

# TREASURY AND INVESTMENT STRATEGIES

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## Contact



**Dave Mazza**

Vice President

Direct: (262) 780-6086

Cell: (513) 266-4136

[DaveM@DanaInvestment.com](mailto:DaveM@DanaInvestment.com)



**Greg S. Peters, CFA**

VP - Client Services and Portfolio Specialist

(407) 718-1115

[GregP@DanaInvestment.com](mailto:GregP@DanaInvestment.com)



**Ellen Roberts –Relationship Manager**

Senior Vice President

(262) 780-6094

[Ellen@DanaInvestment.com](mailto:Ellen@DanaInvestment.com)

## 6-Month and 5-Year CD Rates vs. Inflation Since 2020

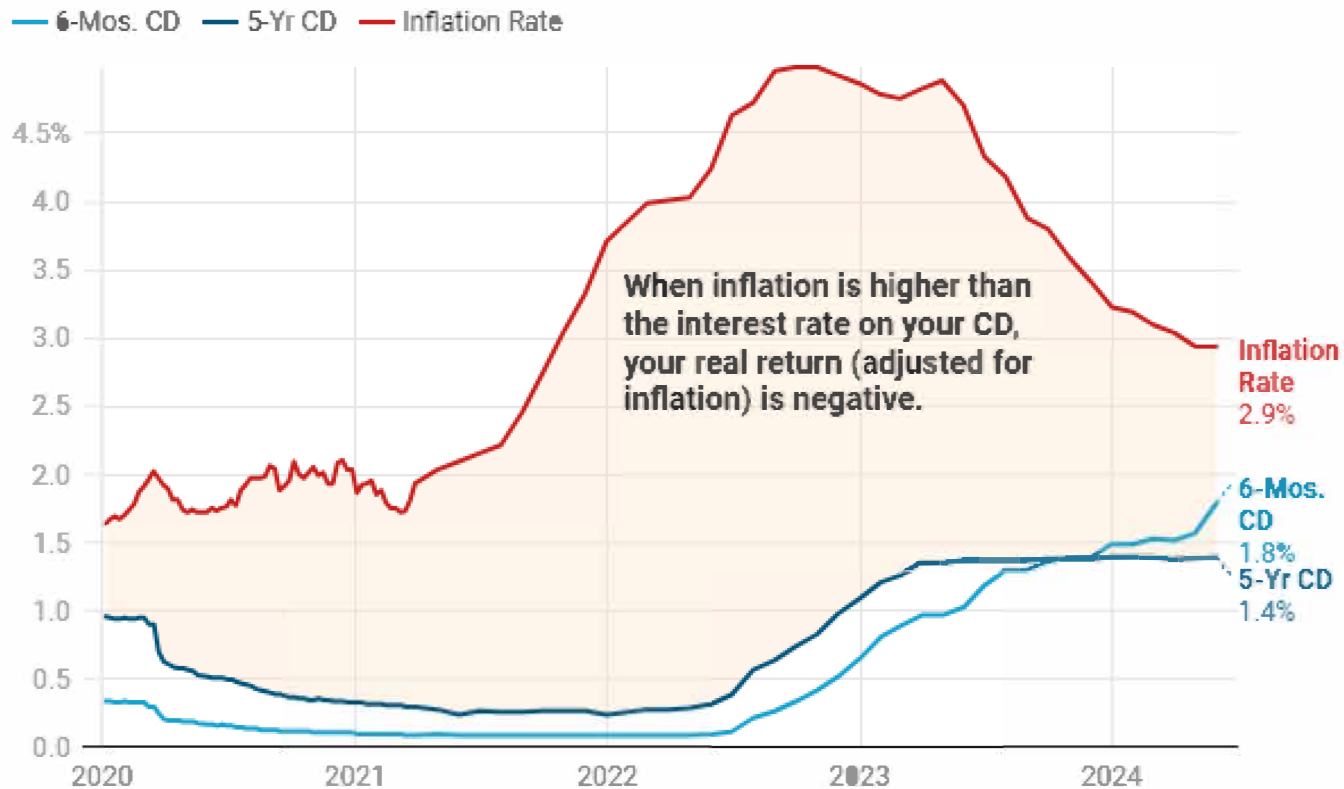
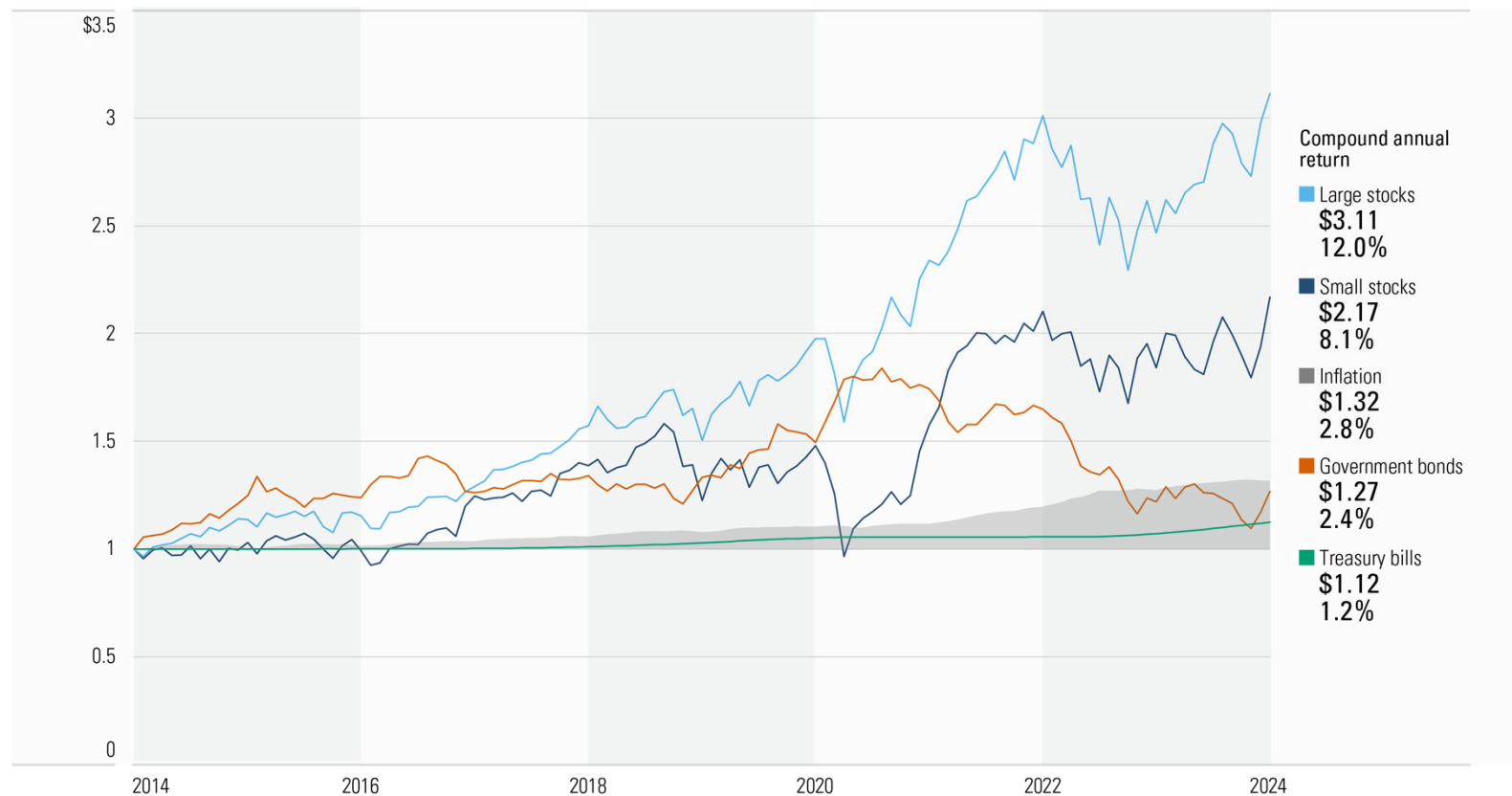


Chart: Investopedia/Peter Gratton • Source: U.S. Federal Reserve of St. Louis • [Get the data](#) • Created with [Datawrapper](#)

## The Past 10 Years 2014-2023

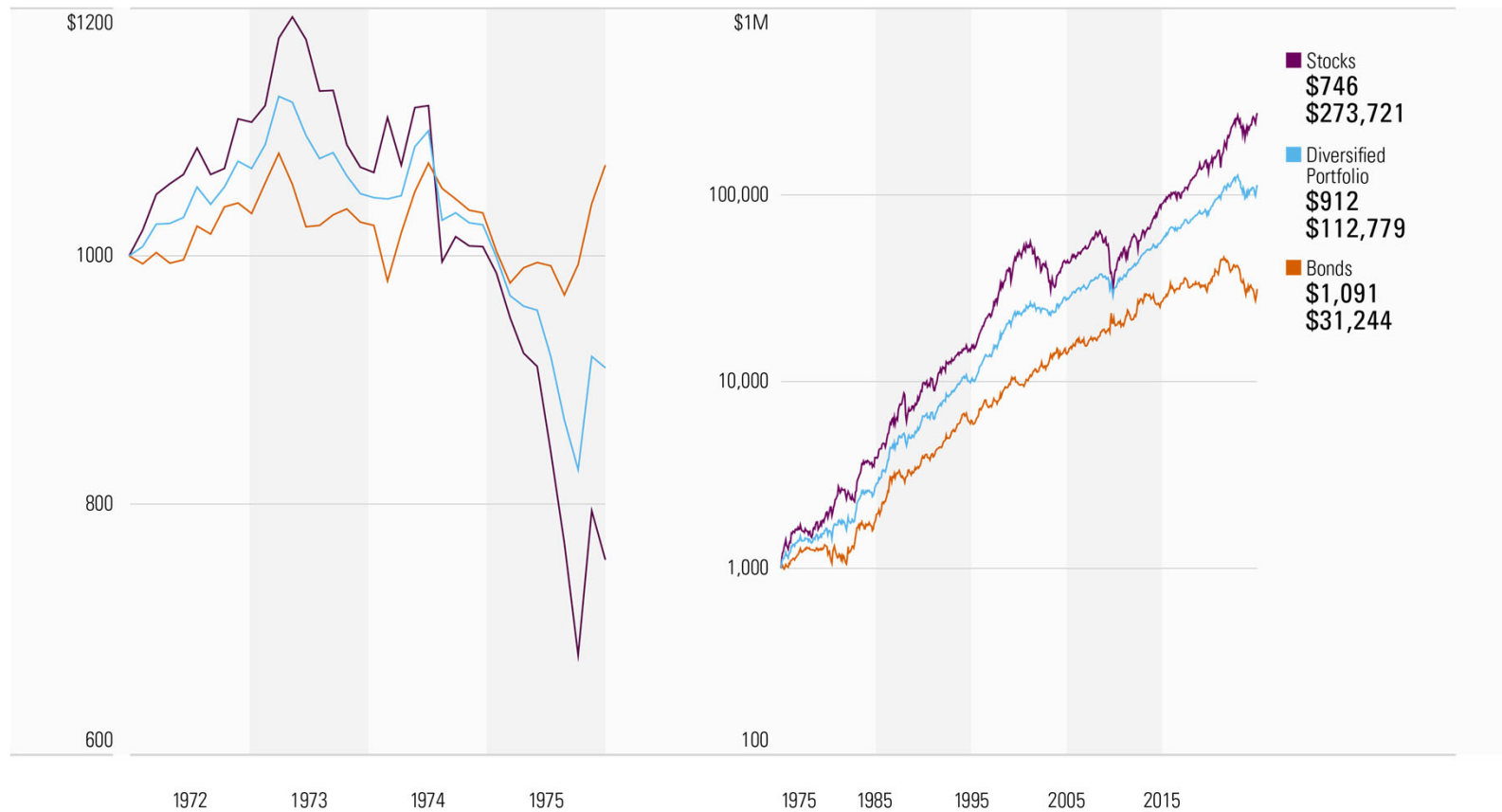


Past performance is no guarantee of future results. Hypothetical value of \$1 invested at the beginning of 2014. Assumes reinvestment of income and no transaction costs or taxes. This presentation is for informative and illustrative purposes only and not financial advice or indicative of any investment. An investment cannot be made directly in an index iGrad, LLC is not a financial advisor. If you want financial or other professional advice, then you should consult with a qualified professional. Source: Morningstar. The reproduction of this chart without prior consent from iGrad, LLC is prohibited. All Rights Reserved. About the data: Small stocks in this example are represented by the Ibbotson Small Company Stock Index. Large stocks are represented by the Ibbotson Large Company Stock Index. Government bonds are represented by the 20-year U.S. government bond, Treasury bills by the 30-day U.S. Treasury bill, and inflation by the Consumer Price Index. Underlying data is from the Stocks, Bonds, Bills, and Inflation (SBBBI®) Yearbook, by Roger G. Ibbotson and Rex Sinquefeld, updated annually. An investment cannot be made directly in an index.

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## Can You Stay on Track?



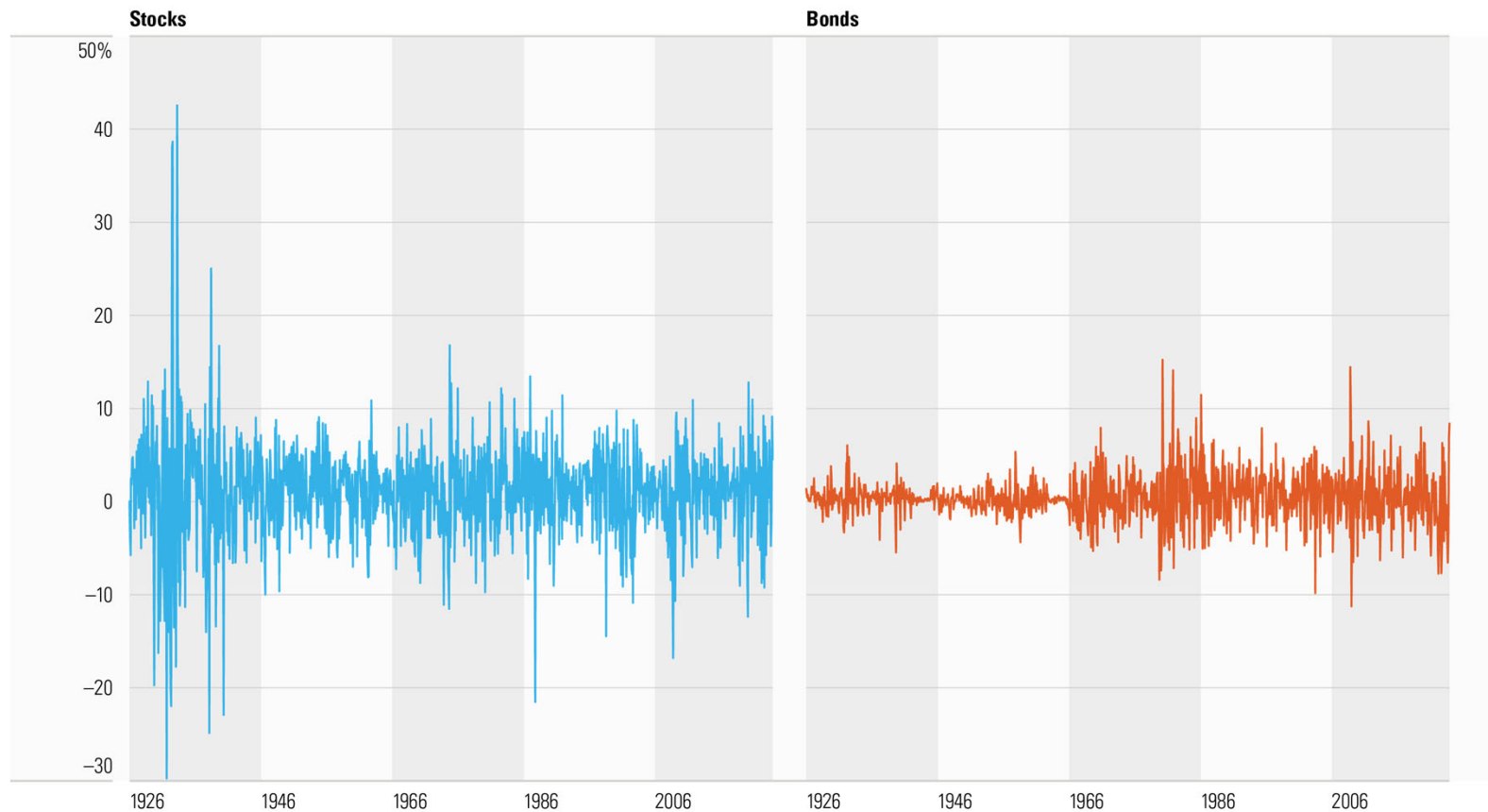
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# Stock and Bond Volatility Varies

1926–2023



A086

Past performance is no guarantee of future results. Monthly percentage returns from 1926–2023. This presentation is for informational and illustrative purposes only and is not financial advice or indicative of any investment. An investment cannot be made directly in an index. iGrad, LLC is not a financial advisor. If you want financial or other professional advice, then you should consult with a qualified professional. Source: Morningstar. The reproduction of part or all of this chart without prior written consent from iGrad, LLC is prohibited. All rights reserved. About the data: Large stocks are represented by the Ibbotson Large Company Stock Index. Bonds are represented by the 20-year U.S. government bond. An investment cannot be made directly in an index. The data assumes reinvestment of all income and does not account for taxes or transaction costs.



## Market Value Today: Stocks Versus Bonds



Global Bond Market



Global Stock Market

For Illustrative Purposes Only

Data Source: SIFMA 2023 Capital Market Factbook



## Diversifying the Investment Portfolio

GFOA recommends that state and local governments properly manage the risk in their portfolios to achieve their investment objectives and comply with their investment constraints.

Government investors have a fiduciary responsibility to protect public funds and to prudently manage their investments in order to achieve the investment objectives of safety, liquidity, and return. Generally, greater risk in a portfolio increases the opportunity for higher returns. However, greater risk also increases the volatility of the returns, which is another definition of risk. The effective management of risk in a portfolio is critical for achieving an entity's investment objectives.

A useful strategy for managing risk in a portfolio is through diversification. To this end, a government should establish a target risk profile. In establishing a risk profile, an entity considers its investment objectives and constraints, risk tolerances, liquidity requirements and the current risk/reward characteristics of the market. The profile should be adjusted as needed to changes in any of those considerations. Such a profile provides a framework and discipline for making individual investment decisions that manage the risk and create the structure of a portfolio.

The government entity's risk profile, in turn, helps it determine appropriate levels of diversification. Diversification of investments in a portfolio is based on the different types of risk - primarily interest rate or market risk, liquidity risk and credit risk. Diversification is achieved by investing in a variety of securities with dissimilar risk characteristics that respond differently to changes in the market. Areas where diversification can be achieved include the maturity distribution in a portfolio (market and liquidity risk), sector allocation (credit risk), issuer allocation (credit risk), and the structures (noncallable vs. callable) of securities (market and liquidity risk).

**GFOA recommends that state and local governments properly manage the risk in their portfolios to achieve their investment objectives and comply with their investment constraints. GFOA further recommends the use of diversification in a portfolio as an important strategy for managing risk. Diversification strategies can be implemented through the following steps:**

- carefully and clearly defining what the objectives safety, liquidity and return mean to the government entity
- preparing a cash flow projection to determine liquidity needs and the level and distribution of risk that is appropriate for the portfolio
- considering political climate, stakeholders' view toward risk, and risk tolerances
- ensuring liquidity to meet ongoing obligations by investing a portion of the portfolio in readily available funds, such as Local Government Investment Pools (LGIPs), money market funds, or overnight repurchase agreements
- establishing limits on positions in specific securities to protect against default risk

- establishing limits on specific business sectors
- developing strategies and guidelines for investments in single class of securities (such as commercial paper or bankers acceptances)
- limiting investments in securities that have higher credit and/or market risks (such as derivatives)
- limiting particular structures (i.e. optionality, amortizing components, coupons, issue sizes)
- defining parameters for maturity/duration ranges
- establishing a targeted risk profile for the portfolio based on investment objectives and constraints, risk tolerances, liquidity requirements and the current risk/reward characteristics of the market.

#### References:

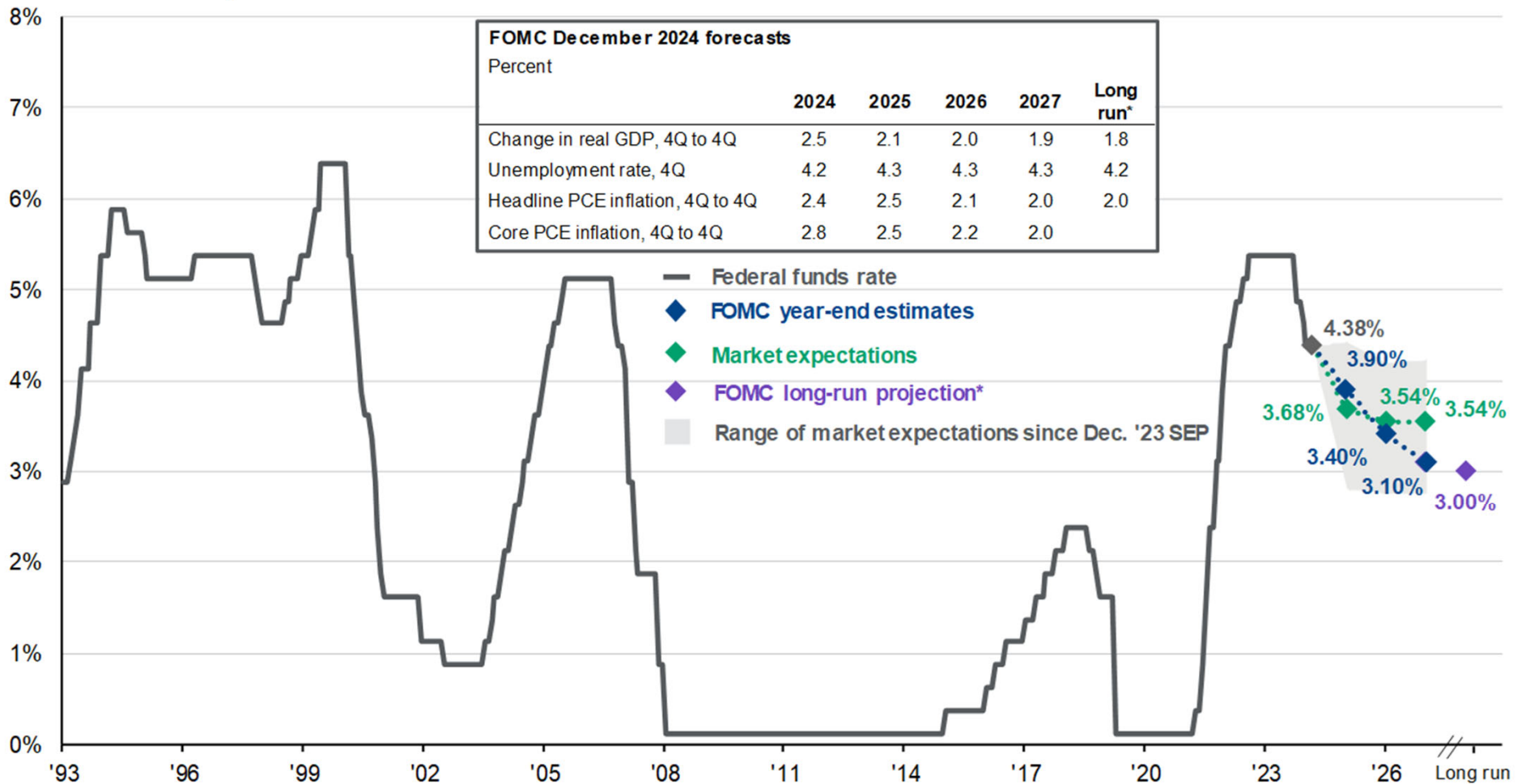
- *Elected Official's Guide Investing, Second Edition*, Sofia Anastopoulos, GFOA, 2007.
- *Investing Public Funds, Second Edition*, Girard Miller with M. Corinne Larson and W. Paul Zorn, GFOA, 1998.

- **Board approval date:** Saturday, March 31, 2007



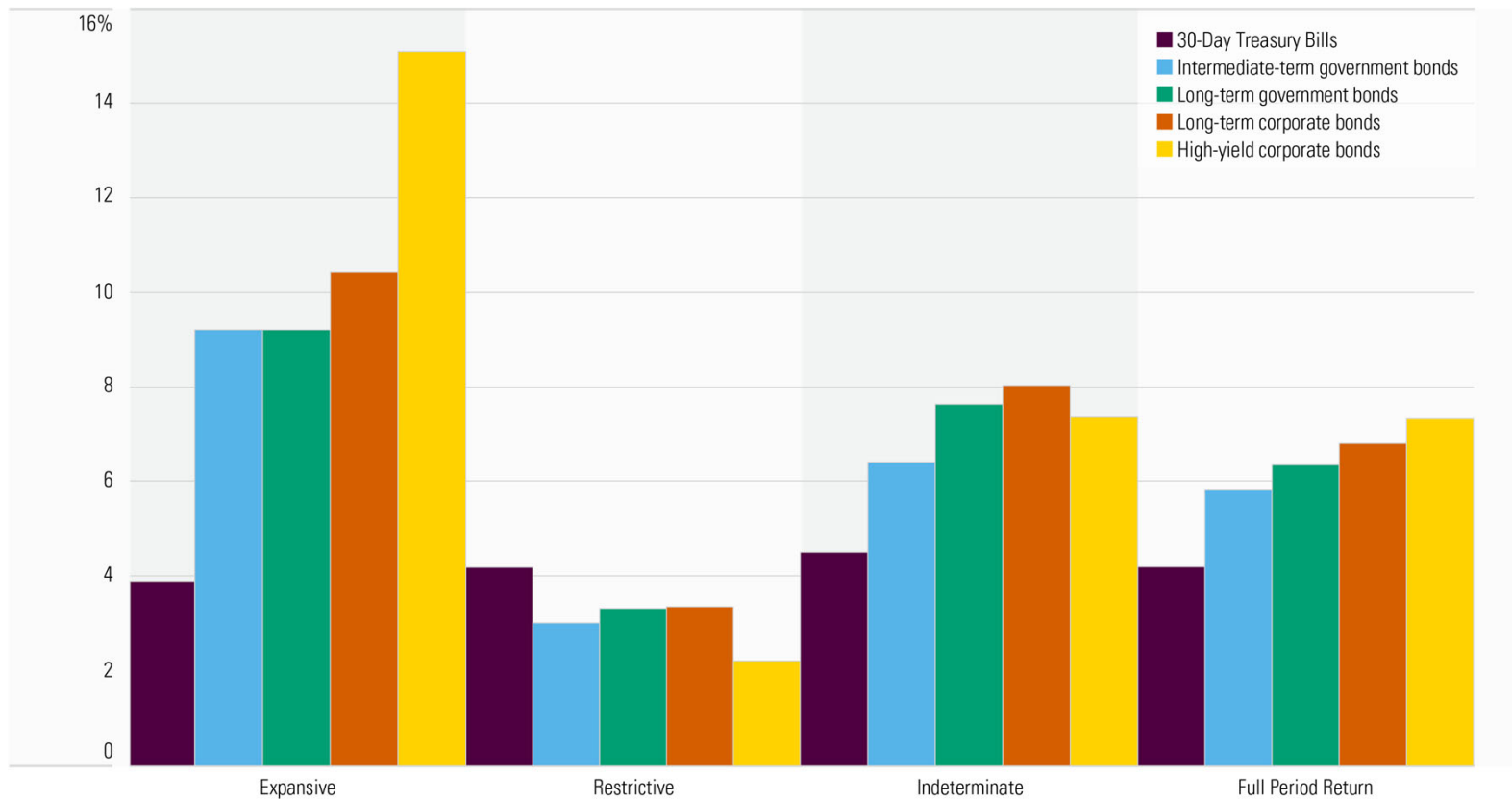
## Federal funds rate expectations

FOMC and market expectations for the federal funds rate



Source: Bloomberg, FactSet, Federal Reserve, J.P. Morgan Asset Management. Market expectations are based off of USD Overnight Index Swaps. \*Long-run projections are the rates of growth, unemployment and inflation to which a policymaker expects the economy to converge over the next five to six years in absence of further shocks and under appropriate monetary policy. Forecasts are not a reliable indicator of future performance. Forecasts, projections and other forward-looking statements are based upon current beliefs and expectations. They are for illustrative purposes only and serve as an indication of what may occur. Given the inherent uncertainties and risks associated with forecasts, projections or other forward-looking statements, actual events, results or performance may differ materially from those reflected or contemplated.

# Average Performance of Fixed-Income Sectors During Different Federal Reserve Regimes (May 1955–December 2023)



IR21

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# Monetary Policy Classification System

**The following slides examine periods of expansive, restrictive, or indeterminate monetary policy:**

- ▶ **Expansive:** A period when the Federal Reserve decreased the discount rate and followed it up with actions that resulted in decreases in the federal-funds rate. Since 1955, Fed policy has followed an unconstrained or expansive policy approximately 30% of the time.
- ▶ **Restrictive:** A period when the Federal Reserve increased the discount rate and followed it up with actions that resulted in increases in the federal-funds rate. Since 1955, Fed policy has followed a constrained or restrictive policy approximately 33% of the time.
- ▶ **Indeterminate:** A period when the discount rate and the federal-funds rate are moving in opposite directions. The Federal Reserve's intentions can't be clearly determined. This classification captures the remaining 37% of months.

Source: Johnson, R., Jensen, G., & Garcia-Feijoo, L. 2015. Invest With the Fed: Maximizing Portfolio Performance by Following Federal Reserve Policy. (New York: McGraw-Hill Education).

## SBBI Summary Statistics of Annual Returns (1926-2023)

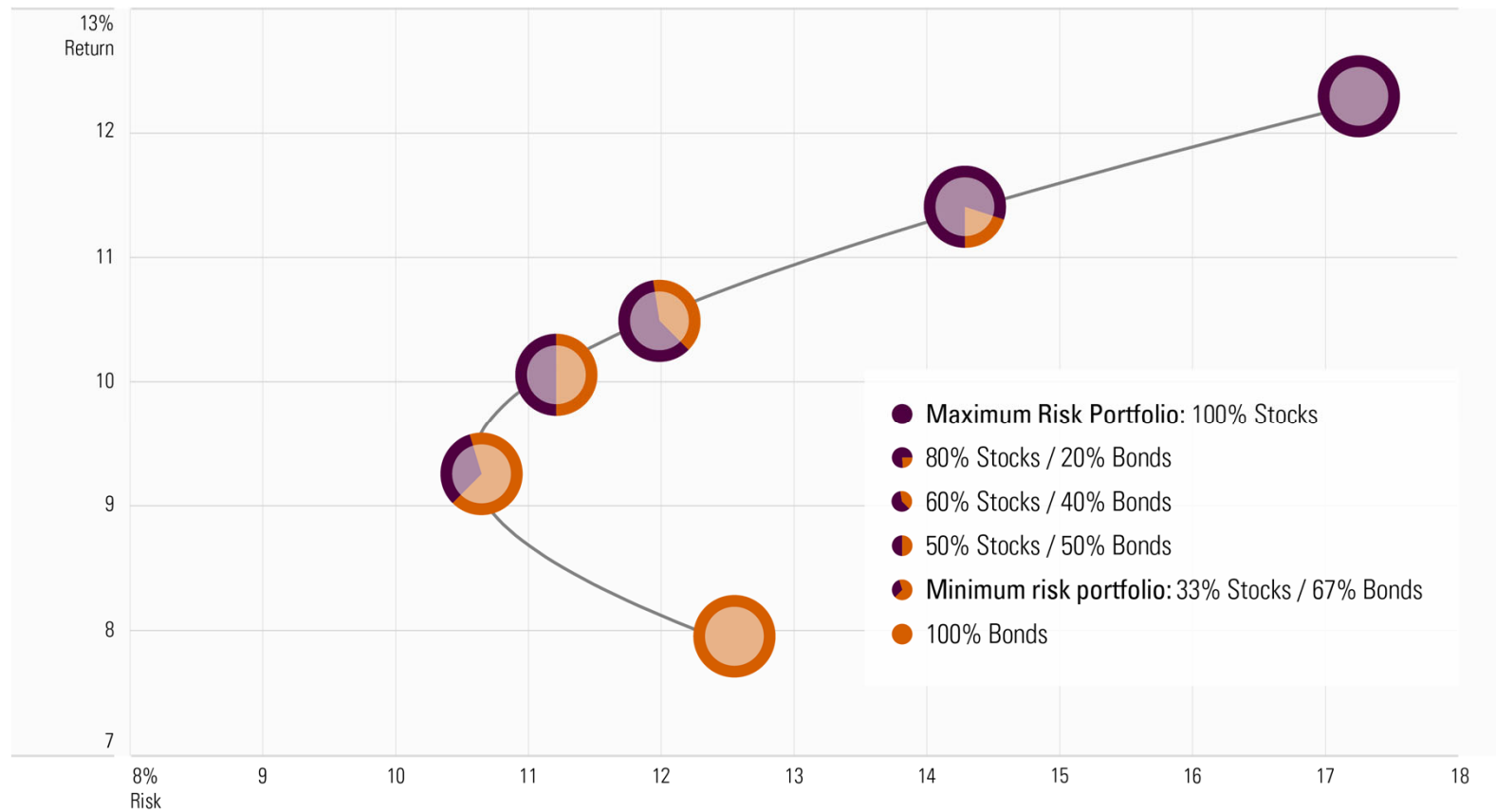
Series	Geometric Mean (%)	Arithmetic Mean (%)	Standard Deviation (%)	Serial Correlation
<b>Large-Company Stocks</b>				
Total Returns	10.3	12.2	19.7	-0.02
Income	3.8	3.8	1.6	0.92
Capital Appreciation	6.0	8.1	19.1	-0.02
<b>Small-Company Stocks</b> (Total Return)	11.8	16.1	31.0	0.05
<b>LT Corp Bonds</b> (Total Return)	5.7	6.1	9.0	0.03
<b>LT Gov't Bonds</b>				
Total Returns	5.1	5.6	10.2	-0.10
Income	4.8	4.8	2.6	0.96
Capital Appreciation	0.1	0.6	9.3	-0.19
<b>Intermediate-Term Gov't Bonds</b>				
Total Returns	4.9	5.0	5.7	0.17
Income	4.2	4.3	2.9	0.96
Capital Appreciation	0.5	0.6	4.6	-0.12
<b>Treasury Bills</b> (Total Returns)	3.3	3.3	3.1	0.91
<b>Inflation</b>	2.9	3.0	4.0	0.62

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# Stocks and Bonds: Risk Versus Return

## 1970–2023



PRIYL05

Past performance is no guarantee of future results. Risk and return are measured by standard deviation and arithmetic mean, respectively. This presentation is for informational and illustrative purposes only and is not financial advice or indicative of any investment. An investment cannot be made directly in an index. iGrad, LLC is not a financial advisor. If you want financial or other professional advice, then you should consult with a qualified professional. Source: Morningstar. The reproduction of part or all of this chart without prior written consent from iGrad, LLC is prohibited. All rights reserved. About the data: About the data: Stocks in this example are represented by the Ibbotson® Large Company Stock Index and bonds by the 20-year U.S. government bond. Risk and return are based on annual data over the 1970–2023 period and are measured by standard deviation and arithmetic mean, respectively. Standard deviation measures the fluctuation of returns around the arithmetic average return of the investment. The higher the standard deviation, the greater the variability (and thus risk) of the investment returns. An investment cannot be made directly in an index. The data assumes reinvestment of all income and does not account for taxes or transaction costs.



# A fistful of securities helps the volatility go down!



- Bullet bonds
- Amortizing bonds
- Fixed rate bonds
- Step-up bonds
- Variable rate bonds

**Rising Rate Environment:**

Amortizing bonds generally outperform due to their lower interest rate risk (duration) and the timing of their cash flows allow investors to reinvest their capital at the new higher market rate more quickly

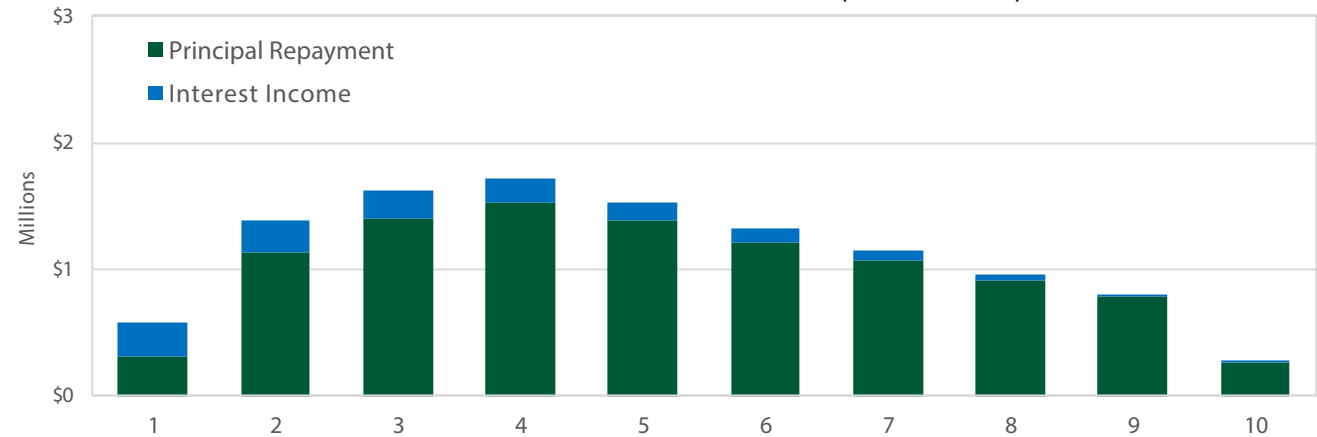
**Stable Rate Environment:**

Both bonds perform similarly

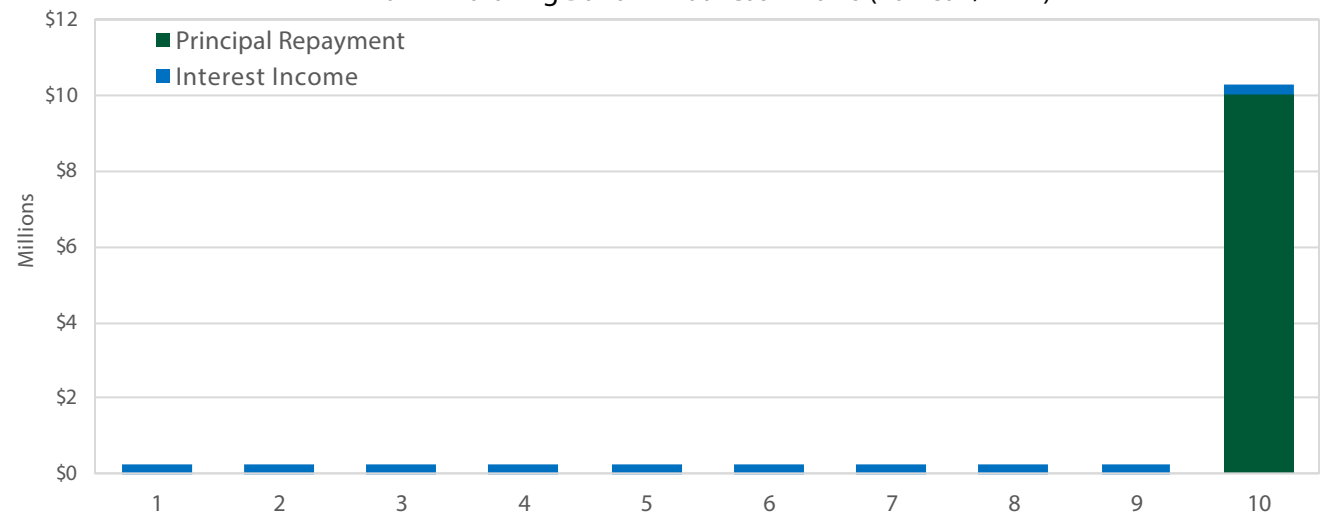
**Falling Rate Environment:**

Traditional (i.e. non-amortizing) bonds generally outperform due to their higher interest rate risk (duration) and the slower timing of their cash flows allow investors to keep their capital invested at the old higher market rate for a longer period of time

Amortized\* Bond Annual Cash Flows (10 Year / AAA)



Non-Amortizing Bond Annual Cash Flows (10 Year / AAA)



\*Amortized bonds includes repayment of principal over the life of the bond rather than a lump sum repayment at maturity. Examples of amortized bonds include home mortgages and car loans.

## Characteristics as of 12/31/2024

Yield to Maturity (%)<sup>1</sup>

## Effective Duration

Portfolio 1: Bullet Bond Portfolio

4.85

3.82

Portfolio 2: Amortizing Bond Portfolio

4.99

0.88

		1	2	3	4	5	6	7	8	9	10	11
Blends	Portfolio 1	100%	90%	80%	70%	60%	50%	40%	30%	20%	10%	0%
	Portfolio 2	0%	10%	20%	30%	40%	50%	60/5	70%	80%	90%	100%
Std. Deviation (ann.) %	1 Year	4.76	4.38	4.00	3.62	3.24	2.86	2.48	2.10	1.71	1.33	0.95
	3 Year	5.46	5.10	4.75	4.39	4.05	3.70	3.36	3.04	2.72	2.43	2.15
	5 Year	4.68	4.35	4.02	3.70	3.38	3.07	2.77	2.49	2.22	1.98	1.78
	10 Year	3.66	3.39	3.13	2.86	2.60	2.35	2.10	1.87	1.66	1.46	1.31
	15 Year	3.22	2.98	2.74	2.50	2.27	2.04	1.82	1.62	1.42	1.26	1.12
	20 Year	3.17	2.93	2.69	2.46	2.23	2.01	1.80	1.61	1.45	1.31	1.22
Total Returns (ann.) %	1 Year	3.33	3.57	3.81	4.05	4.29	4.53	4.76	5.00	5.24	5.47	5.71
	3 Year	0.11	0.38	0.64	0.91	1.17	1.43	1.69	1.96	2.22	2.48	2.74
	5 Year	1.25	1.33	1.41	1.48	1.56	1.63	1.71	1.78	1.85	1.92	1.99
	10 Year	2.03	1.99	1.96	1.92	1.89	1.85	1.81	1.77	1.73	1.69	1.65
	15 Year	2.62	2.53	2.43	2.34	2.24	2.14	2.05	1.95	1.85	1.75	1.66
	20 Year	3.21	3.13	3.04	2.96	2.87	2.79	2.70	2.61	2.53	2.44	2.35
Characteristics (weighted avg)	YTM	4.85	4.86	4.88	4.89	4.91	4.92	4.93	4.95	4.96	4.98	4.99
	Eff. Duration	3.82	3.53	3.23	2.94	2.64	2.35	2.06	1.76	1.47	1.17	0.88
	Avg. Maturity	5.49	5.22	4.95	4.68	4.41	4.14	3.86	3.59	3.32	3.05	2.78
	Avg. Coupon	3.23	3.40	3.57	3.74	3.91	4.08	4.25	4.42	4.59	4.76	4.93



Thank you for your time!

Dave Mazza

Dana Investment Advisors

(513) 266-4136

[davem@danainvestment.com](mailto:davem@danainvestment.com)

### Asset Classes Used:

- Treasury Inflation Protected Securities (TIPs) – Short duration treasury bonds indexed for inflation
- U.S. Agency Bonds (Agency) – Step-coupon, callable and bullet bonds issued by Agencies of the U.S. Government
- Taxable Municipal Bonds (Muni) – Bonds issued by U.S. Municipalities
- Corporate Bonds (Corporates) – Fixed and adjustable rate corporate bonds
- U.S. Treasury Bonds (Treasury) – Securities issued by the U.S. Government
- Small Business Administration (SBAs) – Adjustable rate pools issued by the small business administration
- U.S. Agency Mortgage Backed Securities (MBS) – Fixed and adjustable-rate MBS/CMBS/CMO securities issued by U.S. Agencies
- Repurchase Agreements (Repo) - Classified as a type of money-market instrument, a Repo functions in effect as a short-term, collateral-backed, interest-bearing loan
- Supranationals - Bonds issued by supranational organizations; the International Finance Corporation (IFC), European Union (EU), United Nations (UN), World Trade Organization (WTO), and The World Bank are all, to some degree, supranational groups

### Common Issuers:

- ❖ Fannie Mae (FNMA): A federally chartered, but privately owned, corporation which traces its roots to a government agency created in 1938 to provide additional liquidity to the residential mortgage market. In 1968 Ginnie Mae was spun off from Fannie Mae and Fannie Mae became a government sponsored private corporation. Fannie Mae has had regular capital infusions from the Treasury, and has been under the direction of the Federal Housing Finance Agency since 2008.
- ❖ Ginnie Mae (GNMA): In 1968, Congress established the Government National Mortgage Association, commonly known as Ginnie Mae, as a government-owned corporation within the Department of Housing and Urban Development (HUD). Ginnie Mae securities carry the full faith and credit guarantee of the United States government.
- ❖ Freddie Mac (FHLMC): A publicly owned or privately-owned corporation established by Congress in 1970 to provide a continuous flow of funds to mortgage lenders, primarily through developing and maintaining an active nationwide secondary market in conventional residential mortgages. Like Fannie Mae, Freddie Mac purchases a large volume of conventional residential mortgages and uses them to collateralize mortgage backed securities. Freddie Mac is currently under the direction of the Federal Housing Finance Agency.
- ❖ U. S. Small Business Administration (SBA): SBA was created in 1953 as a government agency that provides financing programs to assist small businesses in the U. S. Small business loans are made by banks under standards maintained by the SBA, and the guaranteed portion of the loan can be securitized and sold in the secondary market. These securities typically adjust their coupon monthly or quarterly at a spread above or below the prime rate.
- ❖ Supranational: supranational organization is a multinational union or association in which member countries cede authority and sovereignty on at least some internal matters to the group, whose decisions are binding on its members; examples of supranational organizations: International Finance Corporation (IFC) and The World Bank



# Managing Market Risk in Investment Portfolios

## BACKGROUND:

Fixed-income securities are investment instruments that provide a stream of cash flows in the form of coupon and principal payments. Typically, they are issued with maturities ranging from one year to 30 years. A security's stated maturity is the date on which its final interest and principal payments are due. There are several general structures for fixed-income securities:

- **Bullet securities** - the principal amount will be paid in one payment at maturity. They are issued without any option that could cause redemption prior to the stated maturity;
- **Securities with options** - issued with either a call or put option that could change the stream of cash flows. Call options give the issuer the right to redeem bonds prior to maturity in accordance with the call schedule. Securities with call options have greater volatility than bullet securities. Issuers of callable securities typically call these when interest rates have fallen, causing investors to lose the higher interest rate in periods when such rates are hard to replace. Put options give the investor the right to submit a bond for redemption prior to maturity in accordance with the rules of the put. Buyers pay a premium for the put option. Typically, investors of puttable securities "put" these when interest rates have risen, gaining the opportunity to reinvest their principal at the then prevailing higher market rates; and
- **Amortizing securities** - pay a portion of the principal with each interest payment throughout the life of the bond (e.g.: mortgage securities, asset-backed securities). They have a stated final maturity and an average maturity, and can also have early redemption options.

Market risk refers to the effect that changing interest rates have on the present value of a fixed-income security, and can also be referred to as interest rate risk. There is an inverse relationship between interest rates and price. As interest rates rise, the value of a security falls. The reverse is true as interest rates fall. The extent of price change is a function of the length of term to maturity, the structure of the security (type of embedded options), the level of interest rates, and the size of the coupon.

Of these factors, the most important are the length of term to maturity and the structure. Generally, the longer the maturity of a security, the greater its market risk as measured by price volatility. Longer maturities have greater volatility because as the time to maturity increases, each change in interest rates has a greater impact on the present value of a security.

The size of a security's coupon also affects price volatility. When analyzing securities with the same maturity, securities with low coupons will have greater price volatility than securities with high coupons. The security with the greatest price volatility for any given maturity is a zero coupon security.

Many government investors employ a buy-and-hold approach, so that changes in a security's market value are never realized and the full face value of the security is received upon maturity. Despite this, market value must be managed for three reasons:

1. The total return of the portfolio is computed and compared to the total return of the portfolio's benchmark to evaluate portfolio performance.
2. The market value of an entity's investments must be disclosed in its annual financial report. Often an entity will include it in more frequent reports to the governing body and public. Accordingly, an entity must be able to understand and explain changes in the market value of its portfolio.
3. Circumstances may arise in which an entity is forced to sell a security before its maturity. In such instances, a government entity may have to accept a loss on a security that it had never planned to sell. Market risk is a critical risk for a government investor. Therefore, it is necessary to understand fully the maturity structure of securities before investing. To ensure appropriate liquidity and to reduce interest rate risk in operating portfolios, most state and local governments:
  1. Limit the maximum maturity for securities they purchase;
  2. Ensure that funds are available for scheduled disbursement by developing cash flow projections and properly structuring the maturities in a portfolio according to the expected cash flows;
  3. Ensure that a reasonable liquidity buffer is maintained to meet unexpected disbursements; and
  4. Ensure that a security can be sold with ease and minimal cost (price disruption) to the investor by investing in high grade, actively traded fixed-income securities.

Maximum maturity and weighted average maturity limits relate directly to an entity's statute and policy constraints, investment objectives and cash flow projections. Although setting maximum maturity constraints may help limit the market risk in a portfolio, it is not generally considered to be the most effective way for managing market risk and understanding the potential price volatility of either an individual security or an entire portfolio. Maximum maturities allow the portfolio to take advantage of longer securities and the weighted average maturity protects against over-extension of the portfolio in those longer maturities.

A widely used measure of market risk in the investment industry is *modified duration*. Durations can be obtained from professional market resources such as Bloomberg. For governments without access to these resources, broker-dealers may send documentation of the durations. Duration is more comprehensive and accurate in measuring market risk than the maturity of a security for two important reasons. First, duration takes into consideration all cash flows (interest and principal payments) of a fixed-income security using their present values. Maturity as a market risk measure only considers the principal payment of a security using its future value.

Second, modified duration is a multiplier that measures the approximate percentage change in the value of a security or portfolio given a 1% (100 basis points) move in interest rates. For example, if a security has a modified duration of 1.74 and interest rates rose by 50 basis points, the security would experience approximately a -0.87% change in value.

**Formula and calculation:**

$$\% \text{ change in market value} = (-1) \times (\text{modified duration}) \times \left( \frac{\text{basis points change in yield}}{100} \right)$$

$$-0.87\% = (-1) \times (1.74) \times \left( \frac{+50}{100} \right)$$

\* multiplied by -1 because of inverse relationship between price and interest rates

With this type of price volatility analysis, a government investor can determine more accurately the amount of market risk in a security or portfolio.

Weighted average maturity and weighted average duration in a portfolio are calculated using the maturity and duration values of all the securities in a portfolio. Weighted average maturity allows a government to verify compliance with investment constraints since most investment policies and state statutes have maximum weighted average maturity limitations. Weighted average duration is considered industry wide as an acceptable measure of market risk in a portfolio. As such, it can provide the government investor with valuable information for managing the market risk in a portfolio.

The Governmental Accounting Standards Board (GASB) in GASB Statement No. 40 requires a disclosure of all risks associated with a government entity's portfolio, including market risk, including market rate or interest rate risk. Weighted average maturity and weighted average duration are two of five accepted methods for disclosing a portfolio's market risk. (A description of the other three is beyond the scope of this Best Practice.) In accordance with the GASB fair market value reporting requirements in GASB Statement No. 31, a government entity's portfolio could show unrealized losses or gains for any reporting period.

**RECOMMENDATION:**

State and local governments should comply with state statutes pertaining to investing public funds along with all investment policy parameters. Fixed income investing involves a certain level of market risk. Investors should be aware of their risk tolerance and confirm that the market risk they assume is within this tolerance level.

GFOA makes the following recommendations to government investors with respect to managing market risk:

1. Develop and update cash flow projections to determine: a) the dollar amount of the portfolio that needs to remain liquid (liquidity buffer) to meet disbursement obligations within a six-month period (shortterm), b) what dollar amount is required within the next 6 - 12 month period, and c) whether there is a 'core' of funds available for longer-term investing.
2. Structure the portfolio to provide sufficient liquidity for anticipated cash flow requirements by continuously investing a portion of the portfolio in money market type investments such as local government investment pools, money market mutual funds, overnight repurchase agreements and money market securities.
3. Understand fully the maturity structure of a security. Prior to purchase, the government should confirm compliance with its investment constraints and overall investment strategy. If a security has options associated with it such as call options,

the structure of the option should be analyzed to determine its potential impact on market risk through an analysis such as option adjusted spread (OAS) analysis. The stated maturity date should always be used to determine compliance with maximum maturity constraints, not any potential call dates unless an official announcement of a call has been released.

4. Adopt weighted average maturity limitations and/or weighted average duration targets, consistent with the government's investment objectives, constraints, cash flow needs and risk tolerances. The weighted average maturity limitations is used to limit the liquidity and market risk in a portfolio consistent with the constraints in the governing state statutes and the investment policy. The weighted average duration targets can be used to manage market risk in a portfolio.
5. Do not directly invest in securities with maturities greater than the limits imposed by investment policy. In general, the maturities in a portfolio should coincide as nearly as practicable with the expected use of funds. Securities with maturities greater than five years should be matched to a specific cash requirement. The government should include in its investment policy a process for authorizing longer-term investments and for providing disclosures.

#### References:

- *Investing Public Funds, Second Edition*, Girard Miller with M. Corinne Larson and W. Paul Zorn, GFOA, 1998.
- GFOA Sample Investment Policy, 2003.
- GASB Statement No. 31 and Statement No. 40, [www.GASB.org](http://www.GASB.org)

203 N. LaSalle Street - Suite 2700 | Chicago, IL 60601-1210 | Phone: (312) 977-9700 - Fax: (312) 977-4806