying with securities used	Normally unimpeded immediate access, but liquidity fees (up to 200 basis points [bps]) and redemption gates (up to 10 days) possible in periods of market stress can limit access	Normal market settlement, but customizable as to cash flows; borrowing against holdings also possible
Gain/Loss Considerations	N/A	None	None	Gains/losses will be incurred on sales	Little gains/losses; Net Asset Value (NAV) fluctuates in historically tight range, but could be large	Unanticipated sales to raise cash results in gains/losses; customization and borrowing can mitigate
Fees	N/A	None	Net yield reported, but manager fees generally in the 8-20 bps range	Generally small (but unknown) spread taken per transaction	Net yield reported, but manager fees generally in the 8-20 bps range	Generally lower than MMF manager fees; negotiable; mandate specific
Other Considerations	Single balance sheet exposure beyond $250,000 Federal Deposit Insurance Corporation (FDIC) limit	Single balance sheet exposure beyond $250,000 FDIC limit	Commingled; non-customizable; no FDIC insurance, fund and underlying AAA rated	Client assumes security selection (both duration and credit, if applicable) and execution process; not commingled; customizable; no FDIC insurance	Challenging in times of market stress; commingled; non-customizable; no FDIC insurance, fund AAA rated	Up front client time required to determine cash needs and risk tolerance; manager assumes security selection and execution; not commingled; unlimited customization; no FDIC insurance

Conclusion

The key to principal-preservation-biased and yield productive cash management, we strongly believe, lies in using these options in conjunction with each other, matching the "right" vehicle to the "right" tier of cash, with deeper tiers likely having increasing flexibility to assume some additional risk prudently and thoughtfully, whether that be credit, interest rate or liquidity risk, to enhance yield on that tier and, thereby, total yield on the entirety of cash.

The list of cash vehicles is not a revelation. The ability to use them in combination, however, might very well lead to better overall cash yield productivity via the assumption of more risk in a prudent, methodical fashion.

Asset

Active Management is a type of investment management in which a manager or management team makes decisions about how to invest the fund's money.

Separately Managed Account is a portfolio of individual securities managed on your behalf to by a professional asset management firm. You invest in the individual securities, which can provide the ownership, control, and transparency you seek. We'll work with you to find the managed account that fits your needs.

Earnings Credit Rate is a daily calculation of the return banking customers earn on funds held overnight in a demand deposit or current account. Rather than receiving hard interest, depositors receive this return in the form of an "earnings credit allowance" and apply it to offset bank service charges.

Interest Bearing Demand Deposit Accounts (IBDDA) offer clients an attractive return on balances and daily liquidity.

Traditional Treasury/Government Money Market Funds (MMFs) are defined as money market funds that invest 99.5% or more of their total assets in very liquid investments, namely, cash, government securities, and/or repurchase agreements that are collateralized fully with government securities.

Prime Money Fund invests in floating-rate debt and commercial paper of non-Treasury assets, like those issued by corporations, U.S. government agencies, and government-sponsored enterprises (GSEs).

Asset Class Proxies and Index Definitions

Securities indexes assume reinvestment of all distributions and interest payments. Indexes are unmanaged and do not take into account fees or expenses. It is not possible to invest directly in an index. Indexes are all based in dollars.

ICE BofA U.S. Corporate Index tracks the performance of U.S. dollar denominated investment grade corporate debt publicly issued in the US domestic market.

Municipals/Bloomberg Muni Bond Index measures the performance of the Bloomberg U.S. Municipal bond market, which covers the USD- denominated Long-Term tax-exempt bond market with four main sectors: state and local general obligation bonds, revenue bonds, insured bonds, and pre-refunded bonds.

Bonds/Bloomberg Aggregate Bond Index is a broad base, market capitalization-weighted bond market index representing intermediate term investment grade bonds traded in the United States.

High-grade/U.S. Investment Grade/Bloomberg U.S. Corporate Bond Index measures the investment grade, fixed-rate, taxable corporate bond market. It includes U.S. dollar-denominated securities publicly issued by U.S. and non-U.S. industrial, utility and financial issuers.

U.S. High Yield/Bloomberg U.S. Corporate High Yield Index: The Bloomberg U.S. Corporate High Yield Bond Index measures the USD-denominated, high yield, fixed-rate corporate bond market. Securities are classified as high yield if the middle rating of Moody's, Fitch and S&P is Ba1/BB+/BB+ or below.

U.S. Municipal High Yield/Bloomberg High Yield Municipal Index is a benchmark that covers the high yield portion of the USD-denominated long-term tax exempt bond market. The index has four main sectors: state and local general obligation bonds, revenue bonds, insured bonds, and pre-refunded bonds.

Emerging Market/Bloomberg Emerging Market USD Index is a flagship hard currency Emerging Markets debt benchmark that includes USD-denominated debt from sovereign, quasisovereign, and corporate EM issuers.

U.S. Treasury/Bloomberg U.S. Treasury Index measures U.S. dollar-denominated, fixed-rate, nominal debt issued by the U.S. Treasury. Treasury bills are excluded by the maturity constraint, but are part of a separate Short Treasury Index. STRIPS are excluded from the index because their inclusion would result in double-counting.

U.S. Mortgage-backed Securities (MBS)/Bloomberg U.S. Mortgage-backed Securities Index is the U.S. MBS component of the U.S. Aggregate index. The MBS Index covers the mortgage-backed pass-through securities of Ginnie Mae (GNMA), Fannie Mae (FNMA), and Freddie Mac (FHLMC).

Corporates/Bloomberg U.S. Corporate Index measures the investment grade, fixed-rate, taxable corporate bond market. It includes U.S. dollar-denominated securities publicly issued by U.S. and non-U.S. industrial, utility and financial issuers. The U.S. Corporate Index is a component of the U.S. Credit and U.S. Aggregate Indices.

Government/Credit/ICE BofA Global Govt Bond Index + ICE BofA Global Large Cap Quasi-Govt Index (i) The ICE BofA Global Government Index tracks the performance of publicly issued investment grade sovereign debt denominated in the issuer's own domestic currency. (ii) The ICE BofA Global Large Cap Quasi-Government Index tracks the performance of large capitalization investment grade quasi-government debt publicly issued in the major domestic and euro-bond markets, including agency, foreign government, local government, supranational and government guaranteed securities. Qualifying securities must have an investment grade rating (based on an average of Moody's, S&P and Fitch).

U.S. Aggregate/Bloomberg U.S. Aggregate Bond Total Return is a broad-based flagship benchmark that measures the investment grade, US dollar-denominated, fixed-rate taxable bond market.

Bloomberg Capital Asset-Backed Securities (ABS) Index is composed of debt securities backed by credit card, auto and home equity loans that are rated investment grade or higher by Moody's.

Bloomberg U.S. Commercial Mortgage Backed Securities (CMBS) Index is the Bloomberg Non-Agency Investment Grade CMBS: BBB Total Return Index Unhedged.

S&P/LSTA Leveraged Loan Index is a market value-weighted index designed to measure the performance of the U.S. leveraged loan market based upon market weightings, spreads and interest payments.

Bloomberg 1-10-year Municipal Bond Index is a total return performance benchmark for municipal bonds that are backed by insurers with Aaa/AAA ratings and have maturities of at least one year.

Bloomberg 1-10-year U.S. Treasury Index measures the performance of public obligations of the U.S. Treasury with maturities of 10 years and greater, including securities that roll up to the U.S. Aggregate, U.S. Universal, and Global Aggregate Indices.

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Asset allocation, diversification and rebalancing do not ensure a profit or protect against loss in declining markets.

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Investing in fixed-income securities may involve certain risks, including the credit quality of individual issuers, possible prepayments, market or economic developments and yields and share price fluctuations due to changes in interest rates. When interest rates go up, bond prices typically drop, and vice versa. Income from investing in municipal bonds is generally exempt from Federal and state taxes for residents of the issuing state. While the interest income is tax-exempt, any capital gains distributed are taxable to the investor. Income for some investors may be subject to the Federal Alternative Minimum Tax (AMT). Tax-exempt investing offers current tax-exempt income, but it also involves special risks. Single-state municipal bonds pose additional risks due to limited geographical diversification. Interest income from certain tax-exempt bonds may be subject to certain state and local taxes and, if applicable, the alternative minimum tax. Any capital gains distributed are taxable to the investor. Investments in high-yield bonds (sometimes referred to as "junk bonds") offer the potential for high current income and attractive total return but involve certain risks. Changes in economic conditions or other circumstances may adversely affect a junk bond issuer's ability to make principal and interest payments. Treasury bills are less volatile than longer-term fixed income securities and are guaranteed as to timely payment of principal and interest by the U.S. government. For investments in Agency Mortgage-backed Securities (AMBS) and Mortgage-backed Securities (MBS), generally, when interest rates decline, prepayments accelerate beyond the initial pricing assumptions, which could cause the average life and expected maturity of the securities to shorten. Conversely, when interest rates rise, prepayments slow down beyond the initial pricing assumptions, and could cause the average life and expected maturity of the securities to extend, and the market value to decline. Most senior/leveraged loans are made to corporations with below investment-grade credit ratings and are subject to significant credit, valuation and liquidity risk. The value of the collateral securing a loan may not be sufficient to cover the amount owed, may be found invalid or may be used to pay other outstanding obligations of the borrower under applicable law. There is also the risk that the collateral may be difficult to liquidate, or that a majority of the collateral may be illiquid. Investing directly in Master Limited Partnerships, foreign equities, commodities or other investment strategies discussed in this document, may not be available to, or appropriate for, clients who receive this document. However, these investments may exist as part of an underlying investment strategy within exchange-traded funds and mutual funds.

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