

Pioneer Municipal High Income Advantage Fund, Inc.

November 30, 2024

Pioneer Municipal High Income Advantage Fund, Inc. is a closed-end fund designed to pursue high current income exempt from regular federal income tax, with capital appreciation as a secondary objective. The Fund invests in a professionally managed portfolio of municipal securities from across the United States. The market prices of securities may go up or down, sometimes rapidly or unpredictably, due to general market conditions, such as real or perceived adverse economic, political, or regulatory conditions, recessions, inflation, changes in interest or currency rates, lack of liquidity in the bond markets, the spread of infectious illness or other public health issues or adverse investor sentiment. All investments are subject to risk, including the possible loss of principal. In the past several years, financial markets have experienced increased volatility and heightened uncertainty. These conditions may continue, recur, worsen or spread. Investments in high-yield or lower-rated securities are subject to greater-than-average risk. The Fund may invest in securities of issuers that are in default or that are in bankruptcy. A portion of income may be subject to state, federal, and/or alternative minimum tax. Capital gains, if any, are subject to a capital gains tax. When interest rates rise, the prices of fixed-income securities held by the Fund will generally fall. Conversely, when interest rates fall, the prices of fixed-income securities held by the Fund will generally rise. By concentrating in municipal securities, the portfolio is more susceptible to adverse economic, political or regulatory developments than is a portfolio that invests more broadly. Investments in the Fund are subject to possible loss due to the financial failure of the issuers of the underlying securities and the issuers' inability to meet their debt obligations. The Fund currently uses leverage through the issuance of preferred shares. Leverage creates significant risks, including the risk that the Fund's incremental income or capital appreciation for investments purchased with the proceeds of leverage will not be sufficient to cover the cost of leverage, which may adversely affect the return for the holders of common shares. These risks may increase share price volatility.

Fund Facts

CUSIP	723762100
Symbol	MAV
Total Common Assets (millions)	\$223.6
Total Preferred Assets (millions)	\$50.0
Total Net Assets (millions)	\$273.6
Leverage %	18.3%
Net Asset Value	\$9.35
Market Price	\$8.87
Premium/Discount	-5.1%
Inception Date	10/17/2003
Total Expense Ratio (Common)	2.44%
Number of Issues	120

12-Month Distribution History

Ex Date	Payable Date	Distribution Per Share
12/11/23	12/19/23	0.0275*
1/18/24	1/31/24	0.0275*
2/15/24	2/29/24	0.0275*
3/14/24	4/1/24	0.0310*
4/18/24	4/30/24	0.0325*
5/16/24	5/31/24	0.0325*
6/18/24	6/28/24	0.0325*
7/19/24	7/31/24	0.0325*
8/20/24	8/30/24	0.0325*
9/20/24	9/30/24	0.0325*
10/18/24	10/31/24	0.0325*
11/15/24	11/29/24	0.0325*

Distributions are not guaranteed. The amount of distributions may vary depending on a number of factors. As portfolio and market conditions change, the rate of distributions on Fund common shares could change. The Fund will determine the tax characteristics of all fund distributions after the end of the Fund's fiscal year and will provide shareholders such information at that time.

*A portion of the Fund's distribution is comprised of non-income items. For additional information, please refer to Section 19a Notices posted on our website at www.amundi.com/us/investors/Products/Closed-End-Funds/Section-19a-Notices. The Fund will determine the tax characteristics of all fund distributions after the end of the Fund's fiscal year and will provide shareholders such information at that time.

Top 5 Sectors

1. Tobacco	14.4%
2. IDR/PCR-Other	14.0%
3. Transportation	13.8%
4. Education	12.5%
5. Hospital	12.5%

Portfolio Characteristics

Weighted Average Life	19.78 Years
Effective Duration	7.17 Years
Current Distribution Rate (on market price)	4.40%
Taxable-Equivalent Rate (on market price)	7.43%

Duration is a measure of the sensitivity of the price (the value of principal) of a fixed income investment to a change in interest rates, expressed as a number of years. Effective Duration (also called option-adjusted duration) is a duration calculation for bonds that have embedded options. Current Distribution Rate is calculated by dividing the last distribution per share (annualized) by market price. The current distribution rate includes leverage (non-income items such as loan proceeds or borrowings). Taxable-Equivalent Rate reflects top federal tax rate of 40.8%. **The performance data quoted represents past performance, which is no guarantee of future results.**

Top 10 Holdings

1. Puerto Ric Cmlt Aquedu Sew Aut 5% 7/1/47	5.52%
2. Buckeye Tobacco Stmt Fin Auth 5% 6/1/55	4.80%
3. Stanislaus County Tobacco Fdg 0% 6/1/46	4.05%
4. United States Steel Corp 5.45% 9/1/52	3.88%
5. Puerto Rico Sale Tax Fi Cor Tr 5% 7/1/58	3.75%
6. WGBH Educational Foundation 5.75% 1/1/42	3.71%
7. United Airlines Inc 4% 7/15/41	2.63%
8. Howmet Aerospace Inc 4.75% 8/1/42	2.57%
9. Commonwealth Of Puerto Rico 4% 7/1/46	2.42%
10. Thomas Jefferson University Og 4% 9/1/49	2.35%

The portfolio is actively managed, and current holdings may be different. The holdings listed should not be considered recommendations to buy or sell any security.

Quality Distribution*

AAA	0.76%
AA	8.34%
A	10.50%
BBB	20.53%
BB	22.01%
B	0.69%
CCC	0.86%
Not Rated	35.49%
Cash Equivalent	0.82%

Rating Description/Source: Credit rating breakdown reflects the average of available ratings across Moody's, Standard & Poor's (S&P), Fitch, DBRS Morningstar and KBRA. Bond ratings are ordered highest to lowest in the portfolio. Based on S&P's measures, AAA (highest possible rating) through BBB are considered investment grade. BB or lower ratings are considered non-investment grade. Cash equivalents and some bonds may not be rated.

Maturity Distribution*

0 to 2 Years	7.61%
2 to 5 Years	0.39%
5 to 7 Years	6.75%
7 to 10 Years	2.00%
10 to 20 Years	26.79%
20+ Years	56.48%

* Due to rounding, figures may not total 100%. Portfolio is actively managed and characteristics are subject to change.

Net Asset Value and Market Price History



Next Call Date as of 11/30/24

Under 5 years	50.9%
5-9.99 years	41.3%
10+ Years	0.0%
Cash	0.0%
Non-Callable	7.8%

Average Annual Total Returns (%)

Through November 30, 2024	Market Price	Net Asset Value
1 Year	22.36	9.85
3 Year	-4.86	-3.86
5 Year	0.93	-0.11
10 Year	0.04	2.46
Since Inception	4.25	4.74

Pioneer Municipal High Income Advantage Fund, Inc. Offers Investors:

- **High current income potential** – The Fund seeks opportunities for a high level of current income exempt from federal income tax by investing in municipal securities with a broad range of maturities and credit ratings. The Fund intends to pay distributions on a monthly basis.

Portfolio Management

Day-to-day management of the fund's portfolio is the responsibility of John (Jake) Crosby van Roden III and Prakash Vadlamani. Mr. van Roden and Mr. Vadlamani are supported by the fixed income team. Mr. van Roden, Managing Director and Director of Municipals, US, joined Amundi US in February 2024. Prior to joining Amundi US, Mr. van Roden was Managing Director and Senior Portfolio Manager at Macquarie Investment Management, which he joined in 2004. Mr. Vadlamani, Senior Vice President, Associate Portfolio Manager and Senior Credit Analyst at Amundi US, has been a member of the Amundi US Municipals investment team since 2014 and has served as portfolio manager of the fund since February 2024.

Effective February 28, 2024, Mr. van Roden and Mr. Vadlamani became Portfolio Managers for the Fund.

Call 1-800-225-6292 or visit amundi.com/usinvestors for the most recent month-end performance results. Current performance may be lower or higher than the performance data quoted.

Performance data shown represents past performance. Past performance is no guarantee of future results. Investment return and market price will fluctuate, and your shares may trade below net asset value, due to such factors as interest rate changes, and the perceived credit quality of borrowers.

Total investment return does not reflect broker sales charges or commissions. All performance information is for common shares of the Fund.

The performance information does not reflect the deduction of fees and taxes that a shareowner would pay on Fund distributions or the sale of Fund shares. Had these fees and taxes been reflected, performance would have been lower.

Shares of closed-end funds, unlike open-end funds, are not continuously offered. Once issued, shares of closed-end funds are bought and sold in the open market through a stock exchange and frequently trade at prices lower than their net asset value. Net Asset Value (NAV) is total assets less total liabilities, which includes preferred shares, divided by the number of common shares outstanding.

When net asset value (NAV) is lower than market price, dividends are assumed to be reinvested at the greater of NAV or 95% of the market price. When NAV is higher, dividends are assumed to be reinvested at prices obtained through open market purchases under the Fund's dividend reinvestment plan.

For additional information, please contact your financial professional or visit our website amundi.com/usinvestors.