

PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST
Form N-CSR
May 30, 2018

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

FORM N-CSR

CERTIFIED SHAREHOLDER REPORT OF REGISTERED
MANAGEMENT INVESTMENT COMPANIES

Investment Company Act file number 811-21409

Pioneer Municipal High Income Advantage Trust
(Exact name of registrant as specified in charter)

60 State Street, Boston, MA 02109
(Address of principal executive offices) (ZIP code)

Terrence J. Cullen, Amundi Pioneer Asset Management, Inc.,
60 State Street, Boston, MA 02109
(Name and address of agent for service)

Registrant's telephone number, including area code: (617) 742-7825

Date of fiscal year end: March 31

Date of reporting period: April 1, 2017 through March 31, 2018

Form N-CSR is to be used by management investment companies to file reports with the Commission not later than 10 days after the transmission to stockholders of any report that is required to be transmitted to stockholders under Rule 30e-1 under the Investment Company Act of 1940 (17 CFR 270.30e-1). The Commission may use the information provided on Form N-CSR in its regulatory, disclosure review, inspection, and policymaking roles.

A registrant is required to disclose the information specified by Form N-CSR, and the Commission will make this information public. A registrant is not required to respond to the collection of information contained in Form N-CSR unless the Form displays a currently valid Office of Management and Budget ("OMB") control number. Please direct comments concerning the accuracy of the information collection burden estimate and any suggestions for reducing the burden to Secretary, Securities and Exchange Commission, 450 Fifth Street, NW, Washington, DC 20549-0609. The OMB has reviewed this collection of information under the clearance requirements of 44 U.S.C. ss. 3507.

ITEM 1. REPORTS TO STOCKHOLDERS.

Edgar Filing: PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST - Form N-CSR

Pioneer Municipal High
Income Advantage Trust

Annual Report | March 31, 2018

Ticker Symbol: MAV

[LOGO] Amundi Pioneer

=====
ASSET MANAGEMENT

visit us: www.amundipioneer.com

Table of Contents

President's Letter	2
Portfolio Management Discussion	4
Portfolio Summary	10
Prices and Distributions	11
Performance Update	12
Schedule of Investments	13
Financial Statements	23
Notes to Financial Statements	28
Report of Independent Registered Public Accounting Firm	38
Additional Information	40
Trustees, Officers and Service Providers	42

Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/18 1

President's Letter

While 2017 delivered strong positive performance, 2018, thus far, has introduced market volatility. Equity and fixed-income markets pulled back in the first quarter of this year, as the Standard & Poor's 500 Index and the Bloomberg Barclays U.S. Aggregate Bond Index both finished in negative territory, returning -0.76% and -1.46%, respectively, for the three-month period ended March 31, 2018. Concerns about the sustainability of the pace of economic growth, extended equity valuations, and rising interest rates drove a significant stock market sell-off beginning in late January, approaching correction levels. The market did recover from its initial slump, but this year's significant fluctuations have served to remind investors that even the strongest "bulls" cannot run forever. Within fixed income, rising interest rates helped drive down returns of most asset classes in the first quarter, though

Edgar Filing: PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST - Form N-CSR

floating-rate sectors such as bank loans fared well in the rising-rate environment.

Our view is that the first-quarter pause in the market's near-continuous upward momentum over the previous 15 months, dating back to the final quarter of 2016, presents an opportunity for investors to enter the market at healthier valuation levels. We believe fundamentals are still quite positive, yet also believe that caution is warranted given that the market remains vulnerable to corrections. Some areas, such as growth stocks, appear expensive, but we do see opportunity in value stocks, with prices supported by better corporate earnings due to the recent tax reforms in the U.S. as well as robust, nominal gross domestic product (GDP) growth. In fact, GDP growth in the U.S. rose to close to or better than 3% over the final three quarters of 2017, and it is anticipated that GDP growth in the first quarter of 2018 will exceed 2%.

In the fixed-income markets, we believe investors should consider positioning their portfolios to defend against rising interest rates, with underweight positions in U.S. Treasuries. We see more attractive valuations within structured investment vehicles, such as mortgage-backed securities (MBS) in both the agency and non-agency residential MBS sectors, as fundamentals within the U.S. housing market remain positive. We believe that agency MBS, in particular, offer investors reasonable value.

Since 1928, the foundation of Amundi Pioneer's investment approach has been active management, which is especially important during periods of market volatility. We believe investors can benefit from the experience and tenure of our investment teams who make active and informed decisions across our funds. In fact, the Pioneer Fund, the third-oldest mutual fund in the U.S., recently celebrated its 90th birthday. We believe the Fund serves as an important ambassador of our time-tested value style of investing and our early focus on understanding the benefits of investing in companies with sustainable

2 Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/18

business models. Over its nine decades of existence - a time period that included a Great Depression, a devastating World War, a long Cold War, and enormous technological as well as societal changes - the Fund has been well-served by this investment approach.

As always, and particularly during times of market uncertainty, we encourage you to work with your financial advisor to develop an overall investment plan that addresses both your short- and long-term goals, and to implement such a plan in a disciplined manner.

We greatly appreciate the trust you have placed in us and look forward to continuing to serve you in the future.

/s/ Lisa M. Jones

Lisa M. Jones
Head of the Americas, President and CEO of U.S.
Amundi Pioneer Asset Management USA, Inc.
March 31, 2018

Any information in this shareowner report regarding market or economic trends or the factors influencing the Trust's historical or future performance are statements of opinion as of the date of this report. Past performance is no guarantee of future results.

Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/18 3

Edgar Filing: PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST - Form N-CSR

Portfolio Management Discussion | 3/31/18

The municipal bond market generated positive results over the 12-month period ended March 31, 2018, with high-yield municipals outperforming investment-grade municipals. In the following interview, David Eurkus and Jonathan Chirunga discuss the factors that influenced the performance of Pioneer Municipal High Income Advantage Trust during the 12-month period. Mr. Eurkus, Managing Director, Director of Municipals, U.S., and a portfolio manager at Amundi Pioneer Asset Management, Inc. ("Amundi Pioneer"), and Mr. Chirunga, a senior vice president and a portfolio manager at Amundi Pioneer, are responsible for the day-to-day management of the Trust.

Q How did Pioneer Municipal High Income Advantage Trust perform during the 12-month period ended March 31, 2018?

A Pioneer Municipal High Income Advantage Trust returned 3.11% at net asset value (NAV) and 2.92% at market price during the 12-month period ended March 31, 2018. During the same 12-month period, the Trust's benchmarks, the Bloomberg Barclays U.S. Municipal High Yield Bond Index and the Bloomberg Barclays Municipal Bond Index, returned 6.03% and 2.66% at NAV, respectively. The Bloomberg Barclays U.S. Municipal High Yield Bond Index is an unmanaged measure of the performance of lower-rated municipal bonds, while the Bloomberg Barclays Municipal Bond Index is an unmanaged measure of the performance of investment-grade municipal bonds. Unlike the Trust, the two indices do not use leverage. While use of leverage increases investment opportunity, it also increases investment risk.

During the same 12-month period, the average return (at market price) of the 14 closed-end funds in Morningstar's High Yield Municipal Debt Closed End Funds category (which may or may not be leveraged) was 1.37%, and the average return at NAV of the 14 closed-end funds in the same Morningstar category was 5.24%.

The shares of the Trust were selling at a 7.5% discount to NAV on March 31, 2018. Comparatively, the shares of the Trust were selling at a 7.3% discount to NAV on March 31, 2017.

On March 31, 2018, the standardized 30-day SEC yield of the Trust's shares was 4.10%*.

* The 30-day SEC yield is a standardized formula that is based on the hypothetical annualized earning.

4 Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/18

Q How would you describe the investment environment in the municipal bond market during the 12-month period ended March 31, 2018?

A A favorable backdrop continued to support the municipal bond market over the 12-month period, as both economic fundamentals and technical factors helped municipal debt turn in positive performance. Favorable fundamentals included a persistently growing economy with improving corporate profits, low inflation, and a U.S. Federal Reserve System (the Fed) that acted to gradually tighten monetary policy. Over the period, the Fed raised the federal funds rate three times, in June 2017, December 2017, and March 2018.

In 2017, longer-term interest rates were gradually falling and short-term rates rising, with the yield curve flattening. Demand for fixed-income instruments, including municipal bonds, was steady, as

investors continued to search for yield in a generally low-rate environment. As 2017 drew to a close, the U.S. economy posted stronger results, with unemployment falling to 4.1% and inflation remaining low and stable. Up until December, municipal security issuance was fairly light.

However, the possibility of the first major overhaul to the U.S. tax code since 1986 also loomed large during the fourth quarter of 2017, and uncertainty over the content of the new tax package roiled the municipal market. When the legislation was finalized in December, one of its provisions had a heavy impact on "advance refunding" bonds within the municipal market. Advance refunding refers to when one municipal bond issuance is used to pay off another outstanding municipal bond. The new bond is issued at a lower interest rate than the older, unpaid obligation. Municipalities typically use advance refundings to reduce borrowing costs and to take advantage of lower interest rates. However, under the new tax law, after December 31, 2017, interest on a municipal bond issued to advance refund another municipal bond more than 90 days prior to the refunded bond's call date is no longer tax exempt.

While interest on refunding bonds issued within 90 days of the original municipal bond's call date remains tax exempt, it is expected that the elimination of the tax exemption on advance refunding bonds could reduce municipal supply by as much as 15 to 20 percent going forward. In December 2017, after the terms of the tax bill were announced, a host of municipal entities rushed to issue advance refunding bonds before the legislation took effect. That drove municipal issuance for December to a record-breaking \$62.5 billion, and total 2017 issuance to \$425 billion, much higher than forecast at the start of 2017. Another provision within the tax bill was the decrease in the state and local property tax deduction for

Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/18 5

individuals, now limited to a \$10,000 maximum. The change promised to make municipal bonds more attractive given that investors would likely seek to shelter their taxable income in other ways.

Over the final three months of the period, municipal issuance was light, as many municipalities had already issued their bonds before January 1, when the law regarding advance refundings was changed. In turn, demand for municipal bonds began to creep up in February 2018, as investors, especially those from higher-tax states such as California, New York, Massachusetts, and New Jersey, purchased tax-exempt securities at increased levels.

High-yield municipal bonds outperformed investment-grade municipals during the period, by a fairly significant margin.

Q What factors affected the Trust's performance relative to the Bloomberg Barclays municipal bond indices during the 12-month period ended March 31, 2018?

A We maintained a well-diversified** portfolio during the period, with exposures to both investment-grade and high-yield municipal bonds. The portfolio's diversification across different municipal sectors helped the Trust's return exceed that of the Bloomberg Barclays Municipal Bond Index, which tracks investment-grade municipals, even as it trailed the return of the Bloomberg Barclays U.S. Municipal High Yield Bond Index during a period which saw high-yield municipals outperform.

The portfolio's holdings of certain tobacco bonds funded by Master

Edgar Filing: PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST - Form N-CSR

Settlement Agreements between the tobacco industry and individual states, as well as an allocation to general obligation bonds issued by the Commonwealth of Puerto Rico contributed to the Trust's performance during the period.

Conversely, holdings in the Trust's portfolio that underperformed during the period included bonds issued by Sanger (Texas) Industrial Development Corporation, which has experienced ongoing credit problems that have contributed to a moderate decrease in value, and municipal bonds issued by the City of Philippi, West Virginia.

The City of Philippi (education bond) obligation is an older portfolio holding that dates back to before the current team took over day-to-day management responsibilities for the Trust. The bonds funded several projects at a small college in rural West Virginia that have not been additive to the school's bottom line. However, the Trust is currently receiving

** Diversification does not assure a profit nor protect against loss.

6 Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/18

payments from the issuer under the terms of a forbearance agreement we negotiated, and will receive a total of \$1.4 million by the time the agreement expires in October 2018. Prior to the forbearance agreement, the Trust was realizing no income from the City of Philippi bond. Meanwhile, the administrative staff of the school has changed, and we are optimistic about the bond's forward-looking prospects based on the new administrators' efforts in continuing to work through the school's problems.

Q Did the Trust's distributions*** to shareholders change during the 12-month period ended March 31, 2018?

A Yes, the Trust's distributions increased slightly over the 12-month period.

Q Did the level of leverage in the Trust change during the 12-month period ended March 31, 2018?

A At the end of the 12-month period on March 31, 2018, 36.6% of the Trust's total managed assets were financed by leverage obtained through the issuance of preferred shares, compared with 34.6% of the Trust's total managed assets financed by leverage at the start of the period on April 1, 2017. The Trust historically employed leverage through the issuance of Auction Preferred Shares ("APS"). The Trust redeemed all of its outstanding APS on February 20, 2018. The Trust refinanced the APS, and increased the amount of leverage employed by the Trust, through the issuance of Variable Rate Muni Fund Term Preferred Shares ("VMTP Shares"). VMTP Shares are issued via private placement and are not publicly available. The increase in leverage as a percentage of the Trust's total managed assets during the 12-month period was due to the increase in the par value of the VMTP Shares compared to that of the APS.

Q Did the Trust invest in any derivative securities during the 12-month period ended March 31, 2018?

A No, the Trust's portfolio held no derivative securities during the period.

Q What is your investment outlook?

A We maintain an optimistic view of the municipal bond market, as its underlying fundamentals remain strong and investor demand is steady. In

Edgar Filing: PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST - Form N-CSR

addition, we believe we are entering what looks to be a strong technical period for municipals from May through July of this year. Those three months typically feature the largest volume of municipal bond coupon

*** Distributions are not guaranteed.

Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/18 7

interest payments and maturities, which investors will most likely seek to reinvest in tax-free securities. The technical situation could translate into a significant increase in demand. Meanwhile, as mentioned, following the surge in supply in December 2017, municipal supply in 2018 has been limited. Additionally, we believe that healthy demand from both traditional and non-traditional investors drawn to the municipal market by the attractive value and generous yields of municipal bonds - as compared with yields available on taxable debt instruments - can continue to outstrip the limited new-issue supply and help to support the prices of municipal bonds.

At the same time, we think that the U.S. economy should continue to grow at a stable and steady pace, without an accompanying acceleration in inflation. We also believe that the Fed will continue to act deliberately and cautiously as it gradually raises short-term rates.

In managing the Trust going forward, we will continue to monitor events carefully and remain focused on intensive, fundamental research, while maintaining a well-diversified portfolio with exposures to both investment-grade and high-yield municipal securities.

Please refer to the Schedule of Investments on pages 13-22 for a full listing of Trust securities.

All investments are subject to risk, including the possible loss of principal. In the past several years, financial markets have experienced increased volatility, depressed valuations, decreased liquidity 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 Trust may invest in securities of issuers that are in default or that are in bankruptcy.

8 Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/18

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 in the Trust will generally fall. Conversely, when interest rates fall, the prices of fixed-income securities in the Trust 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 Trust 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 Trust currently uses leverage through the issuance of preferred shares.

Edgar Filing: PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST - Form N-CSR

Leverage creates significant risks, including the risk that the Trust'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.

The Trust is required to meet certain regulatory and rating agency asset coverage requirements in connection with its outstanding preferred shares. In order to maintain required asset coverage levels, the Trust may be required to alter the composition of its investment portfolio or take other actions, such as redeeming preferred shares with the proceeds from portfolio transactions, at what might be inopportune times in the market. Such actions could reduce the net earnings or returns to holders of the Trust's common shares over time, which is likely to result in a decrease in the market value of the Trust's shares.

These risks may increase share price volatility.

Any information in this shareholder report regarding market or economic trends or the factors influencing the Trust's historical or future performance are statements of opinion as of the date of this report. Past performance is no guarantee of future results.

Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/18 9

Portfolio Summary | 3/31/18

Portfolio Diversification

(As a percentage of total investments)*

[THE FOLLOWING DATA WAS REPRESENTED AS A PIE CHART IN THE PRINTED MATERIAL]

Insured:	13.3%
Revenue Bonds: Other Revenue	36.7%
Health Revenue	12.6%
Education Revenue	10.4%
Tobacco Revenue	8.9%
Development Revenue	6.4%
Facilities Revenue	5.2%
Water Revenue	2.7%
Pollution Control Revenue	1.7%
Transportation Revenue	1.5%
Airport Revenue	0.6%

Portfolio Maturity

(As a percentage of total investments)*

[THE FOLLOWING DATA WAS REPRESENTED AS A PIE CHART IN THE PRINTED MATERIAL]

20+ years	57.1%
10-20 years	29.6%
7-10 years	11.5%
5-7 years	0.8%
0-5 years	1.0%

Edgar Filing: PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST - Form N-CSR

10 Largest Holdings

(As a percentage of total investments)*

1. New Jersey Transportation Trust Fund Authority, 12/15/27 (BHAC-CR MBIA Insured)	2.
2. Massachusetts Development Finance Agency, WGBH Foundation, Series A, 5.75%, 1/1/42 (AMBAC Insured)	2.
3. Buckeye Tobacco Settlement Financing Authority, Asset-Backed, Series A-2, 6.5%, 6/1/47	2.
4. Private Colleges & Universities Authority, Emory University, Series A, 5.0%, 10/1/43	2.
5. New York State Dormitory Authority, Series C, 5.0%, 3/15/39	1.
6. New Jersey Economic Development Authority, Continental Airlines, 5.75%, 9/15/27	1.
7. State of Connecticut, Series E, 4.0%, 9/1/30	1.
8. Jefferson Parish Hospital Service District No. 2, East Jefferson General Hospital, 6.375%, 7/1/41	1.
9. District of Columbia Tobacco Settlement Financing Corp., Asset-Backed, 6.75%, 5/15/40	1.
10. California County Tobacco Securitization Agency, Asset-Backed, Gold County Funding Corp., 5.25%, 6/1/46	1.

* Excludes temporary cash investments and all derivative contracts except for options purchased. 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 listed.

10 Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/18

Prices and Distributions | 3/31/18

Share Prices and Distributions

Market Value per Common Share^

	3/31/18	3/31/17
Market Value	\$10.72	\$10.99
Discount	(7.5)%	(7.3)%

Edgar Filing: PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST - Form N-CSR

Net Asset Value per Common Share[^]

	3/31/18	3/31/17
Net Asset Value	\$11.59	\$11.86

Distributions per Common Share: 4/1/17 - 3/31/18

	Net Investment Income	Short-Term Capital Gains	Long-Term Capital Gains
	\$0.6100	\$--	\$--

Yields

	3/31/18	3/31/17
30-Day SEC Yield	4.10%	4.56%

The data shown above represents past performance, which is no guarantee of future results.

[^] Net asset value and market value are published in Barron's on Saturday, The Wall Street Journal on Monday and The New York Times on Monday and Saturday. Net asset value and market value are published daily on the Trust's website at www.amundipioneer.com.

Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/18 11

Performance Update | 3/31/18

Investment Returns

The mountain chart on the right shows the change in market value, including reinvestment of dividends and distributions, of a \$10,000 investment made in common shares of Pioneer Municipal High Income Advantage Trust during the periods shown, compared to that of the Bloomberg Barclays Municipal Bond Index and the Bloomberg Barclays U.S. Municipal High Yield Bond Index.

Edgar Filing: PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST - Form N-CSR

Average Annual Total Returns
(As of March 31, 2018)

Period	Net Asset Value (NAV)	Market Price	Bloomberg Barclays Municipal Bond Index	Bloomberg Barclays U.S. Municipal High Yield Index
10 years	6.45%	5.47%	4.40%	5.61%
5 years	4.02	-0.35	2.73	4.06
1 year	3.11	2.92	2.66	6.03

[THE FOLLOWING DATA WAS REPRESENTED AS A MOUNTAIN CHART IN THE PRINTED MATERIAL]

Value of \$10,000 Investment

	Pioneer Municipal High Income Advantage Trust	Bloomberg Barclays Municipal Bond Index	Bloomberg Barclays U.S. Municipal High Yield Bond Index
3/08	\$10,000	\$10,000	\$10,000
3/09	\$ 7,160	\$10,227	\$ 8,084
3/10	\$11,295	\$11,219	\$10,373
3/11	\$11,857	\$11,401	\$10,713
3/12	\$15,266	\$12,777	\$12,372
3/13	\$17,331	\$13,447	\$14,141
3/14	\$17,780	\$13,500	\$13,877
3/15	\$20,393	\$14,393	\$15,083
3/16	\$19,683	\$14,965	\$15,603
3/17	\$16,549	\$14,989	\$16,275
3/18	\$17,032	\$15,387	\$17,257

Call 1-800-225-6292 or visit www.amundipioneer.com 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 NAV 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 is for common shares of the Trust.

Shares of closed-end funds, unlike open-end funds, are not continuously offered. There is a one-time public offering and, 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 NAV. NAV per common share is total assets less total liabilities, which include preferred shares, divided by the number of common shares outstanding.

When NAV is lower than market price, dividends are assumed to be reinvested at

Edgar Filing: PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST - Form N-CSR

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 Trust's dividend reinvestment plan.

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

The Bloomberg Barclays Municipal Bond Index is an unmanaged, broad measure of the municipal bond market. The Bloomberg Barclays U.S. Municipal High Yield Bond Index is unmanaged, totals over \$26 billion in market value and maintains over 1,300 securities. Municipal bonds in this index have the following requirements: maturities of one year or greater, sub investment grade (below Baa or non-rated), fixed coupon rate, issue date later than 12/31/90, deal size over \$20 million, maturity size of at least \$3 million. Index returns are calculated monthly, assume reinvestment of dividends and, unlike Trust returns, do not reflect any fees, expenses or sales charges. The indices do not employ leverage. You cannot invest directly in the indices.

12 Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/18

Schedule of Investments | 3/31/18

Principal Amount USD (\$)		Value
	UNAFFILIATED ISSUERS -- 155.4%	
	CORPORATE BOND -- 1.6% of Net Assets	
	DIVERSIFIED FINANCIALS -- 1.6%	
	Specialized Finance -- 1.6%	
4,432,000^	Texas Pellets, Inc. / German Pellets Texas LLC, 8.0%, 9/30/18 (144A)	\$
	Total Diversified Financials	\$
	TOTAL CORPORATE BOND	
	(Cost \$4,432,000)	\$
	TAX EXEMPT OBLIGATIONS --	
	153.8% of Net Assets (a)	
	Alabama -- 1.6%	
2,500,000	Alabama Industrial Development Authority, Pine City Fiber Co., 6.45%, 12/1/23	\$
2,500,000	Huntsville-Redstone Village Special Care Facilities Financing Authority, Redstone Village Project, 5.5%, 1/1/43	\$
	Arizona -- 2.5%	
4,000,000 (b)	City of Phoenix, 5.0%, 7/1/27	\$
2,000,000	City of Phoenix, Industrial Development Authority, 3rd & Indian School Assisted Living Project, 5.4%, 10/1/36	
32,000	County of Pima, Industrial Development Authority, Arizona Charter Schools Project, Series C, 6.75%, 7/1/31	\$

Edgar Filing: PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST - Form N-CSR

6,990,000	California -- 15.3%	
38,610,000 (c)	California County Tobacco Securitization Agency, Asset-Backed, Gold County Funding Corp., 5.25%, 6/1/46	\$
1,845,000	California County Tobacco Securitization Agency, Capital Appreciation, Stanislaus County, Subordinated, Series A, 6/1/46	
1,550,000	California Educational Facilities Authority, Stanford University, 5.25%, 4/1/40	
5,000,000	California Enterprise Development Authority, Sunpower Corp., 8.5%, 4/1/31	
3,000,000 (d)	California Pollution Control Financing Authority, 5.0%, 7/1/37 (144A)	
1,875,000	California School Finance Authority, Classical Academies Project, Series A, 7.375%, 10/1/43	
757,342 (e)	California Statewide Communities Development Authority, Lancer Plaza Project, 5.875%, 11/1/43	
1,500,000 (d)	California Statewide Communities Development Authority, Microgy Holdings Project, 9.0%, 12/1/38	
1,500,000 (d)	City of Madera, Irrigation Financing Authority, 6.25%, 1/1/31	
2,695,000 (b)	City of Madera, Irrigation Financing Authority, 6.5%, 1/1/40	
	Coast Community College District, Election, Series D, 5.0%, 8/1/31	

The accompanying notes are an integral part of these financial statements.

Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/18 13

Schedule of Investments | 3/31/18 (continued)

Principal Amount USD (\$)		Value
1,000,000	California -- (continued)	
3,140,000 (f)	Golden State Tobacco Securitization Corp., Asset-Backed, Series A-1, 5.125%, 6/1/47	\$
1,000,000	Lehman Municipal Trust Receipts, RIB, 10.824%, 11/1/39 (144A) (AGM Insured)	
2,425,000 (b)	River Islands Public Financing Authority, Community Facilities, 5.5%, 9/1/45	
465,000	State of California, Various Purposes, 5.75%, 4/1/31	
	Tobacco Securitization Authority of Southern California, Series A-1, 5.125%, 6/1/46	\$
1,500,000 (d)	Colorado -- 0.7%	
	Colorado Educational & Cultural Facilities Authority, Rocky Mountain Classical Academy Project, 8.0%, 9/1/43	\$
2,035,000	Connecticut -- 3.8%	
7,200,000 (b)	Mohegan Tribal Finance Authority, 7.0%, 2/1/45 (144A)	\$
1,000,000	State of Connecticut, Series E, 4.0%, 9/1/30	
	Town of Hamden, Whitney Center Project, Series A, 7.75%, 1/1/43	

Edgar Filing: PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST - Form N-CSR

Principal Amount USD (\$)		Value
		\$
2,355,000	District of Columbia -- 5.0% District of Columbia Tobacco Settlement Financing Corp., Asset-Backed, 6.5%, 5/15/33	\$
6,825,000	District of Columbia Tobacco Settlement Financing Corp., Asset-Backed, 6.75%, 5/15/40	
3,975,000	District of Columbia, Housing Product Trust Fund, Series A, 4.25%, 6/1/37 (NATL Insured)	
		\$
1,500,000	Florida -- 6.3% Alachua County Health Facilities Authority, Terraces Bonita Springs Project, Series A, 8.125%, 11/15/41	\$
1,500,000	Alachua County Health Facilities Authority, Terraces Bonita Springs Project, Series A, 8.125%, 11/15/46	
2,500,000 (d)	County of Miami-Dade, Aviation Revenue, Series B, 5.5%, 10/1/41	
5,000,000	County of Miami-Dade, Water & Sewer System Revenue, Series A, 4.0%, 10/1/44	
5,000,000	Florida's Turnpike Enterprise, Department of Transportation, Series A, 4.0%, 7/1/32	
1,000,000 (d)	Hillsborough County Industrial Development Authority, Various Health Facilities, 8.0%, 8/15/32	
		\$

The accompanying notes are an integral part of these financial statements.

14 Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/18

Principal Amount USD (\$)		Value
5,000,000	Georgia -- 6.3% City of Atlanta, Water & Wastewater Revenue, Series A, 5.0%, 11/1/34	\$
900,000	DeKalb County Georgia Hospital Authority, DeKalb Medical Center, Inc., Project, 6.0%, 9/1/30	
750,000	DeKalb County Georgia Hospital Authority, DeKalb Medical Center, Inc., Project, 6.125%, 9/1/40	
8,750,000	Private Colleges & Universities Authority, Emory University, Series A, 5.0%, 10/1/43	
		\$
1,000,000	Guam -- 0.4% Guam Department of Education, Certificates of Participation, John F. Kennedy High School, Series A, 6.625%, 12/1/30	\$
2,000,000	Idaho -- 0.7% Power County Industrial Development Corp., FMC Corp. Project,	

Edgar Filing: PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST - Form N-CSR

	6.45%, 8/1/32	\$

	Illinois -- 2.8%	
1,000,000 (b)	Chicago Board of Education, Series A, 7.0%, 12/1/46 (144A)	\$
417,400 (f)	Illinois Finance Authority, Clare Oaks Project, Series B, 4.0%, 11/15/52	
261,000 (c)	Illinois Finance Authority, Clare Oaks Project, Series C-1, 11/15/52	
52,200 (c)	Illinois Finance Authority, Clare Oaks Project, Series C-2, 11/15/52	
52,200 (c)	Illinois Finance Authority, Clare Oaks Project, Series C-3, 11/15/52	
1,450,000	Illinois Finance Authority, Memorial Health System, 5.5%, 4/1/39	
2,000,000 (d)	Illinois Finance Authority, Northwestern Memorial Hospital, Series A, 6.0%, 8/15/39	
280,000 (d)	Illinois Finance Authority, Swedish Covenant, Series A, 6.0%, 8/15/38	
1,000,000	Metropolitan Pier & Exposition Authority, McCormick Place, Series B, 5.0%, 6/15/52 (ST APPROP Insured)	
1,390,000	Southwestern Illinois Development Authority, Village of Sauget Project, 5.625%, 11/1/26	

		\$

	Indiana -- 0.9%	
250,000	City of Carmel, Barrington Carmel Project, Series A, 7.0%, 11/15/32	\$
750,000	City of Carmel, Barrington Carmel Project, Series A, 7.125%, 11/15/42	
500,000	City of Carmel, Barrington Carmel Project, Series A, 7.125%, 11/15/47	
1,000,000	Indiana Finance Authority, Educational Facilities, 5.125%, 7/1/37	

		\$

The accompanying notes are an integral part of these financial statements.

Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/18 15

Schedule of Investments | 3/31/18 (continued)

Principal Amount USD (\$)		Value

	Kansas -- 0.4%	
1,000,000 (d)	Kansas Development Finance Authority, Hayes Medical Center, Inc., Series Q, 5.0%, 5/15/35	\$

	Louisiana -- 2.9%	
7,000,000	Jefferson Parish Hospital Service District No. 2, East Jefferson General Hospital, 6.375%, 7/1/41	\$
750,000	Opelousas Louisiana General Hospital Authority, Opelousas General Health System Project, 5.75%, 10/1/23	

Edgar Filing: PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST - Form N-CSR

		\$
1,500,000	Maine -- 2.0% Maine Health & Higher Educational Facilities Authority, Maine General Medical Center, 7.5%, 7/1/32	\$
3,500,000	Maine Turnpike Authority, Series A, 5.0%, 7/1/42	\$
2,000,000 (d)	Maryland -- 3.9% Maryland Health & Higher Educational Facilities Authority, Charlestown Community, 6.25%, 1/1/45	\$
2,160,000	Maryland Health & Higher Educational Facilities Authority, City Neighbors, Series A, 6.75%, 7/1/44	
1,250,000 (d)	Maryland Health & Higher Educational Facilities Authority, Doctor's Community Hospital, 5.75%, 7/1/38	
4,500,000	Maryland Health & Higher Educational Facilities Authority, Maryland University Medical System, Series A, 5.0%, 7/1/43	\$
7,000,000 (c)	Massachusetts -- 10.0% Massachusetts Bay Transportation Authority, Series A, 7/1/28	\$
2,575,000 (d)	Massachusetts Development Finance Agency, Broad Institute, Inc., Series A, 5.25%, 4/1/37	
961,679	Massachusetts Development Finance Agency, Linden Ponds, Inc., Series A-1, 5.5%, 11/15/46	
2,200,000	Massachusetts Development Finance Agency, Partner's Healthcare System, Series M-4, 5.0%, 7/1/39	
8,000,000	Massachusetts Development Finance Agency, WGBH Foundation, Series A, 5.75%, 1/1/42 (AMBAC Insured)	
4,325,000	Massachusetts Health & Educational Facilities Authority, Massachusetts Institute of Technology, Series K, 5.5%, 7/1/32	\$
2,000,000	Michigan -- 3.0% Flint Michigan Hospital Building Authority, Hurley Medical Center, 7.375%, 7/1/35	\$
560,000	Michigan Public Educational Facilities Authority, Crescent Academy, 7.0%, 10/1/36	
5,000,000	Michigan State University, Series A, 5.0%, 8/15/41	\$

The accompanying notes are an integral part of these financial statements.

16 Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/18

Principal Amount USD (\$)		Value
	Minnesota -- 2.7%	

Edgar Filing: PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST - Form N-CSR

2,000,000	Bloomington Port Authority, Radisson Blu Mall of America, 9.0%, 12/1/35	\$
1,000,000	City of Ham Lake, DaVinci Academy, Series A, 5.0%, 7/1/47	
3,755,000 (b)	State of Minnesota, Series B, 4.0%, 8/1/27	
		----- \$
	Mississippi -- 0.5%	
1,400,000 (f)	Mississippi Business Finance Corp., Chevron USA, Inc., Project, Series B, 1.7%, 12/1/30	\$
		----- \$
	Montana -- 0.1%	
2,445,000 (e)	City of Hardin, Tax Allocation, Rocky Mountain Power, Inc., Project, 6.25%, 9/1/31	\$
1,000,000 (e)	Two Rivers Authority, Inc., 7.375%, 11/1/27	
		----- \$
	Nevada -- 0.7%	
2,000,000	County of Washoe, Fuel Tax, 5.0%, 2/1/43	\$
		----- \$
	New Hampshire -- 0.7%	
2,000,000	New Hampshire Health & Education Facilities Authority Act, Catholic Medical Centre, 3.75%, 7/1/40	\$
		----- \$
	New Jersey -- 9.2%	
7,500,000	New Jersey Economic Development Authority, Continental Airlines, 5.75%, 9/15/27	\$
3,500,000 (f)	New Jersey State Turnpike Authority, RIB, 11.324%, 1/1/28 (144A) (AGM Insured)	
15,375,000 (c)	New Jersey Transportation Trust Fund Authority, 12/15/27 (BHAC-CR MBIA Insured)	
		----- \$
	New York -- 7.0%	
5,000,000	New York State Dormitory Authority, Columbia University, 5.0%, 10/1/41	\$
2,000,000 (d)	New York State Dormitory Authority, Orange Medical Center, 6.125%, 12/1/29	
7,500,000	New York State Dormitory Authority, Series C, 5.0%, 3/15/39	
1,500,000	New York State Dormitory Authority, Trustees of Columbia University, 5.0%, 10/1/45	
1,333,463	Westchester County Healthcare Corp., Series A, 5.0%, 11/1/44	
		----- \$
	North Carolina -- 0.7%	
500,000	City of Charlotte, Airport Revenue, Series A, 5.0%, 7/1/42	\$
1,250,000	City of Charlotte, Airport Revenue, Series A, 5.0%, 7/1/47	
		----- \$

The accompanying notes are an integral part of these financial statements.

Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/18 17

Schedule of Investments | 3/31/18 (continued)

Edgar Filing: PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST - Form N-CSR

Principal Amount USD (\$)		Value
	Ohio -- 6.7%	
3,000,000 (d)	Akron Bath Copley Joint Township Hospital District, Akron General Health System, 5.0%, 1/1/31	\$
2,500,000	Buckeye Tobacco Settlement Financing Authority, Asset-Backed, Series A-2, 5.875%, 6/1/47	
9,945,000	Buckeye Tobacco Settlement Financing Authority, Asset-Backed, Series A-2, 6.5%, 6/1/47	
2,500,000 (b) (d)	State of Ohio, Common Schools, Series B, 5.0%, 6/15/29	\$
	Oregon -- 1.2%	
1,000,000	Oregon Health & Science University, Series A, 5.0%, 7/1/42	\$
2,000,000	Oregon State Facilities Authority, Samaritan Health Services, Series A, 5.25%, 10/1/40	\$
	Pennsylvania -- 8.6%	
1,000,000	Chester County Industrial Development Authority, Collegium Charter School, Series A, 5.25%, 10/15/47	\$
1,965,000	Pennsylvania Economic Development Financing Authority, US Airways Group, Series B, 8.0%, 5/1/29	
5,000,000	Pennsylvania Economic Development Financing Authority, USG Corp. Project, 6.0%, 6/1/31	
1,555,000 (d)	Pennsylvania Turnpike Commission, Series D, 5.3%, 12/1/41	
3,445,000 (d)	Pennsylvania Turnpike Commission, Series D, 5.3%, 12/1/41	
500,000	Philadelphia Authority for Industrial Development, Greater Philadelphia Health Action, Inc., Project, Series A, 6.625%, 6/1/50	
6,000,000	Philadelphia Authority for Industrial Development, Nueva Esperanze, Inc., 8.2%, 12/1/43	
1,000,000	Philadelphia Authority for Industrial Development, Performing Arts Charter School Project, 6.5%, 6/15/33 (144A)	
2,000,000	Philadelphia Authority for Industrial Development, Performing Arts Charter School Project, 6.75%, 6/15/43 (144A)	\$
	Puerto Rico -- 1.0%	
6,500,000 (b) (e)	Commonwealth of Puerto Rico, Series A, 8.0%, 7/1/35	\$
	Rhode Island -- 1.9%	
1,355,000 (e)	Central Falls Detention Facility Corp., 7.25%, 7/15/35	\$
3,000,000	Rhode Island Health & Educational Building Corp., Brown University, Series A, 4.0%, 9/1/37	
1,500,000 (d)	Rhode Island Health & Educational Building Corp., Tockwatten Home Issue, 8.375%, 1/1/46	\$

The accompanying notes are an integral part of these financial statements.

Edgar Filing: PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST - Form N-CSR

18 Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/18

Principal Amount USD (\$)		Value
4,400,000 (g)	South Carolina -- 2.1% Tobacco Settlement Revenue Management Authority, Series B, 6.375%, 5/15/30	\$
4,000,000	South Dakota -- 1.5% South Dakota Health & Educational Facilities Authority, Sanford Health, Series B, 4.0%, 11/1/44	\$
5,000,000	Tennessee -- 1.9% Johnson City Health & Educational Facilities Board, Mountain States Health Alliance, 6.5%, 7/1/38	\$
1,000,000	Texas -- 20.6% Arlington Higher Education Finance Corp., Universal Academy, Series A, 7.0%, 3/1/34	\$
1,500,000	Arlington Higher Education Finance Corp., Universal Academy, Series A, 7.125%, 3/1/44	
2,500,000 (d)	Central Texas Regional Mobility Authority, Sub Lien, 6.75%, 1/1/41	
2,500,000 (b)	County of Harris, Series A, 5.0%, 10/1/26	
5,000,000 (b)	Goose Creek Consolidated Independent School District, Series C, 4.0%, 2/15/26 (PSF-GTD Insured)	
5,020,000	Grand Parkway Transportation Corp., Series A, 5.5%, 4/1/53	
2,663,453 (e)	Gulf Coast Industrial Development Authority, Microgy Holdings Project, 7.0%, 12/1/36	
4,145,000 (f)	Harris County Health Facilities Development Corp., The Methodist Hospital System, Series A-1, 1.72%, 12/1/41	
2,100,000 (f)	Harris County Health Facilities Development Corp., The Methodist Hospital System, Series A-2, 1.72%, 12/1/41	
3,000,000	Houston Higher Education Finance Corp., St. John's School Project, Series A, 5.0%, 9/1/38	
4,000,000 (f)	Lower Neches Valley Authority Industrial Development Corp., Exxonmobil, 1.67%, 11/1/38	
3,355,000	North Texas Tollway Authority, Series A, 5.0%, 1/1/30	
1,500,000 (d)	Red River Health Facilities Development Corp., MRC Crestview, Series A, 8.0%, 11/15/41	
2,000,000 (b)	Richardson Independent School District, School Building, 5.0%, 2/15/38 (PSF-GTD Insured)	
6,960,000^ (e)	Sanger Industrial Development Corp., Texas Pellets Project, Series B, 8.0%, 7/1/38	
1,000,000 (e)	Tarrant County Cultural Education Facilities Finance Corp., Mirador Project, Series A, 4.875%, 11/15/48	
750,000	Tarrant County Cultural Education Facilities Finance Corp., Mirador Project, Series A, 5.0%, 11/15/55	
1,000,000 (e)	Texas Midwest Public Facility Corp., Secure Treatment Facility Project, 9.0%, 10/1/30	
3,365,000	Texas Private Activity Bond Surface Transportation Corp., NTE Mobility Partners LLC, 7.0%, 12/31/38	
2,500,000 (d)	Travis County Health Facilities Development Corp., Longhorn Village Project, 7.125%, 1/1/46	

Edgar Filing: PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST - Form N-CSR

The accompanying notes are an integral part of these financial statements.

Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/18 19

Schedule of Investments | 3/31/18 (continued)

Principal Amount USD (\$)		Value
<hr/>		
5,000,000 (b)	Texas -- (continued) Tyler Independent School District, School Building, 5.0%, 2/15/38 (PSF-GTD Insured)	\$ ----- \$
<hr/>		
5,000,000	Utah -- 2.3% County of Utah, IHC Health Services, Inc., Series B, 4.0%, 5/15/47	\$
1,000,000	Salt Lake City Corp., Airport Revenue, Series B, 5.0%, 7/1/36	----- \$
<hr/>		
2,275,000 (b)	Virginia -- 7.3% County of Arlington, 4.0%, 8/15/35	\$
2,000,000	County of Washington, Industrial Development Authority, Mountain States Health Alliance, Series C, 7.75%, 7/1/38	
4,550,000	Tobacco Settlement Financing Corp., Series B-1, 5.0%, 6/1/47	
5,000,000	University of Virginia, Series A, 5.0%, 4/1/42	
5,000,000	Virginia Public School Authority Revenue, 4.0%, 8/1/25 (State Aid Withholding)	----- \$
<hr/>		
3,000,000	Washington -- 4.2% City of Seattle, Water System Revenue, 4.0%, 8/1/32	\$
2,500,000 (b)	King County, Issaquah School District No. 411, 4.0%, 12/1/31 (SCH BD GTY Insured)	
2,500,000	University of Washington, Series B, 5.0%, 6/1/29	
1,500,000 (d)	Washington State Health Care Facilities Authority, Kadlec Regional Medical Center, 5.5%, 12/1/39	
1,100,000	Washington State Housing Finance Commission, Mirabella Project, Series A, 6.75%, 10/1/47 (144A)	----- \$
<hr/>		
2,000,000 (e)	West Virginia -- 0.4% City of Philippi, Alderson-Broadus College, Inc., Series A, 7.75%, 10/1/44	\$
<hr/>		
5,000,000	Wisconsin -- 4.0% Public Finance Authority, Glenridge Palmer Ranch, Series A, 8.25%, 6/1/46	\$
750,000	Public Finance Authority, Roseman University Health Sciences Project, 5.875%, 4/1/45	

Edgar Filing: PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST - Form N-CSR

1,000,000	Public Finance Authority, SearStone CCRC Project, Series A, 5.3%, 6/1/47
1,500,000 (d)	Public Finance Authority, SearStone CCRC Project, Series A, 8.625%, 6/1/47 (144A)
1,500,000 (d)	Wisconsin Health & Educational Facilities Authority, Pro Healthcare, Inc., Group, 6.625%, 2/15/39

\$

The accompanying notes are an integral part of these financial statements.

20 Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/18

Principal Amount USD (\$)	Value
TOTAL TAX EXEMPT OBLIGATIONS (Cost \$410,380,902)	\$ 4
TOTAL INVESTMENTS IN UNAFFILIATED ISSUERS -- 155.4% (Cost \$414,812,902)	\$ 4
OTHER ASSETS AND LIABILITIES -- 2.4%	\$
VARIABLE RATE MUNIFUND TERM PREFERRED SHARES AT REDEMPTION VALUE -- (57.8)%	\$ (1
NET ASSETS APPLICABLE TO COMMON SHAREOWNERS -- 100.0%	\$ 2

(144A) Security is exempt from registration under Rule 144A of the Securities Act of 1933. Such securities may be resold normally to qualified institutional buyers in a transaction exempt from registration. At March 31, 2018, the value of these securities amounted to \$27,795,132, or 10.0% of net assets applicable to common shareowners.

RIB Residual Interest Bond is purchased in a secondary market. The interest rate is subject to change periodically and inversely based upon prevailing market rates. The interest rate shown is the rate at March 31, 2018.

^ Security is valued using fair value methods (other than supplied by independent pricing services). See Notes to Financial Statements -- Note 1A.

(a) Consists of Revenue Bonds unless otherwise indicated.

(b) Represents a General Obligation Bond.

(c) Security issued with a zero coupon. Income is recognized through accretion of discount.

Edgar Filing: PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST - Form N-CSR

- (d) Prerefunded bonds have been collateralized by U.S. Treasury or U.S. Government Agency securities which are held in escrow to pay interest and principal on the tax exempt issue and to retire the bonds in full at the earliest refunding date.
- (e) Security is in default.
- (f) The interest rate is subject to change periodically. The interest rate and/or reference index and spread shown at March 31, 2018.
- (g) Escrow to maturity.

Purchases and sales of securities (excluding temporary cash investments) for the year ended March 31, 2018 aggregated \$92,820,578 and \$87,820,213, respectively.

The Trust is permitted to engage in purchase and sale transactions ("cross trades") with certain funds and accounts for which Amundi Pioneer Asset Management, Inc., formerly Pioneer Investment Management, Inc. (the "Adviser") serves as the investment adviser, as set forth in Rule 17a-7 under the Investment Company Act of 1940, pursuant to procedures adopted by the Board of Trustees. Under these procedures, cross trades are effected at current market prices. During the year ended March 31, 2018, the Trust engaged in purchases and sales pursuant to these procedures amounting to \$12,002,762 and none, respectively, resulting in a gain of none.

The accompanying notes are an integral part of these financial statements.

Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/18 21

Schedule of Investments | 3/31/18 (continued)

At March 31, 2018, the net unrealized appreciation on investments based on cost for federal tax purposes of \$414,565,375 was as follows:

Aggregate gross unrealized appreciation for all investments in which there is an excess of value over tax cost	\$
Aggregate gross unrealized depreciation for all investments in which there is an excess of tax cost over value	(
Net unrealized appreciation	\$ =====

Various inputs are used in determining the value of the Trust's investments. These inputs are summarized in the three broad levels below.

Level 1 - quoted prices in active markets for identical securities.

Level 2 - other significant observable inputs (including quoted prices for similar securities, interest rates, prepayment speeds, credit risks, etc.). See Notes to Financial Statements -- Note 1A.

Level 3 - significant unobservable inputs (including the Trust's own assumptions in determining fair value of investments). See Notes to Financial Statements -- Note 1A.

The following is a summary of the inputs used as of March 31, 2018, in valuing

Edgar Filing: PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST - Form N-CSR

the Trust's investments.

	Level 1	Level 2	Level 3	Total
Corporate Bond	\$ --	\$ 4,432,000	\$ --	\$ 4,432,000
Tax Exempt Obligations				
Texas	--	54,501,481	2,610,000	57,111,481
All Other Tax Exempt Obligations	--	368,931,515	--	368,931,515
Total Investments in Securities	\$ --	\$427,864,996	\$ 2,610,000	\$ 430,474,996

The following is a reconciliation of assets valued using significant unobservable inputs (Level 3):

	Tax Exempt Obligations
Balance as of 3/31/17	\$ 4,176,000
Realized gain (loss) (1)	--
Changed in unrealized appreciation (depreciation) (2)	(1,563,014)
Accrued discounts/premiums	(2,986)
Purchases	--
Sales	--
Transfers in to Level 3*	--
Transfers out of Level 3*	--
Balance as of 3/31/18	\$ 2,610,000

(1) Realized gain (loss) on these securities is included in the net realized gain (loss) from investments on the Statement of Operations.

(2) Unrealized appreciation (depreciation) on these securities is included in the change in unrealized appreciation (depreciation) on investments on the Statement of Operations.

* Transfers are calculated on the beginning of period value. During year ended March 31, 2018, there were no transfers between Levels 1, 2 and 3.

Net change in unrealized appreciation (depreciation) of investments still held as of March 31, 2018: \$ (1,563,014)

The accompanying notes are an integral part of these financial statements.

22 Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/18

Edgar Filing: PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST - Form N-CSR

Statement of Assets and Liabilities | 3/31/18

ASSETS:

Investments in unaffiliated issuers, at value (cost \$414,812,902)	\$430,474,996
Cash	533,750
Receivables --	
Interest	5,958,392
Other assets	152,883

Total assets	\$437,120,021
--------------	---------------

LIABILITIES:

Payables --	
Administration fee	\$ 23,511
Trustees' fees	21
Custody fees	1,580
Professional fees	32,580
Transfer Agent fees	1,653
Shareowner communications expense	1,974
Printing expenses	6,723
Pricing fees	6,230
Due to affiliates	
Management fees	26,687
Other due to affiliates	1,679
Miscellaneous expenses	5,876

Total liabilities	\$ 108,514
-------------------	------------

Variable Rate MuniFund Term Preferred Shares, net of deferred offering costs:	
\$100,000 liquidation value per share applicable to 1,600 shares	\$160,000,000

NET ASSETS APPLICABLE TO COMMON SHAREOWNERS:

Paid-in capital	\$288,356,407
Undistributed net investment income	2,936,714
Accumulated net realized loss on investments	(29,943,708)
Net unrealized appreciation on investments	15,662,094

Net assets applicable to common shareowners	\$277,011,507
---	---------------

NET ASSET VALUE PER COMMON SHARE:

No par value (unlimited number of shares authorized)	
Based on \$277,011,507 / 23,899,020 common shares	\$ 11.59

The accompanying notes are an integral part of these financial statements.

Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/18 23

Statement of Operations

For the Year Ended 3/31/18

INVESTMENT INCOME:

Edgar Filing: PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST - Form N-CSR

Interest from unaffiliated issuers	\$ 20,741,963	
<hr/>		
Total investment income		\$ 20,741,963
<hr/>		
EXPENSES:		
Management fees	\$ 2,611,638	
Administrative expense	175,049	
Transfer agent fees	14,634	
Shareowner communications expense	18,228	
Auction agent fees	171,117	
Custodian fees	7,075	
Professional fees	126,939	
Printing expense	15,845	
Trustees' fees	15,462	
Pricing fees	31,417	
Miscellaneous	94,157	
<hr/>		
Total expenses		\$ 3,281,561
<hr/>		
Net investment income		\$ 17,460,402
<hr/>		
REALIZED AND UNREALIZED GAIN (LOSS) ON INVESTMENTS:		
Net realized gain (loss) on investments from unaffiliated issuers:	\$ (12,363,112)	
Change in net unrealized appreciation (depreciation) on investments from unaffiliated issuers:	5,708,826	
<hr/>		
Net realized and unrealized gain (loss) on investments		\$ (6,654,286)
<hr/>		
DISTRIBUTIONS TO PREFERRED SHAREOWNERS FROM NET INVESTMENT INCOME:		
		\$ (2,744,083)
<hr/>		
Net increase in net assets resulting from operations		\$ 8,062,033
<hr/>		

The accompanying notes are an integral part of these financial statements.

24 Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/18

Statements of Changes in Net Assets

	Year Ended 3/31/18	Year Ended 3/31/17*
<hr/>		
FROM OPERATIONS:		
Net investment income (loss)	\$ 17,460,402	\$ 19,075,550
Net realized gain (loss) on investments	(12,363,112)	(217,084)
Change in net unrealized appreciation (depreciation) on investments	5,708,826	(16,216,394)
Distributions to preferred shareowners from net investment income	(2,744,083)	(1,559,147)
<hr/>		
Net increase in net assets resulting from operations	\$ 8,062,033	\$ 1,082,925
<hr/>		
DISTRIBUTIONS TO COMMON SHAREOWNERS:		

Edgar Filing: PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST - Form N-CSR

Net investment income and previously undistributed net investment income (\$0.61 and \$0.74 per share, respectively)	\$ (14,578,402)	\$ (17,540,094)
Total distributions to common shareowners	\$ (14,578,402)	\$ (17,540,094)
FROM TRUST SHARE TRANSACTIONS:		
Reinvestment of distributions	\$ --	\$ 967,385
Net increase in net assets applicable to common shareowners from Trust share transactions	\$ --	\$ 967,385
Net decrease in net assets applicable to common shareowners	\$ (6,516,369)	\$ (15,489,784)
NET ASSETS APPLICABLE TO COMMON SHAREOWNERS:		
Beginning of year	283,527,876	299,017,660
End of year	\$ 277,011,507	\$ 283,527,876
Undistributed net investment income	\$ 2,936,714	\$ 2,395,648

* The Trust was audited by an independent registered public accounting firm other than Ernst & Young LLP.

The accompanying notes are an integral part of these financial statements.

Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/18 25

Financial Highlights

	Year Ended 3/31/18	Year Ended 3/31/17*	Year Ended 3/31/16
Per Share Operating Performance			
Net asset value, beginning of period	\$ 11.86	\$ 12.55	\$ 12.55
Increase (decrease) from investment operations: (a)			
Net investment income (loss)	\$ 0.73	\$ 0.80	\$ 0.80
Net realized and unrealized gain (loss) on investments	(0.28)	(0.68)	0.00
Distribution to preferred shareowners from:			
Net investment income	\$ (0.11)	\$ (0.07)	\$ (0.07)
Net increase (decrease) from Investment operations	\$ 0.34	\$ 0.05	\$ 0.00
Distributions to common shareowners from:			
Net investment income and previously undistributed net investment income	\$ (0.61)	\$ (0.74)	\$ (0.74)
Net increase (decrease) in net asset value	\$ (0.27)	\$ (0.69)	\$ (0.69)
Net asset value, end of period	\$ 11.59	\$ 11.86	\$ 12.55
Market value, end of period	\$ 10.72	\$ 10.99	\$ 13.00

Edgar Filing: PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST - Form N-CSR

Total return at net asset value (b)	3.11%	0.28%	6
Total return at market value (b)	2.92%	(15.92)%	(3)
Ratios to average net assets of common shareowners:			
Total expenses (c)	1.16%	1.12%	1
Net investment income before preferred share distributions	6.15%	6.47%	6
Preferred share distributions	0.97%	0.53%	0
Net investment income available to common shareowners	5.18%	5.94%	6
Portfolio turnover rate	20%	9%	
Net assets of common shareowners, end of period (in thousands)	\$277,012	\$283,528	\$299,

The accompanying notes are an integral part of these financial statements.

26 Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/18

	Year Ended 3/31/18	Year Ended 3/31/17*	Year Ended 3/31/
Preferred shares outstanding (in thousands) (d) (e)	\$160,000	\$150,000	\$150,
Asset coverage per preferred share, end of period	\$273,132	\$ 72,252	\$ 74,
Average market value per preferred share (f)	\$100,000	\$ 25,000	\$ 25,
Liquidation value, including dividends payable, per preferred share	\$100,000	\$ 24,998	\$ 25,

* The Trust was audited by an independent registered public accounting firm other than Ernst & Young LLP.

** The amount of distributions made to shareowners during the year were in excess of the net investment income earned by the Trust during the year. The Trust has accumulated undistributed net investment income which is part of the Trust's NAV. A portion of the accumulated net investment income was distributed to shareowners during the year.

- (a) The per common share data presented above is based upon the average common shares outstanding for the periods presented.
- (b) Total investment return is calculated assuming a purchase of common shares at the current net asset value or market value on the first day and a sale at the current net asset value or market value on the last day of the periods reported. Dividends and distributions, if any, are assumed for purposes of this calculation to be reinvested at prices obtained under the Trust's dividend reinvestment plan. Total investment return does not reflect brokerage commissions. Past performance is not a guarantee of future results.
- (c) Expense ratios do not reflect the effect of distribution payments to preferred shareowners.
- (d) Prior to February 20, 2018, there were 6,000 Auction Preferred Shares ("APS") outstanding, with a liquidation preference of \$25,000 per share. The Trust redeemed all of its outstanding APS on February 20, 2018.
- (e) The Trust issued 1,600 Variable Rate Munifund Term Preferred Shares, with a liquidation preference of \$100,000 per share, on February 20, 2018.

(f) Market value is redemption value without an active market.

The accompanying notes are an integral part of these financial statements.

Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/18 27

Notes to Financial Statements | 3/31/18

1. Organization and Significant Accounting Policies

Pioneer Municipal High Income Advantage Trust (the "Trust") was organized as a Delaware statutory trust on August 6, 2003. Prior to commencing operations on October 20, 2003, the Trust had no operations other than matters relating to its organization and registration as a diversified, closed-end management investment company under the Investment Company Act of 1940, as amended. The investment objective of the Trust is to seek a high level of current income exempt from regular federal income tax, and the Trust may, as a secondary objective, also seek capital appreciation to the extent that it is consistent with its primary investment objective.

On July 3, 2017, Amundi acquired Pioneer Investments, a group of asset management companies located throughout the world. Amundi, one of the world's largest asset managers, is headquartered in Paris, France. As a result of the transaction, Pioneer Investment Management, Inc., the Trust's investment adviser, became an indirect wholly owned subsidiary of Amundi and Amundi's wholly owned subsidiary, Amundi USA, Inc. Prior to July 3, 2017, Pioneer Investments was owned by Pioneer Global Asset Management S.p.A., a wholly owned subsidiary of UniCredit S.p.A.

In connection with the transaction, the names of the Trust's investment adviser and principal underwriter changed. Effective July 3, 2017, the name of Pioneer Investment Management, Inc. changed to Amundi Pioneer Asset Management, Inc. (the "Adviser") and the name of Pioneer Funds Distributor, Inc. changed to Amundi Pioneer Distributor, Inc. (the "Distributor").

In October 2016, the Securities and Exchange Commission (SEC) released its Final Rule on Investment Company Reporting Modernization. In addition to introducing two new regulatory reporting forms (Form N-PORT and Form N-CEN), the Final Rule amends Regulation S-X, which impacts financial statement presentation, particularly related to the presentation of derivative investments. The Fund's financial statements were prepared in compliance with the amendments to Regulation S-X.

The Trust's financial statements have been prepared in conformity with U.S. generally accepted accounting principles ("U.S. GAAP") that require the management of the Trust to make estimates and assumptions that affect the reported amounts of assets and liabilities, the disclosure of contingent assets and liabilities at the date of the financial statements, and the reported amounts of income, expenses and gain or loss on investments during the reporting period. Actual results could differ from those estimates.

28 Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/18

The Trust is an investment company and follows investment company accounting and reporting guidance under U.S. GAAP. The following is a summary of significant accounting policies followed by the Trust in the preparation of its financial statements:

A. Security Valuation

The net asset value of the Trust is computed once daily, on each day the New York Stock Exchange ("NYSE") is open, as of the close of regular trading on the NYSE.

Fixed-income securities are valued by using prices supplied by independent pricing services, which consider such factors as market prices, market events, quotations from one or more brokers, Treasury spreads, yields, maturities and ratings, or may use a pricing matrix or other fair value methods or techniques to provide an estimated value of the security or instrument. A pricing matrix is a means of valuing a debt security on the basis of current market prices for other debt securities, historical trading patterns in the market for fixed income securities and/or other factors. Non-U.S. debt securities that are listed on an exchange will be valued at the bid price obtained from an independent third party pricing service. When independent third party pricing services are unable to supply prices, or when prices or market quotations are considered to be unreliable, the value of that security may be determined using quotations from one or more broker-dealers.

Securities or loan interests for which independent pricing services or broker-dealers are unable to supply prices or for which market prices and/or quotations are not readily available or are considered to be unreliable are valued by a fair valuation team comprised of certain personnel of the Adviser, pursuant to procedures adopted by the Trust's Board of Trustees. The Adviser's fair valuation team uses fair value methods approved by the Valuation Committee of the Board of Trustees. The Adviser's fair valuation team is responsible for monitoring developments that may impact fair valued securities and for discussing and assessing fair values on an ongoing basis, and at least quarterly, with the Valuation Committee of the Board of Trustees.

Inputs used when applying fair value methods to value a security may include credit ratings, the financial condition of the company, current market conditions and comparable securities. The Trust may use fair value methods if it is determined that a significant event has occurred after the close of the exchange or market on which the security trades and prior to the determination of the Trust's net asset value. Examples of a significant event might include political or economic news, corporate restructurings, natural disasters, terrorist activity or trading halts. Thus, the valuation of the Trust's securities may differ significantly from exchange prices and such differences could be material.

Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/18 29

At March 31, 2018, two securities were valued using fair value methods (in addition to securities valued using prices supplied by independent pricing services, broker-dealers or using third party insurance pricing model) representing 2.54% of net assets. The value of these fair valued securities was \$7,042,000.

B. Investment Income and Transactions

Interest income, including interest on income-bearing cash accounts, is recorded on the accrual basis, net of unrecoverable foreign taxes withheld at the applicable country rates and net of income accrued or defaulted securities.

Discounts and premiums on purchase prices of debt securities are accreted or amortized, respectively, daily, into interest income on an effective yield to maturity basis with a corresponding increase or decrease in the

Edgar Filing: PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST - Form N-CSR

cost basis of the security. Premiums and discounts related to certain mortgage-backed securities are amortized or accreted in proportion to the monthly paydowns. Interest and dividend income payable by delivery of additional shares is reclassified as PIK ("payment-in-kind") income upon receipt and is included in interest income.

Security transactions are recorded as of trade date. Gains and losses on sales of investments are calculated on the identified cost method for both financial reporting and federal income tax purposes.

C. Federal Income Taxes

It is the Trust's policy to comply with the requirements of the Internal Revenue Code applicable to regulated investment companies and to distribute all of its net taxable income and net realized capital gains, if any, to its shareowners. Therefore, no provision for federal Income taxes is required. As of March 31, 2018, the Trust did not accrue any interest or penalties with respect to uncertain tax positions, which, if applicable, would be recorded as an income tax expense on the Statement of Operations. Tax returns filed within the prior three years remain subject to examination by federal and state tax authorities.

The amount and character of income and capital gain distributions to shareowners are determined in accordance with federal income tax rules, which may differ from U.S. GAAP. Distributions in excess of net investment income or net realized gains are temporary overdistributions for financial statement purposes resulting from differences in the recognition or reclassification of income or distributions for financial statement and tax purposes. Capital accounts within the financial statements are adjusted for permanent book/tax differences to reflect tax character, but are not adjusted for temporary differences.

30 Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/18

At March 31, 2018, the Trust reclassified \$18,242,633 to decrease paid-in capital, \$403,149 to increase undistributed net investment income and \$17,839,484 to decrease accumulated net realized loss on investments to reflect permanent book/tax differences. These adjustments have no impact on the net assets or results of operations.

At March 31, 2018, the Trust was permitted to carry forward \$1,186,929 of short-term capital losses and \$26,097,368 of long-term capital losses without limitation. Additionally, at March 31, 2018, the Trust had a net capital loss carry forward of \$2,659,411 which will expire in 2019 if not utilized. Capital loss not utilized and expired in 2018 amounts to \$18,242,633. Since unlimited losses are required to be used first, loss carry forwards that are subject to expiration may be more likely to expire unused.

The tax character of distributions paid to shareowners during the years ended March 31, 2018 and March 31, 2017 were as follows:

	2018	2017
Distributions paid from:		
Tax exempt income	\$16,843,525	\$18,477,950
Ordinary income	478,960	621,291

Total	\$17,322,485	\$19,099,241
-------	--------------	--------------

The following shows the components of distributable earnings (losses) on a federal income tax basis at March 31, 2018:

	2018
Distributable earnings:	
Undistributed ordinary income	\$ 351,344
Capital loss carryforward	(29,943,708)
Other book/tax temporary differences	247,527
Undistributed Tax-Exempt Income	2,337,843
Unrealized appreciation	15,662,094
Total	\$(11,344,900)

The difference between book-basis and tax-basis unrealized appreciation/depreciation is primarily attributable to the book/tax differences in the accrual of income on securities in default, the difference between book and tax amortization methods and discounts on fixed income securities.

Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/18 31

D. Automatic Dividend Reinvestment Plan

All shareowners whose shares are registered in their own names automatically participate in the Automatic Dividend Reinvestment Plan (the "Plan"), under which participants receive all dividends and capital gain distributions (collectively, dividends) in full and fractional shares of the Trust in lieu of cash. Shareowners may elect not to participate in the Plan. Shareowners not participating in the Plan receive all dividends and capital gain distributions in cash. Participation in the Plan is completely voluntary and may be terminated or resumed at any time without penalty by notifying American Stock Transfer & Trust Company, the agent for shareowners in administering the Plan (the "Plan Agent"), in writing prior to any dividend record date; otherwise such termination or resumption will be effective with respect to any subsequently declared dividend or other distribution.

If a shareowner's shares are held in the name of a brokerage firm, bank or other nominee, the shareowner can ask the firm or nominee to participate in the Plan on the shareowner's behalf. If the firm or nominee does not offer the Plan, dividends will be paid in cash to the shareowner of record. A firm or nominee may reinvest a shareowner's cash dividends in shares of the Trust on terms that differ from the terms of the Plan.

Whenever the Trust declares a dividend on shares payable in cash, participants in the Plan will receive the equivalent in shares acquired by the Plan Agent either (i) through receipt of additional unissued but authorized shares from the Trust or (ii) by purchase of outstanding shares on the New York Stock Exchange or elsewhere. If, on the payment date for any dividend, the net asset value per share is equal to or less than the

market price per share plus estimated brokerage trading fees (market premium), the Plan Agent will invest the dividend amount in newly issued shares. The number of newly issued shares to be credited to each account will be determined by dividing the dollar amount of the dividend by the net asset value per share on the date the shares are issued, provided that the maximum discount from the then current market price per share on the date of issuance does not exceed 5%. If, on the payment date for any dividend, the net asset value per share is greater than the market value (market discount), the Plan Agent will invest the dividend amount in shares acquired in open-market purchases. There are no brokerage charges with respect to newly issued shares. However, each participant will pay a pro rata share of brokerage trading fees incurred with respect to the Plan Agent's open-market purchases. Participating in the Plan does not relieve shareowners from any federal, state or local taxes which may be due on dividends paid in any taxable year. Shareowners holding Plan shares in a brokerage account may be able to transfer the shares to another broker and continue to participate in the Plan.

32 Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/18

E. Risks

The value of securities held by the Trust 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, inflation, changes in interest rates, lack of liquidity in the bond markets or adverse investor sentiment. In the past several years, financial markets have experienced increased volatility, depressed valuations, decreased liquidity and heightened uncertainty. These conditions may continue, recur, worsen or spread.

Interest rates in the U.S. recently have been historically low, so the Trust faces a heightened risk that interest rates may rise. A general rise in interest rates may cause investors to move out of fixed income securities on a large scale, which could adversely affect the price and liquidity of fixed income securities.

The municipal bond market can be susceptible to unusual volatility, particularly for lower-rated and unrated securities. Liquidity can be reduced unpredictably in response to overall economic conditions or credit tightening. Municipal issuers may be adversely affected by rising health care costs, increasing unfunded pension liabilities, and by the phasing out of federal programs providing financial support. Unfavorable conditions and developments relating to projects financed with municipal securities can result in lower revenues to issuers of municipal securities, potentially resulting in defaults. Issuers often depend on revenues from these projects to make principal and interest payments. The value of municipal securities can also be adversely affected by changes in the financial condition of one or more individual municipal issuers or insurers of municipal issuers, regulatory and political developments, tax law changes or other legislative actions, and by uncertainties and public perceptions concerning these and other factors. Municipal securities may be more susceptible to down-grades or defaults during recessions or similar periods of economic stress. In recent periods, an increasing number of municipal issuers in the United States have defaulted on obligations and commenced insolvency proceedings. Financial difficulties of municipal issuers may continue or get worse. To the extent the Trust invests significantly in a single state, including California, Massachusetts and Texas, or in securities the payments on which are dependent upon a single project or source of revenues, or that relate to a sector or industry, including health care facilities, education, transportation, special revenues and pollution control, the Trust will be

more susceptible to associated risks and developments.

With the increased use of technologies such as the Internet to conduct business, the Trust is susceptible to operational, information security and related risks. While the Trust's adviser has established business continuity plans in the event of, and risk management systems to prevent, limit or mitigate, such cyber-attacks, there are inherent limitations in such plans and systems including the possibility that certain risks have not been identified.

Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/18 33

Furthermore, the Trust cannot control the cybersecurity plans and systems put in place by service providers to the fund such as Brown Brothers Harriman & Co., the fund's custodian and accounting agent, and American Stock Transfer & Trust Company ("AST"), the Trust's transfer agent. In addition, many beneficial owners of Trust shares hold them through accounts at broker-dealers, retirement platforms and other financial market participants over which neither the Trust nor Amundi Pioneer exercises control. Each of these may in turn rely on service providers to them, which are also subject to the risk of cyber-attacks. Cybersecurity failures or breaches at Amundi Pioneer or the Trust's service providers or intermediaries have the ability to cause disruptions and impact business operations potentially resulting in financial losses, interference with the Trust's ability to calculate its NAV, impediments to trading, the inability of Trust shareholders to effect share purchases or receive distributions, loss of or unauthorized access to private shareholder information and violations of applicable privacy and other laws, regulatory fines, penalties, reputational damage, or additional compliance costs. Such costs and losses may not be covered under any insurance. In addition, maintaining vigilance against cyber-attacks may involve substantial costs over time, and system enhancements may themselves be subject to cyber-attacks.

2. Management Agreement

The Adviser manages the Trust's portfolio. Management fees payable under the Trust's Advisory Agreement with the Adviser are calculated daily at the annual rate of 0.60% of the Trust's average daily managed assets. "Managed assets" means (a) the total assets of the Trust, including any form of investment leverage, minus (b) all accrued liabilities incurred in the normal course of operations, which shall not include any liabilities or obligations attributable to investment leverage obtained through (i) indebtedness of any type (including, without limitation, borrowing through a credit facility or the issuance of debt securities), (ii) the issuance of preferred stock or other similar preference securities, and/or (iii) any other means. For the year ended March 31, 2018, the net management fee was 0.60% of the Trust's average daily managed assets, which was equivalent to 0.92% of the Trust's average daily net assets.

In addition, under the Adviser's management and administration agreements, certain other services and costs are paid by the Adviser and reimbursed by the Trust. At March 31, 2018, \$28,366, was payable to the Adviser related to management costs, administrative costs and certain other services is included in "Due to affiliates" on the Statement of Assets and Liabilities.

34 Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/18

3. Transfer Agent

American Stock Transfer & Trust Company ("AST") serves as the transfer agent with respect to the Trust's common shares. The Trust pays AST an annual fee, as

Edgar Filing: PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST - Form N-CSR

is agreed to from time to time by the Trust and AST, for providing such services.

In addition, the Trust reimbursed the transfer agent for out-of-pocket expenses incurred by the transfer agent related to shareowner communications activities such as proxy and statement mailings and outgoing calls.

Deutsche Bank Trust Company Americas ("Deutsche Bank") served as the transfer agent, registrar, dividend-paying agent and auction agent with respect to the Trust's auction preferred shares ("APS"). The Trust paid Deutsche Bank an annual fee for providing such services.

4. Trust Shares

There are an unlimited number of common shares of beneficial interest authorized.

Transactions in common shares of beneficial interest for the years ended March 31, 2018 and March 31, 2017 were as follows:

	3/31/18	3/31/17
Shares outstanding at beginning of year	23,899,020	23,822,909
Reinvestment of distributions	--	76,111
Shares outstanding at end of year	23,899,020	23,899,020

The Trust may classify or reclassify any unissued shares of beneficial interest into one or more series of preferred shares of beneficial interest.

As of March 31, 2018, the Trust has outstanding 1,600 Variable Rate MuniFund Term Preferred Shares Series 2021 ("series 2021 VMTP Shares or "VMTP Shares"). The trust issued the VMTP Shares on February 20, 2018. See Note 5 for additional information.

Prior to February 20, 2018, the Trust had outstanding 3,000 Series A APS and 3,000 Series B APS. The Trust redeemed all outstanding Series A APS and Series B APS on February 20, 2018. See Note 6 for additional information.

5. Variable Rate MuniFund Term Preferred Shares

The Trust has 1,600 shares issued and outstanding of Series 2021 VMTP Shares, with a liquidation preference of \$100,000 per share. VMTP Shares are issued via private placement and are not publicly available.

The Trust is obligated to redeem its VMTP Shares by the date as specified in its offering document ("Term Redemption Date"), unless earlier redeemed by the Trust. VMTP Shares are subject to optional and mandatory redemption in

Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/18 35

certain circumstances. The VMTP Shares may be redeemed at the option of the Trust, subject to payment of premium for approximately one year following the date of issuance ("Optional Redemption Date"), and at the redemption price per share thereafter. The redemption price per share is equal to the sum of the

Edgar Filing: PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST - Form N-CSR

liquidation preference per share plus any accumulated but unpaid dividends. The Trust may be obligated to redeem a certain amount of the VMTP Shares if it fails to maintain certain asset coverage and leverage ratio requirements and such failures are not cured by the applicable cure date. The Term Redemption Date and Optional Redemption Date for the Trust's Series 2021 VMTP Shares are August 2, 2021 and February 28, 2019, respectively.

VMTP Shares are subject to restrictions on transfer, generally do not trade, and market quotations are generally not available. VMTP Shares are short-term or short/intermediate-term instruments that pay a variable dividend rate tied to a short-term index, plus an additional fixed "spread" amount established at the time of issuance. For financial reporting purposes, the liquidation preference of VMTP Shares is a liability and is recognized as a component of "Variable Rate MuniFund Term Preferred Shares, net of deferred offering costs" on the Statement of Assets and Liabilities.

Dividends on the VMTP Shares (which are treated as interest payments for financial reporting purposes) are declared daily. The dividend rate for the VMTP Shares is determined weekly. Unpaid dividends on VMTP Shares are recognized as a component of "Dividend payable" on the Statement of Assets and Liabilities. From February 22, 2018 (issuance) through March 31, 2018, the Series 2021 VMTP Shares paid an average dividend rate of 2.26%.

Costs incurred in connection with the Trust's offering of VMTP Shares were recorded as a deferred charge, which is being amortized over the life of the shares and is recognized as a component of "Variable Rate MuniFund Term Preferred Shares, net of deferred offering costs" on the Statement of Assets and Liabilities.

Transactions in the Series 2021 VMTP Shares during the Trust's current and prior reporting periods were as follows:

	Year Ended 3/31/18	
	Shares	Amount
VMTP Shares issued	1,600	\$160,000,000
VMTP Shares exchanged	--	--
Net increase (decrease)	1,600	\$160,000,000

36 Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/18

6. Redemption of APS

The Trust redeemed all of its outstanding APS at the liquidation preference per share, together with accrued and unpaid dividends, if any, as of the redemption date as follows:

Series	Shares Outstanding	Redemption Date	Preference Per Share	Accrued and Unpaid Dividends Per Share

A	3,000	February 20, 2018	\$25,000	\$18,840
B	3,000	February 20, 2018	\$25,000	\$19,260

7. Dividends to APS

Prior to the redemption of the Trust's APS (See Note 6), dividends on Series A and Series B were cumulative at a rate which reset every seven days based on the results of an auction. Since February 2008, the Trust's auctions related to the APS failed. Accordingly, during the period, dividends were paid at the maximum rate on the auction dates described in the prospectus for the APS. The maximum rate for each series was 125% of the 7 day commercial paper rate or adjusted Kenny rate. Dividend rates on APS ranged from 1.276% to 3.491% during the year ended March 31, 2018.

8. Subsequent Events

A monthly dividend was declared on May 4, 2018 from undistributed and accumulated net investment income of \$0.0525 per common share payable May 31, 2018, to common shareowners of record on May 16, 2018.

Subsequent to March 31, 2018, dividends declared and paid on VMTP Shares totaled \$288,000 through April 30, 2018.

Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/18 37

Report of Independent Registered Public Accounting Firm

To the Board of Trustees and the Shareholders of
Pioneer Municipal High Income Advantage Trust:

Opinion on the Financial Statements

We have audited the accompanying statement of assets and liabilities of Pioneer Municipal High Income Advantage Trust (the "Trust"), including the schedule of investments, as of March 31, 2018, and the related statements of operations, changes in net assets, and the financial highlights for the year then ended and the related notes and the financial highlights for the year ended March 31, 2014 (collectively referred to as the "financial statements"). The statement of changes in net assets for the year ended March 31, 2017 and the financial highlights for the periods ended March 31, 2015, March 31, 2016 and March 31, 2017 were audited by another independent registered public accounting firm whose report, dated May 26, 2017, expressed an unqualified opinion on the statement of changes in net assets and those financial highlights. In our opinion, the financial statements present fairly, in all material respects, the financial position of Pioneer Municipal High Income Advantage Trust at March 31, 2018, the results of its operations, the changes in its net assets, and the financial highlights for the year ended and the financial highlights for the year ended March 31, 2014, in conformity with U.S. generally accepted accounting principles.

Basis for Opinion

These financial statements are the responsibility of the Trust's management. Our responsibility is to express an opinion on the Trust's financial statements based on our audits. We are a public accounting firm registered with the Public

Edgar Filing: PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST - Form N-CSR

Company Accounting Oversight Board (United States) ("PCAOB") and are required to be independent with respect to the Trust in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement, whether due to error or fraud. The Trust is not required to have, nor were we engaged to perform, an audit of the Trust's internal control over financial reporting. As part of our audits, we are required to obtain an understanding of internal control over financial reporting, but not for the purpose of expressing an opinion on the effectiveness of the Trust's internal control over financial reporting. Accordingly, we express no such opinion.

38 Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/18

Our audits included performing procedures to assess the risks of material misstatement of the financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the financial statements. Our procedures included confirmation of securities owned as of March 31, 2018, by correspondence with the custodian and brokers. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the financial statements. We believe that our audits provide a reasonable basis for our opinion.

/s/ Ernst & Young LLP

Boston, Massachusetts

We have served as the Trust's auditor since 2017.

May 29, 2018

Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/18 39

ADDITIONAL INFORMATION (unaudited)

During the period, there have been no material changes in the Trust's investment objective or fundamental policies that have not been approved by the shareowners. There have been no changes in the Trust's charter or By-Laws that would delay or prevent a change in control of the Trust which has not been approved by the shareowners. During the period, there have been no changes in the principal risk factors associated with investment in the Trust. There were no changes in the persons who are primarily responsible for the day-to-day management of the Trust's portfolio.

Notice is hereby given in accordance with Section 23(c) of the Investment Company Act of 1940 that the Trust may purchase, from time to time, its common shares in the open market.

Change in Independent Registered Public Accounting Firm

Prior to July 3, 2017 Pioneer Investment Management, Inc. (the "Adviser"), the Trust's investment adviser, was an indirect, wholly owned subsidiary of UniCredit S.p.A. ("UniCredit"). On that date, UniCredit completed the sale of its Pioneer Investments business, which includes the Adviser, to Amundi (the "Transaction"). As a result of the Transaction, the Adviser became an indirect, wholly owned subsidiary of Amundi. Amundi is controlled by Credit Agricole S.A. Amundi is headquartered in Paris, France, and, as of September 30, 2016, had

Edgar Filing: PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST - Form N-CSR

more than \$1.1 trillion in assets under management worldwide.

Deloitte & Touche LLP ("D&T"), the Trust's previous independent registered public accounting firm, informed the Audit Committee and the Board that it would no longer be independent with respect to the Trust upon the completion of the Transaction as a result of certain services being provided to Amundi and Credit Agricole, and, accordingly, that it intended to resign as the Trust's independent registered public accounting firm upon the completion of the Transaction. D&T's resignation was effective on July 3, 2017, when the Transaction was completed.

During the periods as to which D&T has served as the Trust's independent registered public accounting firm, including the Trust's two most recent fiscal years, D&T's reports on the Trust's financial statements have not contained an adverse opinion or disclaimer of opinion and have not been qualified or modified as to uncertainty, audit scope or accounting principles. Further, there have been no disagreements with D&T on any matter of accounting principles or practices, financial statement disclosure, or auditing scope or procedure, which, if not resolved to the satisfaction of D&T, would have caused D&T to make reference to the subject matter of the disagreement in connection with its report on the financial statements. In addition, there have been no reportable events of the kind described in Item 304(a)(1)(v) of Regulation S-K under the Securities Exchange Act of 1934.

40 Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/18

Effective immediately following the completion of the Transaction on July 3, 2017, the Board, acting upon the recommendation of the Audit Committee, engaged a new independent registered public accounting firm, Ernst & Young LLP ("EY"), for the Trust's fiscal year ended July 31, 2017.

Prior to its engagement, EY had advised the Trust's Audit Committee that EY had identified the following matters, in each case relating to services rendered by other member firms of Ernst & Young Global Limited, all of which are located outside the United States, to UniCredit and certain of its subsidiaries during the period commencing July 1, 2016, that it determined to be inconsistent with the auditor independence rules set forth by the Securities and Exchange Commission ("SEC"): (a) project management support services to UniCredit in the Czech Republic, Germany, Italy, Serbia and Slovenia in relation to twenty-two projects, that were determined to be inconsistent with Rule 2-01(c)(4)(vi) of Regulation S-X (management functions); (b) two engagements for UniCredit in Italy where fees were contingent/success based and that were determined to be inconsistent with Rule 2-01(c)(5) of Regulation S-X (contingent fees); (c) four engagements where legal and expert services were provided to UniCredit in the Czech Republic and Germany, and twenty engagements where the legal advisory services were provided to UniCredit in Austria, Czech Republic, Italy and Poland, that were determined to be inconsistent with Rule 2-01(c)(4)(ix) and (x) of Regulation S-X (legal and expert services); and (d) two engagements for UniCredit in Italy involving assistance in the sale of certain assets, that were determined to be inconsistent with Rule 2-01(c)(4)(viii) of Regulation S-X (broker-dealer, investment adviser or investment banking services). None of the foregoing services involved the Trust, any of the other Trusts in the Pioneer Family of Trusts or any other Pioneer entity sold by UniCredit in the Transaction.

EY advised the Audit Committee that it had considered the matters described above and had concluded that such matters would not impair EY's ability to exercise objective and impartial judgment in connection with the audits of the financial statements of the Trust under the SEC and Public Company Accounting Oversight Board independence rules, and that a reasonable investor with knowledge of all relevant facts and circumstances would reach the same

Edgar Filing: PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST - Form N-CSR

conclusion. Management and the Audit Committee considered these matters and discussed the matters with EY and, based upon EY's description of the matters and statements made by EY, Management and the Audit Committee believe that EY will be capable of exercising objective and impartial judgment in connection with the audits of the financial statements of the Trust, and Management further believes that a reasonable investor with knowledge of all relevant facts and circumstances would reach the same conclusion.

Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/18 41

Trustees, Officers and Service Providers

Investment Adviser
Amundi Pioneer Asset Management, Inc.

Custodian and Sub-Administrator
Brown Brothers Harriman & Co.

Independent Registered Public Accounting Firm
Ernst & Young LLP

Principal Underwriter
Amundi Pioneer Distributor, Inc.

Legal Counsel
Morgan, Lewis & Bockius LLP

Shareowner Services and Transfer Agent
American Stock Transfer & Trust Company

Proxy Voting Policies and Procedures of the Fund are available without charge, upon request, by calling our toll free number (1-800-225-6292). Information regarding how the Fund voted proxies relating to portfolio securities during the most recent 12-month period ended June 30 is publicly available to shareowners at www.amundipioneer.com. This information is also available on the Securities and Exchange Commission's web site at www.sec.gov.

Trustees and Officers

The Trust's Trustees and officers are listed below, together with their principal occupations and other directorships they have held during at least the past five years. Trustees who are interested persons of the Trust within the meaning of the 1940 Act are referred to as Interested Trustees. Trustees who are not interested persons of the Trust are referred to as Independent Trustees. Each of the Trustees serves as a Trustee of each of the 44 U.S. registered investment portfolios for which Amundi Pioneer serves as investment adviser (the "Pioneer Funds"). The address for all Trustees and all officers of the Trust is 60 State Street, Boston, Massachusetts 02109.

The Statement of Additional Information of the Fund includes additional information about the Trustees and is available, without charge, upon request, by calling 1-800-225-6292.

42 Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/18

Independent Trustees

Edgar Filing: PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST - Form N-CSR

Name, Age and Position Held With the Trust	Term of Office and Length of Service	Principal Occupation
Thomas J. Perna (67) Chairman of the Board and Trustee	Class III Trustee since 2006. Term expires in 2018.	Private investor (2004 - 2008 and 2013 - present); Chairman (2008 - 2013) and Chief Executive Officer (2008 - 2012), Quadriserv, Inc. (technology products for securities lending industry); and Senior Executive Vice President, The Bank of New York (financial and securities services) (1986 - 2004)
David R. Bock (74) Trustee	Class I Trustee since 2005. Term expires in 2019.	Managing Partner, Federal City Capital Advisors (corporate advisory services company) (1997 - 2004 and 2008 - present); Interim Chief Executive Officer, Oxford Analytica, Inc. (privately held research and consulting company) (2010); Executive Vice President and Chief Financial Officer, I-trax, Inc. (publicly traded health care services company) (2004 - 2007); and Executive Vice President and Chief Financial Officer, Pedestal Inc. (internet-based mortgage trading company) (2000 - 2002); Private Consultant (1995 - 1997); Managing Director, Lehman Brothers (1992 - 1995); Executive, The World Bank (1979 - 1992)
Benjamin M. Friedman (73) Trustee	Class II Trustee since 2008. Term expires in 2020.	William Joseph Maier Professor of Political Economy, Harvard University (1972 - present)

Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/18 43

Independent Trustees (continued)

Name, Age and Position Held With the Trust	Term of Office and Length of Service	Principal Occupation
Margaret B.W. Graham (70) Trustee	Class II Trustee since 2002. Term expires in 2020.	Founding Director, Vice-President and Corporate Secretary, The Winthrop Group, Inc. (consulting firm) (1982 - present); Desautels Faculty of Management, McGill University (1999 - 2017); and Manager of Research

Edgar Filing: PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST - Form N-CSR

Operations and Organizational Learning, Xerox PARC, Xerox's advance research center (1990-1994)

Lorraine H. Monchak (62) Trustee	Class I Trustee since 2015. Term expires in 2019.	Chief Investment Officer, 1199 SEIU Funds (healthcare workers union pension funds) (2001 - present); Vice President - International Investments Group, American International Group, Inc. (insurance company) (1993 - 2001); Vice President, Corporate Finance and Treasury Group, Citibank, N.A. (1980 - 1986 and 1990 - 1993); Vice President - Asset/Liability Management Group, Federal Farm Funding Corporation (government-sponsored issuer of debt securities) (1988 - 1990); Mortgage Strategies Group, Shearson Lehman Hutton, Inc. (investment bank) (1987 - 1988); Mortgage Strategies Group, Drexel Burnham Lambert, Ltd. (investment bank) (1986 - 1987)
Marguerite A. Piret (69) Trustee	Class III Trustee since 2002. Term expires in 2018.	President and Chief Executive Officer, Newbury Piret Company (investment banking firm) (1981 - present)
Fred J. Ricciardi (71) Trustee	Class III Trustee since 2014. Term expires in 2018.	Consultant (investment company services) (2012 - present); Executive Vice President, BNY Mellon (financial and investment company services) (1969 - 2012); Director, BNY International Financing Corp. (financial services) (2002 - 2012); and Director, Mellon Overseas Investment Corp. (financial services) (2009 - 2012)

44 Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/18

Interested Trustees

Name, Age and Position Held With the Trust	Term of Office and Length of Service	Principal Occupation
Lisa M. Jones (56)* Trustee, President and Chief Executive Officer	Class I Trustee since 2015. Term expires in 2019.	Director, CEO and President of Amundi Pioneer Asset Management USA, Inc. (since September 2014); Director, CEO and President of Amundi Pioneer Asset Management, Inc. (since September 2014); Director, CEO and President of

Edgar Filing: PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST - Form N-CSR

Amundi Pioneer Distributor, Inc. (since September 2014); Director, CEO and President of Amundi Pioneer Institutional Asset Management, Inc. (since September 2014); Chair, Amundi Pioneer Asset Management USA, Inc., Amundi Pioneer Distributor, Inc. and Amundi Pioneer Institutional Asset Management, Inc. (September 2014 - 2018); Managing Director, Morgan Stanley Investment Management (2010 - 2013); and Director of Institutional Business, CEO of International, Eaton Vance Management (2005 - 2010)

Kenneth J. Taubes (60)* Trustee	Class II Trustee since 2014. Term expires in 2020.	Director and Executive Vice President (since 2008) and Chief Investment Officer, U.S. (since 2010) of Amundi Pioneer Asset Management USA, Inc.; Executive Vice President and Chief Investment Officer, U.S. of Amundi Pioneer (since 2008); Executive Vice President of Amundi Pioneer Institutional Asset Management, Inc. (since 2009); Portfolio Manager of Amundi Pioneer (since 1999)
------------------------------------	--	---

* Ms. Jones and Mr. Taubes are Interested Trustees because they are officers or directors of the Trust's investment adviser and certain of its affiliates.

Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/18 45

Trust Officers

Name, Age and Position Held With the Trust	Term of Office and Length of Service	Principal Occupation
Christopher J. Kelley (53) Secretary and Chief Legal Officer	Since 2003. Serves at the discretion of the Board	Vice President and Associate General Counsel of Amundi Pioneer since January 2008; Secretary and Chief Legal Officer of all of the Pioneer Funds since June 2010; Assistant Secretary of all of the Pioneer Funds from September 2003 to May 2010; and Vice President and Senior Counsel of Amundi Pioneer from July 2002 to December 2007
Carol B. Hannigan (57) Assistant Secretary	Since 2010. Serves at the discretion of the Board	Fund Governance Director of Amundi Pioneer since December 2006 and Assistant Secretary of all the Pioneer Funds since June 2010; Manager - Fund Governance of Amundi Pioneer from December 2003 to November 2006; and

Edgar Filing: PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST - Form N-CSR

Senior Paralegal of Amundi Pioneer
from January 2000 to November 2003

Thomas Reyes (55) Assistant Secretary	Since 2010. Serves at the discretion of the Board	Senior Counsel of Amundi Pioneer since May 2013 and Assistant Secretary of all the Pioneer Funds since June 2010; and Counsel of Amundi Pioneer from June 2007 to May 2013
--	---	--

Mark E. Bradley (58) Treasurer and Chief Financial and Accounting Officer	Since 2008. Serves at the discretion of the Board	Vice President - Fund Treasury of Amundi Pioneer; Treasurer of all of the Pioneer Funds since March 2008; Deputy Treasurer of Amundi Pioneer from March 2004 to February 2008; and Assistant Treasurer of all of the Pioneer Funds from March 2004 to February 2008
---	---	--

46 Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/18

Name, Age and Position Held With the Trust	Term of Office and Length of Service	Principal Occupation
Luis I. Presutti (53) Assistant Treasurer	Since 2003. Serves at the discretion of the Board	Director - Fund Treasury of Amundi Pioneer; and Assistant Treasurer of all of the Pioneer Funds
Gary Sullivan (60) Assistant Treasurer	Since 2003. Serves at the discretion of the Board	Fund Accounting Manager - Fund Treasury of Amundi Pioneer; and Assistant Treasurer of all of the Pioneer Funds
David F. Johnson (38) Assistant Treasurer	Since 2009. Serves at the discretion of the Board	Fund Administration Manager - Fund Treasury of Amundi Pioneer since November 2008; Assistant Treasurer of all of the Pioneer Funds since January 2009; and Client Service Manager - Institutional Investor Services at State Street Bank from March 2003 to March 2007
Jean M. Bradley (65) Chief Compliance Officer	Since 2010. Serves at the discretion of the Board	Chief Compliance Officer of Amundi Pioneer and of all the Pioneer Funds since March 2010; Chief Compliance Officer of Amundi Pioneer Institutional Asset Management, Inc. since January 2012; Chief Compliance Officer of Vanderbilt Capital Advisors, LLC since July 2012; Director of Adviser and Portfolio Compliance at Amundi Pioneer since October 2005; and Senior Compliance Officer for Columbia Management Advisers, Inc. from October 2003 to October 2005

Edgar Filing: PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST - Form N-CSR

Kelly O'Donnell (47) Anti-Money Laundering Officer	Since 2006. Serves at the discretion of the Board	Vice President - Investor Services Group of Amundi Pioneer and Anti-Money Laundering Officer of all the Pioneer Funds since 2006
---	---	---

Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/18 47

This page is for your notes.

48 Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/18

This page is for your notes.

Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/18 49

This page is for your notes.

50 Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/18

This page is for your notes.

Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/18 51

This page is for your notes.

52 Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/18

How to Contact Amundi Pioneer

We are pleased to offer a variety of convenient ways for you to contact us for assistance or information.

You can call American Stock Transfer & Trust Company (AST) for:

Account Information	1-800-225-6292
---------------------	----------------

Or write to AST:

For	Write to
General inquiries, lost dividend checks, change of address, lost stock certificates, stock transfer	American Stock Transfer & Trust Operations Center 6201 15th Ave. Brooklyn, NY 11219
Dividend reinvestment plan (DRIP)	American Stock Transfer & Trust Wall Street Station P.O. Box 922 New York, NY 10269-0560

Edgar Filing: PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST - Form N-CSR

Website

www.amstock.com

For additional information, please contact your investment advisor or visit our web site www.amundipioneer.com.

The Trust files a complete schedule of investments with the Securities and Exchange Commission for the first and third quarters for each fiscal year on Form N-Q. Shareowners may view the filed Form N-Q by visiting the Commission's web site at www.sec.gov. The filed form may also be viewed and copied at the Commission's Public Reference Room in Washington, DC. Information regarding the operations of the Public Reference Room may be obtained by calling 1-800-SEC-0330.

[LOGO] Amundi Pioneer
=====

ASSET MANAGEMENT

Amundi Pioneer Asset Management, Inc.
60 State Street
Boston, MA 02109
www.amundipioneer.com

Securities offered through Amundi Pioneer Distributor, Inc.
60 State Street, Boston, MA 02109
Underwriter of Pioneer Mutual Funds, Member SIPC
(C) 2018 Amundi Pioneer Asset Management 19205-12-0518

ITEM 2. CODE OF ETHICS.

(a) Disclose whether, as of the end of the period covered by the report, the registrant has adopted a code of ethics that applies to the registrant's principal executive officer, principal financial officer, principal accounting officer or controller, or persons performing similar functions, regardless of whether these individuals are employed by the registrant or a third party. If the registrant has not adopted such a code of ethics, explain why it has not done so.

The registrant has adopted, as of the end of the period covered by this report, a code of ethics that applies to the registrant's principal executive officer, principal financial officer, principal accounting officer and controller.

(b) For purposes of this Item, the term "code of ethics" means written standards that are reasonably designed to deter wrongdoing and to promote:

- (1) Honest and ethical conduct, including the ethical handling of actual or apparent conflicts of interest between personal and professional relationships;
- (2) Full, fair, accurate, timely, and understandable disclosure in reports and documents that a registrant files with, or submits to, the Commission and in other public communications made by the registrant;
- (3) Compliance with applicable governmental laws, rules, and regulations;
- (4) The prompt internal reporting of violations of the code to an appropriate person or persons identified in the code; and

Edgar Filing: PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST - Form N-CSR

(5) Accountability for adherence to the code.

(c) The registrant must briefly describe the nature of any amendment, during the period covered by the report, to a provision of its code of ethics that applies to the registrant's principal executive officer, principal financial officer, principal accounting officer or controller, or persons performing similar functions, regardless of whether these individuals are employed by the registrant or a third party, and that relates to any element of the code of ethics definition enumerated in paragraph (b) of this Item. The registrant must file a copy of any such amendment as an exhibit pursuant to Item 10(a), unless the registrant has elected to satisfy paragraph (f) of this Item by posting its code of ethics on its website pursuant to paragraph (f)(2) of this Item, or by undertaking to provide its code of ethics to any person without charge, upon request, pursuant to paragraph (f)(3) of this Item.

The registrant has made no amendments to the code of ethics during the period covered by this report.

(d) If the registrant has, during the period covered by the report, granted a waiver, including an implicit waiver, from a provision of the code of ethics to the registrant's principal executive officer, principal financial officer, principal accounting officer or controller, or persons performing similar functions, regardless of whether these individuals are employed by the registrant or a third party, that relates to one or more of the items set forth in paragraph (b) of this Item, the registrant must briefly describe the nature of the waiver, the name of the person to whom the waiver was granted, and the date of the waiver.

Not applicable.

(e) If the registrant intends to satisfy the disclosure requirement under paragraph (c) or (d) of this Item regarding an amendment to, or a waiver from, a provision of its code of ethics that applies to the registrant's principal executive officer, principal financial officer, principal accounting officer or controller, or persons performing similar functions and that relates to any element of the code of ethics definition enumerated in paragraph (b) of this Item by posting such information on its Internet website, disclose the registrant's Internet address and such intention.

Not applicable.

(f) The registrant must:

(1) File with the Commission, pursuant to Item 12(a)(1), a copy of its code of ethics that applies to the registrant's principal executive officer, principal financial officer, principal accounting officer or controller, or persons performing similar functions, as an exhibit to its annual report on this Form N-CSR (see attachment);

(2) Post the text of such code of ethics on its Internet website and disclose, in its most recent report on this Form N-CSR, its Internet address and the fact that it has posted such code of ethics on its Internet website; or

(3) Undertake in its most recent report on this Form N-CSR to provide to any person without charge, upon request, a copy of such code of ethics and explain the manner in which such request may be made. See Item 10(2)

ITEM 3. AUDIT COMMITTEE FINANCIAL EXPERT.

Edgar Filing: PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST - Form N-CSR

- (a) (1) Disclose that the registrant's board of trustees has determined that the registrant either:
- (i) Has at least one audit committee financial expert serving on its audit committee; or
 - (ii) Does not have an audit committee financial expert serving on its audit committee.

The registrant's Board of Trustees has determined that the registrant has at least one audit committee financial expert.

(2) If the registrant provides the disclosure required by paragraph (a)(1)(i) of this Item, it must disclose the name of the audit committee financial expert and whether that person is "independent." In order to be considered "independent" for purposes of this Item, a member of an audit committee may not, other than in his or her capacity as a member of the audit committee, the board of trustees, or any other board committee:

- (i) Accept directly or indirectly any consulting, advisory, or other compensatory fee from the issuer; or
- (ii) Be an "interested person" of the investment company as defined in Section 2(a)(19) of the Act (15 U.S.C. 80a-2(a)(19)).

Ms. Marguerite A. Piret, an independent trustee, is such an audit committee financial expert.

(3) If the registrant provides the disclosure required by paragraph (a)(1)(ii) of this Item, it must explain why it does not have an audit committee financial expert.

Not applicable.

ITEM 4. PRINCIPAL ACCOUNTANT FEES AND SERVICES.

(a) Disclose, under the caption AUDIT FEES, the aggregate fees billed for each of the last two fiscal years for professional services rendered by the principal accountant for the audit of the registrant's annual financial statements or services that are normally provided by the accountant in connection with statutory and regulatory filings or engagements for those fiscal years.

The audit fees for the Trust were \$50,500 payable to Ernst & Young LLP for the year ended March 31, 2018 and \$48,714 payable to Deloitte & Touche LLP for the year ended March 31, 2017.

(b) Disclose, under the caption AUDIT-RELATED FEES, the aggregate fees billed in each of the last two fiscal years for assurance and related services by the principal accountant that are reasonably related to the performance of the audit of the registrant's financial statements and are not reported under paragraph (a) of this Item. Registrants shall describe the nature of the services comprising the fees disclosed under this category.

There were no audit-related services in 2018 or 2017.

(c) Disclose, under the caption TAX FEES, the aggregate fees billed in each of the last two fiscal years for professional services rendered by the principal accountant for tax compliance, tax advice, and tax planning. Registrants shall

Edgar Filing: PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST - Form N-CSR

describe the nature of the services comprising the fees disclosed under this category.

The tax fees for the Trust were \$8,028 payable to Ernst & Young LLP for the year ended March 31, 2018 and \$9,904 payable to Deloitte & Touche LLP for the year ended March 31, 2017.

(d) Disclose, under the caption ALL OTHER FEES, the aggregate fees billed in each of the last two fiscal years for products and services provided by the principal accountant, other than the services reported in paragraphs (a) through (c) of this Item. Registrants shall describe the nature of the services comprising the fees disclosed under this category.

There were no other fees in 2018 or 2017.

(e) (1) Disclose the audit committee's pre-approval policies and procedures described in paragraph (c) (7) of Rule 2-01 of Regulation S-X.

PIONEER FUNDS

APPROVAL OF AUDIT, AUDIT-RELATED, TAX AND OTHER SERVICES PROVIDED BY THE INDEPENDENT AUDITOR

SECTION I - POLICY PURPOSE AND APPLICABILITY

The Pioneer Funds recognize the importance of maintaining the independence of their outside auditors. Maintaining independence is a shared responsibility involving Amudi Pioneer Asset Management, Inc, the audit committee and the independent auditors.

The Funds recognize that a Fund's independent auditors: 1) possess knowledge of the Funds, 2) are able to incorporate certain services into the scope of the audit, thereby avoiding redundant work, cost and disruption of Fund personnel and processes, and 3) have expertise that has value to the Funds. As a result, there are situations where it is desirable to use the Fund's independent auditors for services in addition to the annual audit and where the potential for conflicts of interests are minimal. Consequently, this policy, which is intended to comply with Rule 210.2-01(C) (7), sets forth guidelines and procedures to be followed by the Funds when retaining the independent audit firm to perform audit, audit-related tax and other services under those circumstances, while also maintaining independence.

Approval of a service in accordance with this policy for a Fund shall also constitute approval for any other Fund whose pre-approval is required pursuant to Rule 210.2-01(c) (7) (ii).

In addition to the procedures set forth in this policy, any non-audit services that may be provided consistently with Rule 210.2-01 may be approved by the Audit Committee itself and any pre-approval that may be waived in accordance with Rule 210.2-01(c) (7) (i) (C) is hereby waived.

Selection of a Fund's independent auditors and their compensation shall be determined by the Audit Committee and shall not be subject to this policy.

SECTION II - POLICY

SERVICE CATEGORY	SERVICE CATEGORY DESCRIPTION	SPECIFIC PRE-APPROVED SERVICE SUBCATEGORIES
------------------	------------------------------	---

I. AUDIT SERVICES	Services that are directly related to performing the independent audit of the Funds	<ul style="list-style-type: none"> o Accounting research assistance o SEC consultation, registration statements, and reporting o Tax accrual related matters o Implementation of new accounting standards o Compliance letters (e.g. rating agency letters) o Regulatory reviews and assistance regarding financial matters o Semi-annual reviews (if requested) o Comfort letters for closed end offerings
-------------------	---	---

II. AUDIT-RELATED SERVICES	Services which are not prohibited under Rule 210.2-01(C)(4) (the "Rule") and are related extensions of the audit services support the audit, or use the knowledge/expertise gained from the audit procedures as a foundation to complete the project. In most cases, if the Audit-Related Services are not performed by the Audit firm, the scope of the Audit Services would likely increase. The Services are typically well-defined and governed by accounting professional standards (AICPA, SEC, etc.)	<ul style="list-style-type: none"> o AICPA attest and agreed-upon procedures o Technology control assessments o Financial reporting control assessments o Enterprise security architecture assessment
----------------------------	---	---

AUDIT COMMITTEE APPROVAL POLICY

AUDIT COMMITTEE REPORTING POLICY

<ul style="list-style-type: none"> o "One-time" pre-approval for the audit period for all pre-approved specific service subcategories. Approval of the independent auditors as auditors for a Fund shall constitute pre approval for these services. 	<ul style="list-style-type: none"> o A summary of all such services and related fees reported at each regularly scheduled Audit Committee meeting.
---	---

<ul style="list-style-type: none"> o "One-time" pre-approval for the fund fiscal year within a specified dollar limit for all pre-approved specific service subcategories 	<ul style="list-style-type: none"> o A summary of all such services and related fees (including comparison to specified dollar limits) reported quarterly.
<ul style="list-style-type: none"> o Specific approval is needed to exceed the pre-approved dollar limit for these services (see general 	

Edgar Filing: PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST - Form N-CSR

Audit Committee approval policy
below for details on obtaining
specific approvals)

- o Specific approval is needed to use the Fund's auditors for Audit-Related Services not denoted as "pre-approved", or to add a specific service subcategory as "pre-approved"

SECTION III - POLICY DETAIL, CONTINUED

SERVICE CATEGORY	SERVICE CATEGORY DESCRIPTION	SPECIFIC PRE-APPROVED SERVICE SUBCATEGORIES
III. TAX SERVICES	Services which are not prohibited by the Rule, if an officer of the Fund determines that using the Fund's auditor to provide these services creates significant synergy in the form of efficiency, minimized disruption, or the ability to maintain a desired level of confidentiality.	<ul style="list-style-type: none"> o Tax planning and support o Tax controversy assistance o Tax compliance, tax returns, excise tax returns and support o Tax opinions

AUDIT COMMITTEE APPROVAL POLICY	AUDIT COMMITTEE REPORTING POLICY
<ul style="list-style-type: none"> o "One-time" pre-approval for the fund fiscal year within a specified dollar limit 	<ul style="list-style-type: none"> o A summary of all such services and related fees (including comparison to specified dollar limits) reported quarterly.
<ul style="list-style-type: none"> o Specific approval is needed to exceed the pre-approved dollar limits for these services (see general Audit Committee approval policy below for details on obtaining specific approvals) 	
<ul style="list-style-type: none"> o Specific approval is needed to use the Fund's auditors for tax services not denoted as pre-approved, or to add a specific 	

Edgar Filing: PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST - Form N-CSR

service subcategory as
"pre-approved"

SECTION III - POLICY DETAIL, CONTINUED

SERVICE CATEGORY	SERVICE CATEGORY DESCRIPTION	SPECIFIC PRE-APPROVED SERVICE SUBCATEGORIES
IV. OTHER SERVICES A. SYNERGISTIC, UNIQUE QUALIFICATIONS	Services which are not prohibited by the Rule, if an officer of the Fund determines that using the Fund's auditor to provide these services creates significant synergy in the form of efficiency, minimized disruption, the ability to maintain a desired level of confidentiality, or where the Fund's auditors possess unique or superior qualifications to provide these services, resulting in superior value and results for the Fund.	<ul style="list-style-type: none"> o Business Risk Management support o Other control and regulatory compliance projects

AUDIT COMMITTEE APPROVAL POLICY	AUDIT COMMITTEE REPORTING POLICY
<ul style="list-style-type: none"> o "One-time" pre-approval for the fund fiscal year within a specified dollar limit o Specific approval is needed to exceed the pre-approved dollar limits for these services (see general Audit Committee approval policy below for details on obtaining specific approvals) o Specific approval is needed to use the Fund's auditors for "Synergistic" or "Unique Qualifications" Other Services not denoted as pre-approved to the left, or to add a specific service subcategory as "pre-approved" 	<ul style="list-style-type: none"> o A summary of all such services and related fees (including comparison to specified dollar limits) reported quarterly.

SECTION III - POLICY DETAIL, CONTINUED

SERVICE CATEGORY	SERVICE CATEGORY DESCRIPTION	SPECIFIC PROHIBITED SERVICE SUBCATEGORIES
PROHIBITED SERVICES	Services which result in the auditors losing independence status under the Rule.	<ol style="list-style-type: none"> 1. Bookkeeping or other services related to the accounting records or financial statements of the audit client* 2. Financial information systems design and implementation* 3. Appraisal or valuation services, fairness* opinions, or contribution-in-kind reports 4. Actuarial services (i.e., setting actuarial reserves versus actuarial audit work)* 5. Internal audit outsourcing services* 6. Management functions or human resources 7. Broker or dealer, investment advisor, or investment banking services 8. Legal services and expert services unrelated to the audit 9. Any other service that the Public Company Accounting Oversight Board determines, by regulation, is impermissible

AUDIT COMMITTEE APPROVAL POLICY	AUDIT COMMITTEE REPORTING POLICY
<ul style="list-style-type: none"> o These services are not to be performed with the exception of the(*) services that may be permitted if they would not be subject to audit procedures at the audit client (as defined in rule 2-01(f)(4)) level the firm providing the service. 	<ul style="list-style-type: none"> o A summary of all services and related fees reported at each regularly scheduled Audit Committee meeting will serve as continual confirmation that has not provided any restricted services.

GENERAL AUDIT COMMITTEE APPROVAL POLICY:

- o For all projects, the officers of the Funds and the Fund's auditors will each make an assessment to determine that any proposed projects will not impair independence.
- o Potential services will be classified into the four non-restricted service categories and the "Approval of Audit, Audit-Related, Tax and Other Services" Policy above will be applied. Any services outside the specific pre-approved service subcategories set forth above must be specifically

Edgar Filing: PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST - Form N-CSR

approved by the Audit Committee.

- o At least quarterly, the Audit Committee shall review a report summarizing the services by service category, including fees, provided by the Audit firm as set forth in the above policy.

(2) Disclose the percentage of services described in each of paragraphs (b) through (d) of this Item that were approved by the audit committee pursuant to paragraph (c) (7) (i) (C) of Rule 2-01 of Regulation S-X.

Non-Audit Services

Beginning with non-audit service contracts entered into on or after May 6, 2003, the effective date of the new SEC pre-approval rules, the Trust's audit committee is required to pre-approve services to affiliates defined by SEC rules to the extent that the services are determined to have a direct impact on the operations or financial reporting of the Trust. For the years ended March 31 2018 and 2017, there were no services provided to an affiliate that required the Trust's audit committee pre-approval.

(f) If greater than 50 percent, disclose the percentage of hours expended on the principal accountants engagement to audit the registrant's financial statements for the most recent fiscal year that were attributed to work performed by persons other than the principal accountant's full-time, permanent employees.

N/A

(g) Disclose the aggregate non-audit fees billed by the registrants accountant for services rendered to the registrant, and rendered to the registrants investment adviser (not including any sub-adviser whose role is primarily portfolio management and is subcontracted with or overseen by another investment adviser), and any entity controlling, controlled by, or under common control with the adviser that provides ongoing services to the registrant for each of the last two fiscal years of the registrant.

The aggregate non-audit fees for the Trust were \$8,028 payable to Ernst & Young LLP for the year ended March 31, 2018 and \$9,904 payable to Deloitte & Touche LLP for the year ended March 31, 2017.

(h) Disclose whether the registrants audit committee of the board of trustees has considered whether the provision of non-audit services that were rendered to the registrants investment adviser (not including any subadviser whose role is primarily portfolio management and is subcontracted with or overseen by another investment adviser), and any entity controlling, controlled by, or under common control with the investment adviser that provides ongoing services to the registrant that were not pre-approved pursuant to paragraph (c) (7) (ii) of Rule 2-01 of Regulation S-X is compatible with maintaining the principal accountant's independence.

The Fund's audit committee of the Board of Trustees has considered whether the provision of non-audit services that were rendered to the Affiliates (as defined) that were not pre- approved pursuant to paragraph (c) (7) (ii) of Rule 2-01 of Regulation S-X is

Edgar Filing: PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST - Form N-CSR

compatible with maintaining the principal accountant's independence.

ITEM 5. AUDIT COMMITTEE OF LISTED REGISTRANTS

(a) If the registrant is a listed issuer as defined in Rule 10A-3 under the Exchange Act (17 CFR 240.10A-3), state whether or not the registrant has a separately-designated standing audit committee established in accordance with Section 3(a)(58)(A) of the Exchange Act (15 U.S.C. 78c(a)(58)(A)). If the registrant has such a committee, however designated, identify each committee member. If the entire board of directors is acting as the registrant's audit committee as specified in Section 3(a)(58)(B) of the Exchange Act (15 U.S.C. 78c(a)(58)(B)), so state.

N/A

(b) If applicable, provide the disclosure required by Rule 10A-3(d) under the Exchange Act (17 CFR 240.10A-3(d)) regarding an exemption from the listing standards for audit committees.

N/A

ITEM 6. SCHEDULE OF INVESTMENTS.

File Schedule of Investments in securities of unaffiliated issuers as of the close of the reporting period as set forth in 210.1212 of Regulation S-X [17 CFR 210.12-12], unless the schedule is included as part of the report to shareholders filed under Item 1 of this Form.

Included in Item 1

ITEM 7. DISCLOSURE OF PROXY VOTING POLICIES AND PROCEDURES FOR CLOSED-END MANAGEMENT INVESTMENT COMPANIES.

A closed-end management investment company that is filing an annual report on this Form N-CSR must, unless it invests exclusively in non-voting securities, describe the policies and procedures that it uses to determine how to vote proxies relating to portfolio securities, including the procedures that the company uses when a vote presents a conflict between the interests of its shareholders, on the one hand, and those of the company's investment adviser; principal underwriter; or any affiliated person (as defined in Section 2(a)(3) of the Investment Company Act of 1940 (15 U.S.C. 80a-2(a)(3)) and the rules thereunder) of the company, its investment adviser, or its principal underwriter, on the other. Include any policies and procedures of the company's investment adviser, or any other third party, that the company uses, or that are used on the company's behalf, to determine how to vote proxies relating to portfolio securities.

Proxy Voting Policies and Procedures of
Pioneer Investment Management, Inc.

VERSION DATED July, 2004

Overview

Pioneer Investment Management, Inc. ("Pioneer") is a fiduciary that owes each of its client's duties of care and loyalty with respect to all services undertaken on the client's behalf, including proxy voting. When

Edgar Filing: PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST - Form N-CSR

Pioneer has been delegated proxy-voting authority for a client, the duty of care requires Pioneer to monitor corporate events and to vote the proxies. To satisfy its duty of loyalty, Pioneer must place its client's interests ahead of its own and must cast proxy votes in a manner consistent with the best interest of its clients. Pioneer will vote all proxies presented in a timely manner.

The Proxy Voting Policies and Procedures are designed to complement Pioneer's investment policies and procedures regarding its general responsibility to monitor the performance and/or corporate events of companies that are issuers of securities held in accounts managed by Pioneer. Pioneer's Proxy Voting Policies summarize Pioneer's position on a number of issues solicited by companies held by Pioneer's clients. The policies are guidelines that provide a general indication on how Pioneer would vote but do not include all potential voting scenarios.

Pioneer's Proxy Voting Procedures detail monitoring of voting, exception votes, and review of conflicts of interest and ensure that case-by-case votes are handled within the context of the overall guidelines (i.e. best interest of client). The overriding goal is that all proxies for US and non-US companies that are received promptly will be voted in accordance with Pioneer's policies or specific client instructions. All shares in a company held by Pioneer-managed accounts will be voted alike, unless a client has given us specific voting instructions on an issue or has not delegated authority to us or the Proxy Voting Oversight Group determines that the circumstances justify a different approach.

Pioneer does not delegate the authority to vote proxies relating to its clients to any of its affiliates, which include other subsidiaries of UniCredito.

Any questions about these policies and procedures should be directed to the Proxy Coordinator.

1

Proxy Voting Procedures

Proxy Voting Service

Pioneer has engaged an independent proxy voting service to assist in the voting of proxies. The proxy voting service works with custodians to ensure that all proxy materials are received by the custodians and are processed in a timely fashion. To the extent applicable, the proxy voting service votes all proxies in accordance with the proxy voting policies established by Pioneer. The proxy voting service will refer proxy questions to the Proxy Coordinator (described below) for instructions under circumstances where: (1) the application of the proxy voting guidelines is unclear; (2) a particular proxy question is not covered by the guidelines; or (3) the guidelines call for specific instructions on a case-by-case basis. The proxy voting service is also requested to call to the Proxy Coordinator's attention specific proxy questions that, while governed by a guideline, appear to involve unusual or controversial issues. Pioneer reserves the right to attend a meeting in person and may do so when it determines that the company or the matters to be voted on at the meeting are strategically important to its clients.

Proxy Coordinator

Pioneer's Director of Investment Operations (the "Proxy Coordinator") coordinates the voting, procedures and reporting of proxies on behalf of Pioneer's clients. The Proxy Coordinator will deal directly with the proxy voting service and, in the case of proxy questions referred by the proxy

voting service, will solicit voting recommendations and instructions from the Director of Portfolio Management US or, to the extent applicable, investment sub-advisers. The Proxy Coordinator is responsible for ensuring that these questions and referrals are responded to in a timely fashion and for transmitting appropriate voting instructions to the proxy voting service. The Proxy Coordinator is responsible for verifying with the Compliance Department whether Pioneer's voting power is subject to any limitations or guidelines issued by the client (or in the case of an employee benefit plan, the plan's trustee or other fiduciaries).

Referral Items

From time to time, the proxy voting service will refer proxy questions to the Proxy Coordinator that are described by Pioneer's policy as to be voted on a case-by-case basis, that are not covered by Pioneer's guidelines or where Pioneer's guidelines may be unclear with respect to the matter to be voted on. Under such certain circumstances, the Proxy Coordinator will seek a written voting recommendation from the Director of Portfolio Management US. Any such recommendation will include: (i) the manner in which the proxies should be voted; (ii) the rationale underlying any such decision; and (iii) the disclosure of any contacts or communications made between Pioneer and any outside parties concerning the proxy proposal prior to the time that the voting instructions are provided. In addition, the Proxy Coordinator will ask the Compliance Department to review the question for any actual or apparent conflicts of interest as described below under "Conflicts of

2

Interest." The Compliance Department will provide a "Conflicts of Interest Report," applying the criteria set forth below under "Conflicts of Interest," to the Proxy Coordinator summarizing the results of its review. In the absence of a conflict of interest, the Proxy Coordinator will vote in accordance with the recommendation of the Director of Portfolio Management US.

If the matter presents a conflict of interest for Pioneer, then the Proxy Coordinator will refer the matter to the Proxy Voting Oversight Group for a decision. In general, when a conflict of interest is present, Pioneer will vote according to the recommendation of the Director of Portfolio Management US where such recommendation would go against Pioneer's interest or where the conflict is deemed to be immaterial. Pioneer will vote according to the recommendation of its proxy voting service when the conflict is deemed to be material and the Pioneer's internal vote recommendation would favor Pioneer's interest, unless a client specifically requests Pioneer to do otherwise. When making the final determination as to how to vote a proxy, the Proxy Voting Oversight Group will review the report from the Director of Portfolio Management US and the Conflicts of Interest Report issued by the Compliance Department.

Conflicts of Interest

A conflict of interest occurs when Pioneer's interests interfere, or appear to interfere with the interests of Pioneer's clients. Occasionally, Pioneer may have a conflict that can affect how its votes proxies. The conflict may be actual or perceived and may exist when the matter to be voted on concerns:

- o An affiliate of Pioneer, such as another company belonging to the UniCredito Italiano S.p.A. banking group (a "UniCredito Affiliate");
- o An issuer of a security for which Pioneer acts as a sponsor,

advisor, manager, custodian, distributor, underwriter, broker, or other similar capacity (including those securities specifically declared by PGAM to present a conflict of interest for Pioneer);

- o An issuer of a security for which UniCredito has informed Pioneer that a UniCredito Affiliate acts as a sponsor, advisor, manager, custodian, distributor, underwriter, broker, or other similar capacity; or
- o A person with whom Pioneer (or any of its affiliates) has an existing, material contract or business relationship that was not entered into in the ordinary course of Pioneer's business.
- o Pioneer will abstain from voting with respect to companies directly or indirectly owned by UniCredito Italiano Group, unless otherwise directed by a client. In addition, Pioneer will inform PGAM Global Compliance and the PGAM Independent Directors before exercising such rights.

Any associate involved in the proxy voting process with knowledge of any apparent or actual conflict of interest must disclose such conflict to the Proxy Coordinator and the Compliance Department. The Compliance Department will review each item referred to Pioneer to determine whether an actual or potential conflict of interest with Pioneer exists in connection with the proposal(s) to be voted upon. The review will be conducted by comparing the apparent parties affected by the proxy proposal being

3

voted upon against the Compliance Department's internal list of interested persons and, for any matches found, evaluating the anticipated magnitude and possible probability of any conflict of interest being present. For each referral item, the determination regarding the presence or absence of any actual or potential conflict of interest will be documented in a Conflicts of Interest Report to the Proxy Coordinator.

Securities Lending

In conjunction with industry standards Proxies are not available to be voted when the shares are out on loan through either Pioneer's lending program or a client's managed security lending program. However, Pioneer will reserve the right to recall lent securities so that they may be voted according to the Pioneer's instructions. If a portfolio manager would like to vote a block of previously lent shares, the Proxy Coordinator will work with the portfolio manager and Investment Operations to recall the security, to the extent possible, to facilitate the vote on the entire block of shares.

Share-Blocking

"Share-blocking" is a market practice whereby shares are sent to a custodian (which may be different than the account custodian) for record keeping and voting at the general meeting. The shares are unavailable for sale or delivery until the end of the blocking period (typically the day after general meeting date).

Pioneer will vote in those countries with "share-blocking." In the event a manager would like to sell a security with "share-blocking", the Proxy Coordinator will work with the Portfolio Manager and Investment Operations Department to recall the shares (as allowable within the market time-frame and practices) and/or communicate with executing brokerage firm. A list of countries with "share-blocking" is available from the Investment Operations

Edgar Filing: PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST - Form N-CSR

Department upon request.

Record Keeping

The Proxy Coordinator shall ensure that Pioneer's proxy voting service:

- o Retains a copy of the proxy statement received (unless the proxy statement is available from the SEC's Electronic Data Gathering, Analysis, and Retrieval (EDGAR) system);
- o Retains a record of the vote cast;
- o Prepares Form N-PX for filing on behalf of each client that is a registered investment company; and
- o Is able to promptly provide Pioneer with a copy of the voting record upon its request.

4

The Proxy Coordinator shall ensure that for those votes that may require additional documentation (i.e. conflicts of interest, exception votes and case-by-case votes) the following records are maintained:

- o A record memorializing the basis for each referral vote cast;
- o A copy of any document created by Pioneer that was material in making the decision on how to vote the subject proxy; and
- o A copy of any conflict notice, conflict consent or any other written communication (including emails or other electronic communications) to or from the client (or in the case of an employee benefit plan, the plan's trustee or other fiduciaries) regarding the subject proxy vote cast by, or the vote recommendation of, Pioneer.
- o Pioneer shall maintain the above records in the client's file for a period not less than ten (10) years.

Disclosure

Pioneer shall take reasonable measures to inform its clients of the process or procedures clients must follow to obtain information regarding how Pioneer voted with respect to assets held in their accounts. In addition, Pioneer shall describe to clients its proxy voting policies and procedures and will furnish a copy of its proxy voting policies and procedures upon request. This information may be provided to clients through Pioneer's Form ADV (Part II) disclosure, by separate notice to the client, or through Pioneer's website.

Proxy Voting Oversight Group

The members of the Proxy Voting Oversight Group are Pioneer's: Director of Portfolio Management US, Head of Investment Operations, and Director of Compliance. Other members of Pioneer will be invited to attend meetings and otherwise participate as necessary. The Head of Investment Operations will chair the Proxy Voting Oversight Group.

The Proxy Voting Oversight Group is responsible for developing, evaluating, and changing (when necessary) Pioneer's Proxy Voting Policies and Procedures. The group meets at least annually to evaluate and review these policies and procedures and the services of its third-party proxy voting service. In addition, the Proxy Voting Oversight Group will meet as necessary to vote on referral items and address other business as

necessary.

Amendments

Pioneer may not amend its Proxy Voting Policies And Procedures without the prior approval of the Proxy Voting Oversight Group and its corporate parent, Pioneer Global Asset Management S.p.A

5

Proxy Voting Policies

Pioneer's sole concern in voting proxies is the economic effect of the proposal on the value of portfolio holdings, considering both the short- and long-term impact. In many instances, Pioneer believes that supporting the company's strategy and voting "for" management's proposals builds portfolio value. In other cases, however, proposals set forth by management may have a negative effect on that value, while some shareholder proposals may hold the best prospects for enhancing it. Pioneer monitors developments in the proxy-voting arena and will revise this policy as needed.

All proxies that are received promptly will be voted in accordance with the specific policies listed below. All shares in a company held by Pioneer-managed accounts will be voted alike, unless a client has given us specific voting instructions on an issue or has not delegated authority to us. Proxy voting issues will be reviewed by Pioneer's Proxy Voting Oversight Group, which consists of the Director of Portfolio Management US, the Director of Investment Operations (the Proxy Coordinator), and the Director of Compliance.

Pioneer has established Proxy Voting Procedures for identifying and reviewing conflicts of interest that may arise in the voting of proxies.

Clients may request, at any time, a report on proxy votes for securities held in their portfolios and Pioneer is happy to discuss our proxy votes with company management. Pioneer retains a proxy voting service to provide research on proxy issues and to process proxy votes.

Administrative

While administrative items appear infrequently in U.S. issuer proxies, they are quite common in non-U.S. proxies.

We will generally support these and similar management proposals:

- o Corporate name change.
- o A change of corporate headquarters.
- o Stock exchange listing.
- o Establishment of time and place of annual meeting.
- o Adjournment or postponement of annual meeting.
- o Acceptance/approval of financial statements.
- o Approval of dividend payments, dividend reinvestment plans and other dividend-related proposals.
- o Approval of minutes and other formalities.

6

Edgar Filing: PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST - Form N-CSR

- o Authorization of the transferring of reserves and allocation of income.
- o Amendments to authorized signatories.
- o Approval of accounting method changes or change in fiscal year-end.
- o Acceptance of labor agreements.
- o Appointment of internal auditors.

Pioneer will vote on a case-by-case basis on other routine business; however, Pioneer will oppose any routine business proposal if insufficient information is presented in advance to allow Pioneer to judge the merit of the proposal. Pioneer has also instructed its proxy voting service to inform Pioneer of its analysis of any administrative items inconsistent, in its view, with supporting the value of Pioneer portfolio holdings so that Pioneer may consider and vote on those items on a case-by-case basis.

Auditors

We normally vote for proposals to:

- o Ratify the auditors. We will consider a vote against if we are concerned about the auditors' independence or their past work for the company. Specifically, we will oppose the ratification of auditors and withhold votes from audit committee members if non-audit fees paid by the company to the auditing firm exceed the sum of audit fees plus audit-related fees plus permissible tax fees according to the disclosure categories proposed by the Securities and Exchange Commission.
- o Restore shareholder rights to ratify the auditors.

We will normally oppose proposals that require companies to:

- o Seek bids from other auditors.
- o Rotate auditing firms, except where the rotation is statutorily required or where rotation would demonstrably strengthen financial disclosure.
- o Indemnify auditors.
- o Prohibit auditors from engaging in non-audit services for the company.

Board of Directors

On issues related to the board of directors, Pioneer normally supports management. We will, however, consider a vote against management in instances where corporate performance has been very poor or where the board appears to lack independence.

7

General Board Issues

Pioneer will vote for:

- o Audit, compensation and nominating committees composed of independent directors exclusively.

Edgar Filing: PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST - Form N-CSR

- o Indemnification for directors for actions taken in good faith in accordance with the business judgment rule. We will vote against proposals for broader indemnification.
- o Changes in board size that appear to have a legitimate business purpose and are not primarily for anti-takeover reasons.
- o Election of an honorary director.

We will vote against:

- o Minimum stock ownership by directors.
- o Term limits for directors. Companies benefit from experienced directors, and shareholder control is better achieved through annual votes.
- o Requirements for union or special interest representation on the board.
- o Requirements to provide two candidates for each board seat.

We will vote on a case-by case basis on these issues:

- o Separate chairman and CEO positions. We will consider voting with shareholders on these issues in cases of poor corporate performance.

Elections of Directors

In uncontested elections of directors we will vote against:

- o Individual directors with absenteeism above 25% without valid reason. We support proposals that require disclosure of director attendance.
- o Insider directors and affiliated outsiders who sit on the audit, compensation, stock option or nominating committees. For the purposes of our policy, we accept the definition of affiliated directors provided by our proxy voting service.

We will also vote against:

- o Directors who have failed to act on a takeover offer where the majority of shareholders have tendered their shares.
- o Directors who appear to lack independence or are associated with very poor corporate performance.

8

We will vote on a case-by case basis on these issues:

- o Re-election of directors who have implemented or renewed a dead-hand or modified dead-hand poison pill (a "dead-hand poison pill" is a shareholder rights plan that may be altered only by incumbent or "dead " directors. These plans prevent a potential acquirer from disabling a poison pill by obtaining control of the board through a proxy vote).
- o Contested election of directors.

Edgar Filing: PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST - Form N-CSR

- o Prior to phase-in required by SEC, we would consider supporting election of a majority of independent directors in cases of poor performance.
- o Mandatory retirement policies.
- o Directors who have ignored a shareholder proposal that has been approved by shareholders for two consecutive years.

Takeover-Related Measures

Pioneer is generally opposed to proposals that may discourage takeover attempts. We believe that the potential for a takeover helps ensure that corporate performance remains high.

Pioneer will vote for:

- o Cumulative voting.
- o Increase ability for shareholders to call special meetings.
- o Increase ability for shareholders to act by written consent.
- o Restrictions on the ability to make greenmail payments.
- o Submitting rights plans to shareholder vote.
- o Rescinding shareholder rights plans ("poison pills").
- o Opting out of the following state takeover statutes:
 - o Control share acquisition statutes, which deny large holders voting rights on holdings over a specified threshold.
 - o Control share cash-out provisions, which require large holders to acquire shares from other holders.
 - o Freeze-out provisions, which impose a waiting period on large holders before they can attempt to gain control.
 - o Stakeholder laws, which permit directors to consider interests of non-shareholder constituencies.

9

- o Disgorgement provisions, which require acquirers to disgorge profits on purchases made before gaining control.
- o Fair price provisions.
- o Authorization of shareholder rights plans.
- o Labor protection provisions.
- o Mandatory classified boards.

We will vote on a case-by-case basis on the following issues:

- o Fair price provisions. We will vote against provisions requiring supermajority votes to approve takeovers. We will also consider voting against proposals that require a supermajority vote to repeal or amend the provision. Finally, we will consider the

mechanism used to determine the fair price; we are generally opposed to complicated formulas or requirements to pay a premium.

- o Opting out of state takeover statutes regarding fair price provisions. We will use the criteria used for fair price provisions in general to determine our vote on this issue.
- o Proposals that allow shareholders to nominate directors.

We will vote against:

- o Classified boards, except in the case of closed-end mutual funds.
- o Limiting shareholder ability to remove or appoint directors. We will support proposals to restore shareholder authority in this area. We will review on a case-by-case basis proposals that authorize the board to make interim appointments.
- o Classes of shares with unequal voting rights.
- o Supermajority vote requirements.
- o Severance packages ("golden" and "tin" parachutes). We will support proposals to put these packages to shareholder vote.
- o Reimbursement of dissident proxy solicitation expenses. While we ordinarily support measures that encourage takeover bids, we believe that management should have full control over corporate funds.
- o Extension of advance notice requirements for shareholder proposals.
- o Granting board authority normally retained by shareholders (e.g., amend charter, set board size).
- o Shareholder rights plans ("poison pills"). These plans generally allow shareholders to buy additional shares at a below-market price in the event of a change in control and may deter some bids.

10

Capital Structure

Managements need considerable flexibility in determining the company's financial structure, and Pioneer normally supports managements' proposals in this area. We will, however, reject proposals that impose high barriers to potential takeovers.

Pioneer will vote for:

- o Changes in par value.
- o Reverse splits, if accompanied by a reduction in number of shares.
- o Share repurchase programs, if all shareholders may participate on equal terms.
- o Bond issuance.
- o Increases in "ordinary" preferred stock.
- o Proposals to have blank-check common stock placements (other than

Edgar Filing: PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST - Form N-CSR

shares issued in the normal course of business) submitted for shareholder approval.

- o Cancellation of company treasury shares.

We will vote on a case-by-case basis on the following issues:

- o Reverse splits not accompanied by a reduction in number of shares, considering the risk of delisting.
- o Increase in authorized common stock. We will make a determination considering, among other factors:
 - o Number of shares currently available for issuance;
 - o Size of requested increase (we would normally approve increases of up to 100% of current authorization);
 - o Proposed use of the additional shares; and
 - o Potential consequences of a failure to increase the number of shares outstanding (e.g., delisting or bankruptcy).
- o Blank-check preferred. We will normally oppose issuance of a new class of blank-check preferred, but may approve an increase in a class already outstanding if the company has demonstrated that it uses this flexibility appropriately.
- o Proposals to submit private placements to shareholder vote.
- o Other financing plans.

We will vote against preemptive rights that we believe limit a company's financing flexibility.

11

Compensation

Pioneer supports compensation plans that link pay to shareholder returns and believes that management has the best understanding of the level of compensation needed to attract and retain qualified people. At the same time, stock-related compensation plans have a significant economic impact and a direct effect on the balance sheet. Therefore, while we do not want to micromanage a company's compensation programs, we will place limits on the potential dilution these plans may impose.

Pioneer will vote for:

- o 401(k) benefit plans.
- o Employee stock ownership plans (ESOPs), as long as shares allocated to ESOPs are less than 5% of outstanding shares. Larger blocks of stock in ESOPs can serve as a takeover defense. We will support proposals to submit ESOPs to shareholder vote.
- o Various issues related to the Omnibus Budget and Reconciliation Act of 1993 (OBRA), including:
 - o Amendments to performance plans to conform with OBRA;
 - o Caps on annual grants or amendments of administrative features;

- o Adding performance goals; and
- o Cash or cash-and-stock bonus plans.
 - o Establish a process to link pay, including stock-option grants, to performance, leaving specifics of implementation to the company.
 - o Require that option repricings be submitted to shareholders.
 - o Require the expensing of stock-option awards.
 - o Require reporting of executive retirement benefits (deferred compensation, split-dollar life insurance, SERPs, and pension benefits).
 - o Employee stock purchase plans where the purchase price is equal to at least 85% of the market price, where the offering period is no greater than 27 months and where potential dilution (as defined below) is no greater than 10%.

12

We will vote on a case-by-case basis on the following issues:

- o Executive and director stock-related compensation plans. We will consider the following factors when reviewing these plans:
 - o The program must be of a reasonable size. We will approve plans where the combined employee and director plans together would generate less than 15% dilution. We will reject plans with 15% or more potential dilution.

Dilution = $(A + B + C) / (A + B + C + D)$, where

A = Shares reserved for plan/amendment,

B = Shares available under continuing plans,

C = Shares granted but unexercised and

D = Shares outstanding.
 - o The plan must not:
 - o Explicitly permit unlimited option repricing authority or that have repriced in the past without shareholder approval.
 - o Be a self-replenishing "evergreen" plan, plans that grant discount options and tax offset payments.
- o We are generally in favor of proposals that increase participation beyond executives.
- o We generally support proposals asking companies to adopt rigorous vesting provisions for stock option plans such as those that vest incrementally over, at least, a three- or four-year period with a pro rata portion of the shares becoming exercisable on an annual basis following grant date.
- o We generally support proposals asking companies to disclose their

Edgar Filing: PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST - Form N-CSR

window period policies for stock transactions. Window period policies ensure that employees do not exercise options based on insider information contemporaneous with quarterly earnings releases and other material corporate announcements.

o We generally support proposals asking companies to adopt stock holding periods for their executives.

- o All other employee stock purchase plans.
- o All other compensation-related proposals, including deferred compensation plans, employment agreements, loan guarantee programs and retirement plans.
- o All other proposals regarding stock compensation plans, including extending the life of a plan, changing vesting restrictions, repricing options, lengthening exercise periods or accelerating distribution of awards and pyramiding and cashless exercise programs.

13

We will vote against:

- o Pensions for non-employee directors. We believe these retirement plans reduce director objectivity.
- o Elimination of stock option plans.

We will vote on a case-by case basis on these issues:

- o Limits on executive and director pay.
- o Stock in lieu of cash compensation for directors.

Corporate Governance

Pioneer will vote for:

- o Confidential Voting.
- o Equal access provisions, which allow shareholders to contribute their opinion to proxy materials.
- o Proposals requiring directors to disclose their ownership of shares in the company.

We will vote on a case-by-case basis on the following issues:

- o Change in the state of incorporation. We will support reincorporations supported by valid business reasons. We will oppose those that appear to be solely for the purpose of strengthening takeover defenses.
- o Bundled proposals. We will evaluate the overall impact of the proposal.
- o Adopting or amending the charter, bylaws or articles of association.
- o Shareholder appraisal rights, which allow shareholders to demand judicial review of an acquisition price.

Edgar Filing: PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST - Form N-CSR

We will vote against:

- o Shareholder advisory committees. While management should solicit shareholder input, we prefer to leave the method of doing so to management's discretion.
- o Limitations on stock ownership or voting rights.
- o Reduction in share ownership disclosure guidelines.

14

Mergers and Restructurings

Pioneer will vote on the following and similar issues on a case-by-case basis:

- o Mergers and acquisitions.
- o Corporate restructurings, including spin-offs, liquidations, asset sales, joint ventures, conversions to holding company and conversions to self-managed REIT structure.
- o Debt restructurings.
- o Conversion of securities.
- o Issuance of shares to facilitate a merger.
- o Private placements, warrants, convertible debentures.
- o Proposals requiring management to inform shareholders of merger opportunities.

We will normally vote against shareholder proposals requiring that the company be put up for sale.

Mutual Funds

Many of our portfolios may invest in shares of closed-end mutual funds or exchange-traded funds. The non-corporate structure of these investments raises several unique proxy voting issues.

Pioneer will vote for:

- o Establishment of new classes or series of shares.
- o Establishment of a master-feeder structure.

Pioneer will vote on a case-by-case on:

- o Changes in investment policy. We will normally support changes that do not affect the investment objective or overall risk level of the fund. We will examine more fundamental changes on a case-by-case basis.
- o Approval of new or amended advisory contracts.
- o Changes from closed-end to open-end format.
- o Authorization for, or increase in, preferred shares.
- o Disposition of assets, termination, liquidation, or mergers.

- o Classified boards of closed-end mutual funds, but will typically support such proposals.

15

Social Issues

Pioneer will abstain on stockholder proposals calling for greater disclosure of corporate activities with regard to social issues. "Social Issues" may generally be described as shareholder proposals for a company to:

- o Conduct studies regarding certain issues of public concern and interest;
- o Study the feasibility of the company taking certain actions with regard to such issues; or
- o Take specific action, including ceasing certain behavior and adopting company standards and principles, in relation to issues of public concern and interest.

We believe these issues are important and should receive management attention.

Pioneer will vote against proposals calling for substantial changes in the company's business or activities. We will also normally vote against proposals with regard to contributions, believing that management should control the routine disbursement of funds.

16

ITEM 8. PORTFOLIO MANAGERS OF CLOSED-END MANAGEMENT INVESTMENT COMPANIES.

(a) If the registrant is a closed-end management investment company that is filing an annual report on this Form N-CSR, provide the following information:

(1) State the name, title, and length of service of the person or persons employed by or associated with the registrant or an investment adviser of the registrant who are primarily responsible for the day-to-day management of the registrant's portfolio ("Portfolio Manager"). Also state each Portfolio Manager's business experience during the past 5 years.

ADDITIONAL INFORMATION ABOUT THE PORTFOLIO MANAGER

OTHER ACCOUNTS MANAGED BY THE PORTFOLIO MANAGER

The table below indicates, for the portfolio manager of the fund, information about the accounts other than the fund over which the portfolio manager has day-to-day investment responsibility. All information on the number of accounts and total assets in the table is as of March 31, 2018. For purposes of the table, "Other Pooled Investment Vehicles" may include investment partnerships, undertakings for collective investments in transferable securities ("UCITS") and other non-U.S. investment funds and group trusts, and "Other Accounts" may include separate accounts for institutions or individuals, insurance company general or separate accounts, pension funds and other similar institutional accounts but generally do not include the portfolio manager's personal investment accounts or those which the manager may be deemed to own

Edgar Filing: PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST - Form N-CSR

beneficially under the code of ethics. Certain funds and other accounts managed by the portfolio manager may have substantially similar investment strategies.

NAME OF PORTFOLIO MANAGER	TYPE OF ACCOUNT	NUMBER OF ACCOUNTS MANAGED	TOTAL ASSETS MANAGED (000'S)	PERFO
David Eurkus	Other Registered Investment Companies	3	\$2,200,965	
	Other Pooled Investment Vehicles	0	\$ 0	
	Other Accounts	0	\$ 0	
Jonathan Chirunga	Other Registered Investment Companies	3	\$2,200,965	
	Other Pooled Investment Vehicles	0	\$ 0	
	Other Accounts	0	\$ 0	

POTENTIAL CONFLICTS OF INTEREST

When a portfolio manager is responsible for the management of more than one account, the potential arises for the portfolio manager to favor one account over another. The principal types of potential conflicts of interest that may arise are discussed below. For the reasons outlined below, Amundi Pioneer does not believe that any material conflicts are likely to arise out of a portfolio manager's responsibility for the management of the fund as well as one or more other accounts. Although Amundi Pioneer has adopted procedures that it believes are reasonably designed to detect and prevent violations of the federal securities laws and to mitigate the potential for conflicts of interest to affect its portfolio management decisions, there can be no assurance that all conflicts will be identified or that all procedures will be effective in mitigating the potential for such risks. Generally, the risks of such conflicts of interest are increased to the extent that a portfolio manager has a financial incentive to favor one account over another. Amundi Pioneer has structured its compensation arrangements in a manner that is intended to limit such potential for conflicts of interest. See "Compensation of Portfolio Managers" below.

- o A portfolio manager could favor one account over another in allocating new investment opportunities that have limited supply, such as initial public offerings and private placements. If, for example, an initial public offering that was expected to appreciate in value significantly shortly after the offering was allocated to a single account, that account may be expected to have better investment performance than other accounts that did not receive an allocation of the initial public offering. Generally, investments for which there is limited availability are allocated based upon a range of factors including available cash and

consistency with the accounts' investment objectives and policies. This allocation methodology necessarily involves some subjective elements but is

Edgar Filing: PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST - Form N-CSR

intended over time to treat each client in an equitable and fair manner. Generally, the investment opportunity is allocated among participating accounts on a pro rata basis. Although Amundi Pioneer believes that its practices are reasonably designed to treat each client in an equitable and fair manner, there may be instances where a fund may not participate, or may participate to a lesser degree than other clients, in the allocation of an investment opportunity.

- o A portfolio manager could favor one account over another in the order in which trades for the accounts are placed. If a portfolio manager determines to purchase a security for more than one account in an aggregate amount that may influence the market price of the security, accounts that purchased or sold the security first may receive a more favorable price than accounts that made subsequent transactions. The less liquid the market for the security or the greater the percentage that the proposed aggregate purchases or sales represent of average daily trading volume, the greater the potential for accounts that make subsequent purchases or sales to receive a less favorable price. When a portfolio manager intends to trade the same security on the same day for more than one account, the trades typically are "bunched," which means that the trades for the individual accounts are aggregated and each account receives the same price. There are some types of accounts as to which bunching may not be possible for contractual reasons (such as directed brokerage arrangements). Circumstances may also arise where the trader believes that bunching the orders may not result in the best possible price. Where those accounts or circumstances are involved, Amundi Pioneer will place the order in a manner intended to result in as favorable a price as possible for such client.
- o A portfolio manager could favor an account if the portfolio manager's compensation is tied to the performance of that account to a greater degree than other accounts managed by the portfolio manager. If, for example, the portfolio manager receives a bonus based upon the performance of certain accounts relative to a benchmark while other accounts are disregarded for this purpose, the portfolio manager will have a financial incentive to seek to have the accounts that determine the portfolio manager's bonus achieve the best possible performance to the possible detriment of other accounts. Similarly, if Amundi Pioneer receives a performance-based advisory fee, the portfolio manager may favor that account, whether or not the performance of that account directly determines the portfolio manager's compensation.
- o A portfolio manager could favor an account if the portfolio manager has a beneficial interest in the account, in order to benefit a large client or to compensate a client that had poor returns. For example, if the portfolio manager held an interest in an investment partnership that was one of the accounts managed by the portfolio manager, the portfolio manager would have an economic incentive to favor the account in which the portfolio manager held an interest.
- o If the different accounts have materially and potentially conflicting investment objectives or strategies, a conflict of interest could arise. For example, if a portfolio manager purchases a security for one account and sells the same security for another account, such trading pattern may disadvantage either the account that is long or short. In making portfolio manager assignments, Amundi Pioneer seeks to avoid such potentially conflicting situations. However, where a portfolio manager is responsible for accounts with differing investment objectives and policies, it is possible that the portfolio manager will conclude that it is in the best interest of one account to sell a portfolio security while another account continues to hold or increase the holding in such security.

COMPENSATION OF PORTFOLIO MANAGER

Edgar Filing: PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST - Form N-CSR

Amundi Pioneer has adopted a system of compensation for portfolio managers that seeks to align the financial interests of the portfolio managers with those of shareholders of the accounts (including Pioneer funds) the portfolio managers manage, as well as with the financial performance of Amundi Pioneer. The compensation program for all Amundi Pioneer portfolio managers includes a base salary (determined by the rank and tenure of the employee) and an annual bonus program, as well as customary benefits that are offered generally to all full-time employees. Base compensation is fixed and normally reevaluated on an annual basis. Amundi Pioneer seeks to set base compensation at market rates, taking into account the

1

experience and responsibilities of the portfolio manager. The bonus plan is intended to provide a competitive level of annual bonus compensation that is tied to the portfolio manager achieving superior investment performance and align the interests of the investment professional with those of shareholders, as well as with the financial performance of Amundi Pioneer. Any bonus under the plan is completely discretionary, with a maximum annual bonus that may be in excess of base salary. The annual bonus is based upon a combination of the following factors:

- o QUANTITATIVE INVESTMENT PERFORMANCE. The quantitative investment performance calculation is based on pre-tax investment performance of all of the accounts managed by the portfolio manager (which includes the fund and any other accounts managed by the portfolio manager) over a one-year period (20% weighting) and four-year period (80% weighting), measured for periods ending on December 31. The accounts, which include the fund, are ranked against a group of mutual funds with similar investment objectives and investment focus (60%) and a broad-based securities market index measuring the performance of the same type of securities in which the accounts invest (40%), which, in the case of the fund, is the Barclays Capital Municipal Bond Index and the Barclays Capital High Yield Municipal Bond Index. As a result of these two benchmarks, the performance of the portfolio manager for compensation purposes is measured against the criteria that are relevant to the portfolio manager's competitive universe.
- o QUALITATIVE PERFORMANCE. The qualitative performance component with respect to all of the accounts managed by the portfolio manager includes objectives, such as effectiveness in the areas of teamwork, leadership, communications and marketing, that are mutually established and evaluated by each portfolio manager and management.
- o AMUNDI PIONEER RESULTS AND BUSINESS LINE RESULTS. Amundi Pioneer's financial performance, as well as the investment performance of its investment management group, affect a portfolio manager's actual bonus by a leverage factor of plus or minus (+/-) a predetermined percentage.

The quantitative and qualitative performance components comprise 80% and 20%, respectively, of the overall bonus calculation (on a pre-adjustment basis). A portion of the annual bonus is deferred for a specified period and may be invested in one or more Pioneer funds.

Certain portfolio managers participate in other programs designed to reward and retain key contributors. Portfolio managers also may participate in a deferred compensation program, whereby deferred amounts are invested in one or more Pioneer funds.

SHARE OWNERSHIP BY PORTFOLIO MANAGERS

Edgar Filing: PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST - Form N-CSR

The following table indicates as of March 31, 2018 the value, within the indicated range, of shares beneficially owned by the portfolio managers of the fund.

NAME OF PORTFOLIO MANAGER	BENEFICIAL OWNERSHIP OF THE FUND*
-----	-----
David Eurkus	A
-----	-----
Jonathan Chirunga	A
-----	-----

* Key to Dollar Ranges

- A. None
- B. \$1 - \$10,000
- C. \$10,001 - \$50,000
- D. \$50,001 - \$100,000
- E. \$100,001 - \$500,000
- F. \$500,001 - \$1,000,000
- G. Over \$1,000,000

2

ITEM 9. PURCHASES OF EQUITY SECURITIES BY CLOSED-END MANAGEMENT INVESTMENT COMPANY AND AFFILIATED PURCHASERS.

(a) If the registrant is a closed-end management investment company, in the following tabular format, provide the information specified in paragraph (b) of this Item with respect to any purchase made by or on behalf of the registrant or any affiliated purchaser, as defined in Rule 10b-18(a)(3) under the Exchange Act (17 CFR 240.10b-18(a)(3)), of shares or other units of any class of the registrant's equity securities that is registered by the registrant pursuant to Section 12 of the Exchange Act (15 U.S.C. 781).

During the period covered by this report, there were no purchases made by or on behalf of the registrant or any affiliated purchaser as defined in Rule 10b-18(a)(3) under the Securities Exchange Act of 1934 (the Exchange Act), of shares of the registrants equity securities that are registered by the registrant pursuant to Section 12 of the Exchange Act.

ITEM 10. SUBMISSION OF MATTERS TO A VOTE OF SECURITY HOLDERS.

Describe any material changes to the procedures by which shareholders may recommend nominees to the registrant's board of directors, where those changes were implemented after the registrant last provided disclosure in response to the requirements of Item 407(c)(2)(iv) of

Edgar Filing: PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST - Form N-CSR

Regulation S-R(17 CFR 229.407) (as required by Item 22(b)(15)) of Schedule 14A (17 CFR 240.14a-101), or this Item.

There have been no material changes to the procedures by which the shareholders may recommend nominees to the registrant's board of directors since the registrant last provided disclosure in response to the requirements of Item 407(c)(2)(iv) of Regulation S-R of Schedule 14(A) in its definitive proxy statement, or this item.

ITEM 11. CONTROLS AND PROCEDURES.

(a) Disclose the conclusions of the registrant's principal executive and principal financial officers, or persons performing similar functions, regarding the effectiveness of the registrant's disclosure controls and procedures (as defined in Rule 30a-3(c) under the Act (17 CFR 270.30a-3(c))) as of a date within 90 days of the filing date of the report that includes the disclosure required by this paragraph, based on the evaluation of these controls and procedures required by Rule 30a-3(b) under the Act (17 CFR 270.30(a)-3(b) and Rules 13a-15(b) or 15d-15(b) under the Exchange Act (17 CFR 240.13a-15(b) or 240.15d-15(b)).

The registrant's principal executive officer and principal financial officer have concluded that the registrant's disclosure controls and procedures are effective based on the evaluation of these controls and procedures as of a date within 90 days of the filing date of this report.

(b) Disclose any change in the registrant's internal control over financial reporting (as defined in Rule 30a-3(d) under the Act (17CFR 270.30a-3(d)) that occurred during the second fiscal quarter of the period covered by this report that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting.

There were no significant changes in the registrant's internal control over financial reporting that occurred during the second fiscal quarter of the period covered by this report that have materially affected, or are reasonably likely to materially affect, the registrant's internal control over financial reporting.

The registrant's principal executive officer and principal financial officer, however, voluntarily are reporting the following information:

In August of 2006 the registrant's investment adviser enhanced its internal procedures for reporting performance information required to be included in prospectuses. Those enhancements involved additional internal controls over the appropriateness of performance data generated for this purpose. Such enhancements were made following an internal review which identified prospectuses relating to certain classes of shares of a limited number of registrants where, inadvertently, performance information not reflecting the deduction of applicable sales charges was included. Those prospectuses were revised, and the revised prospectuses were distributed to

Edgar Filing: PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST - Form N-CSR

shareholders.

Item 12. Disclosure of Securities Lending Activities for Closed-End Management Investment Companies.

(a) If the registrant is a closed-end management investment company, provide the following dollar amounts of income and compensation related to the securities lending activities of the registrant during its most recent fiscal year:

N/A

(1) Gross income from securities lending activities;

N/A

(2) All fees and/or compensation for each of the following securities lending activities and related services: any share of revenue generated by the securities lending program paid to the securities lending agent(s) (revenue split); fees paid for cash collateral management services (including fees deducted from a pooled cash collateral reinvestment vehicle) that are not included in the revenue split; administrative fees that are not included in the revenue split; fees for indemnification that are not included in the revenue split; rebates paid to borrowers; and any other fees relating to the securities lending program that are not included in the revenue split, including a description of those other fees;

N/A

(3) The aggregate fees/compensation disclosed pursuant to paragraph (2); and

N/A

(4) Net income from securities lending activities (i.e., the dollar amount in paragraph (1) minus the dollar amount in paragraph (3)).

If a fee for a service is included in the revenue split, state that the fee is included in the revenue split.

N/A

(b) If the registrant is a closed-end management investment company, describe the services provided to the registrant by the securities lending agent in the registrants most recent fiscal year.

N/A

ITEM 13. EXHIBITS.

(a) File the exhibits listed below as part of this Form. Letter or number the exhibits in the sequence indicated.

(1) Any code of ethics, or amendment thereto, that is the subject of the disclosure required by Item 2, to the extent that the registrant intends to satisfy the Item 2 requirements through filing of an exhibit.

(2) A separate certification for each principal executive officer and principal financial officer of the registrant as required by Rule 30a-2(a) under the Act

Edgar Filing: PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST - Form N-CSR

(17 CFR 270.30a-2(a)) , exactly as set forth below:

Filed herewith.

SIGNATURES

[See General Instruction F]

Pursuant to the requirements of the Securities Exchange Act of 1934 and the Investment Company Act of 1940, the registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized.

(Registrant) Pioneer Municipal High Income Advantage Trust

By (Signature and Title)* /s/ Lisa M. Jones
Lisa M. Jones, President & Chief Executive Officer

Date May 30, 2018

Pursuant to the requirements of the Securities Exchange Act of 1934 and the Investment Company Act of 1940, this report has been signed below by the following persons on behalf of the registrant and in the capacities and on the dates indicated.

By (Signature and Title)* /s/ Lisa M. Jones
Lisa M. Jones, President & Chief Executive Officer

Date May 30, 2018

By (Signature and Title)* /s/ Mark E. Bradley
Mark E. Bradley, Treasurer & Chief Accounting & Financial Officer

Date May 30, 2018

* Print the name and title of each signing officer under his or her signature.