

PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST
Form N-CSR
May 30, 2017

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, Pioneer Investment 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, 2016 through March 31, 2017

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.

Pioneer Municipal High
Income Advantage Trust

Annual Report | March 31, 2017

Ticker Symbol: MAV

[LOGO] PIONEER
Investments (R)

visit us: us.pioneerinvestments.com

Table of Contents

President's Letter	2
Portfolio Management Discussion	4
Portfolio Summary	12
Prices and Distributions	13
Performance Update	14
Schedule of Investments	15
Financial Statements	26
Notes to Financial Statements	31
Report of Independent Registered Public Accounting Firm	39
Approval of New and Interim Management Agreements	41
Trustees, Officers and Service Providers	49

Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/17 1

President's Letter

After an overall strong year for leading market indices in 2016, U.S. markets continued to generate positive returns over the first calendar quarter of 2017, with so-called "risk" assets, such as equities and credit-sensitive bonds, posting solid gains. In the first quarter, U.S. equities, as measured by the Standard & Poor's 500 Index, returned slightly more than 6%, while high-yield securities dominated bond market performance.

The transfer of power in Washington, D.C. in January had little or no effect on the markets in the first quarter, as the post-election momentum we witnessed late in the fourth quarter of 2016 slowed only when oil prices slumped in March, due to both higher-than-expected inventories and concerns over whether OPEC (Organization of Petroleum Exporting Countries) would continue its supply cuts

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

in June. Not even the Federal Reserve System's (the Fed's) highly anticipated rate hike during the month of March, its second in three months, nor Britain's trigger of Article 50 to begin the "Brexit" process caused any dramatic sell-off of risk assets.

While U.S. gross domestic product (GDP) did slow in the first quarter, the expectation is for GDP to accelerate in the second quarter, with a strong consumer leading the way. Pioneer believes the U.S. economy may lead all developed nations in 2017, with GDP growth in excess of 2% for the year. President Trump has proposed decidedly pro-business policies, such as lower taxes, higher infrastructure spending, and less regulation, though we believe the economy may realize the benefits of those policies, if enacted, more so in 2018 than in 2017. Conversely, the effects of the President's potentially restrictive trade policies could offset some of the benefits of the pro-growth fiscal policies.

Even so, we believe solid domestic employment figures should continue to support consumption and the housing market, and that stronger corporate profits and increased government spending may contribute to economic growth in 2018 and beyond. Increasing global Purchasing Manager Indices (PMIs) suggest that growth in global economies is also improving. (PMIs are used to measure the economic health of the manufacturing sector.)

There are, as always, some risks to our outlook. First, the market already has priced in a good deal of the Trump economic reform platform, and that could lead to near-term disappointment if Congressional follow-through does not happen this year. The future of the Affordable Care Act is another potential concern. The first attempt to repeal/replace it failed, but any new proposed

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

legislation will undoubtedly have an effect on the health care sector, one of the largest segments of the US economy. Geopolitical risks, of course, remain a potential headwind, given ongoing strife in the Middle East and renewed tensions on the Korean Peninsula.

While our current outlook is generally optimistic, conditions can and often do change, and while passive investment strategies may have a place in one's overall portfolio, it is our view that all investment decisions are active choices.

Throughout Pioneer's history, we have believed in the importance of active management. The active decisions to invest in equities or fixed-income securities are made by a team of experienced investment professionals focusing on identifying value across global markets using proprietary research, careful risk management, and a long-term perspective. We believe our shareowners can benefit from the experience and tenure of our investment teams as well as the insights generated from our extensive research process.

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.

Sincerely,

/s/ Lisa M. Jones

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

Lisa M. Jones
President and CEO
Pioneer Investment Management USA Inc.
March 31, 2017

Any information in this shareowner report regarding market or economic trends or the factors influencing the Fund'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 | 3/31/17 3

Portfolio Management Discussion | 3/31/17

High-yield municipal bonds delivered moderate, positive results over the 12-month period ended March 31, 2017, 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, Director of Municipals, a senior vice president and a portfolio manager at Pioneer, and Mr. Chirunga, a vice president and portfolio manager at 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, 2017?

A Pioneer Municipal High Income Advantage Trust returned 0.28% at net asset value and -15.92% at market price during the 12-month period ended March 31, 2017. 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 4.31% and 0.15%, 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 11 closed end funds in Lipper's High Yield Municipal Debt Closed End Funds category (which may or may not be leveraged) was -2.57%.

The shares of the Trust were selling at a 7.34% discount to net asset value at the end of the period, on March 31, 2017. The shares of the Trust were selling at a 10.5% premium to net asset value at the end of the previous 12-month period, on March 31, 2016.

On March 31, 2017, the standardized 30-day SEC yield of the Trust's shares was 4.56%*.

Q How would you describe the investment environment in the municipal bond market during the 12-month period ended March 31, 2017?

A Early in the 12-month period, performance of both investment-grade and high-yield municipal bonds benefited from a favorable environment supported by declining interest rates and the positive outlook of investors in

* The 30-day SEC yield is a standardized formula that is based on the hypothetical annualized earning power (investment income only) of the Trust's portfolio securities during the period indicated.

a growing economy. In the intervening months, however, market sentiment began to change in response to a variety of factors. In the end, investment-grade municipal debt turned in slightly positive results over the 12-month period, as coupon income narrowly overcame price losses driven by rising interest rates. Meanwhile, high-yield municipal debt generated somewhat better results, due to improving confidence in the economy and steady demand from investors attracted to the market by favorable pricing and generous yields.

One of the first events to cause the aforementioned change in market sentiment was the announcement in early summer 2016 that the Commonwealth of Puerto Rico would default on some of its debt. The news had a particularly strong effect on the high-yield municipal market, as Puerto Rico-issued debt, at the time, accounted for approximately 23% of the assets represented in the Bloomberg Barclays U.S. Municipal High Yield Bond Index. Following the default announcement, those weights adjusted, and Puerto Rico's representation in that index dropped to about 13%. After a brief period of high volatility, however, all Puerto Rico-related debt began outperforming. This bounce-back occurred because negotiations between bondholders and the Commonwealth signaled a higher restructuring recovery rate as part of any potential settlement. Moreover, the outperformance of Puerto Rico's bonds also extended to the debt of other distressed municipal issuers, including the State of Illinois, the City of Chicago, and the Chicago Board of Education, whose combined debt securities accounted for 6% of the Bloomberg Barclays Index.

The second significant event to jar the market and cause a spike in volatility was the presidential election victory of Donald Trump in November 2016. Higher-yielding bonds again rallied as investors drew encouragement from the prospect that Mr. Trump and a Republican-controlled Congress would bring about pro-growth economic policies, with reducing corporate and individual tax rates, cutting regulations, increasing infrastructure spending, and replacing or eliminating the Affordable Care Act (ACA) high on their agenda. While interest rates tended to rise during the period, thus eroding the values of most bonds - especially investment-grade debt - high-yield municipals rallied for the remainder of the Trust's fiscal year.

Over the full 12-month period, and in late 2016/early 2017 in particular, municipals bonds in general - and especially high-yield municipals - improved in performance relative to taxable bonds, as their relative values compared with taxable debt became more evident. Demand increased as

Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/17 5

well, as municipals drew attention from a wider group of investors, including non-traditional market participants, and even foreign institutions.

Q Which of your investment decisions had the biggest effects on the Trust's benchmark-relative performance during the 12-month period ended March 31, 2017, and how was the Trust positioned at the end of the period?

A The Trust invests in both investment-grade and high-yield municipal bonds. The Trust's return during the period slightly outperformed that of the investment-grade Bloomberg Barclays Municipal Bond Index, but lagged the return of the Bloomberg Barclays U.S. High Yield Municipal Bond Index (the high-yield municipal index). The underperformance versus the high-yield

municipal index during the period derived primarily from the portfolio's very low exposure to the debt of the Commonwealth of Puerto Rico - which, as noted earlier, outperformed after the default announcement and subsequent renegotiation conversations between the Commonwealth and the bondholders - and from a complete lack of exposure to the debt of other troubled issuers that rallied during the period, including the Illinois-based issuers mentioned previously. Our long-term investment strategy continues to emphasize intensive credit research and analysis, and the selection of bonds of issuers that we believe are financially strong enough to meet their obligations. This strategy, in turn, caused us to avoid owning the debt of borrowers in financial distress, and that approach hurt the Trust's returns relative to the high-yield municipal index during the period.

Another negative factor in the Trust's performance during the period was an increase in borrowing costs driven by increases in interest rates during the 12 months, which resulted in a reduction in the Trust's income.

The Trust's relatively longer-duration positioning detracted from benchmark-relative performance early in the period as market interest rates rose, but it helped benchmark-relative returns later in the period when rates on municipal bonds moved lower in early 2017. (Duration is a measure of the sensitivity of the price, or the value of principal, of a fixed-income investment to a change in interest rates, expressed as a number of years.)

On the positive side, the Trust's general exposure to higher-yielding municipal bonds tended to support benchmark-relative performance during the period, despite the negative influence of the portfolio's underweights to the troubled issuers that outperformed. Security selection

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

within high-yield municipal debt was particularly helpful for benchmark-relative returns in late 2016 and the first quarter of 2017, when high-yield markets rallied and the Trust's performance improved. Our emphasis on project revenue bonds in the Trust's portfolio also proved beneficial for benchmark-relative results, including investments in tobacco bonds -- that is, the debt derived from tobacco Master Settlement Agreements. At the end of the Trust's fiscal year, tobacco bonds represented roughly 10% of the Trust's total investment portfolio. The Trust's exposures to the transportation and education and health care sectors also aided benchmark-relative returns.

With regard to individual positions, of the top six portfolio holdings that contributed positively to the Trust's benchmark-relative performance during the period, five were tobacco bonds, led by two different California bonds, and an Ohio bond.

Notable among the portfolio's holdings that detracted from benchmark-relative returns during the period were several "inverse floater" bonds, which tend to be highly sensitive to changes in interest rates and whose prices depreciated as market rates rose.

The Trust has typically invested in both high-yield and investment-grade bonds, usually with more than 50% of its total investment portfolio allocated to the high-yield municipal sector. At the end of the Trust's fiscal year on March 31, 2017, below-investment-grade debt represented more than 33% of the Trust's total investment portfolio (that is, securities rated by Standard & Poor's as "BBB-" and lower). In addition, we continued to emphasize owning project revenue bonds in the Trust's portfolio during

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

the 12-month period. Revenue bonds are supported by income generated from specific projects or agencies. We believe the income from these projects and agencies is a more consistent and predictable revenue stream than the sources supporting general obligation bonds, which rely principally on state and local tax revenues.

At the end of the fiscal year, revenue bonds represented more than 80% of the Trust's total investment portfolio.

Q What factors affected the Trust's yield during the 12-month period ended March 31, 2017?

A The Trust's monthly dividend** distribution decreased in the first half of the fiscal year, but remained stable over the final six months of the period.

** Dividends are not guaranteed.

Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/17 7

The primary reason for the dividend reduction in the first half of the year was the increase in the borrowing costs resulting from the Trust's use of leverage, which we noted earlier. As the interest rates of municipal debt increased early in the fiscal year, the Trust's borrowing costs increased and the money available for dividend distributions declined. The historically low interest-rate climate also adversely affected the Trust's current income, as issuers of higher-coupon securities took advantage of the low rates and refinanced their obligations into lower-coupon debt. As bonds held by the Trust's portfolio either reached maturity or were called back by their issuers to be refinanced, the portfolio of investments produced less current income to be used to pay the monthly dividends.

Q How did the level of leverage in the Trust change during the 12-month period ended March 31, 2017?

A At the end of the 12-month period on March 31, 2017, 34.6% of the Trust's total managed assets were financed by leverage obtained through the issuance of preferred shares, compared with 33.4% of the Trust's total managed assets financed by leverage at the start of the period on April 1, 2016. While the amount of funds borrowed by the Trust decreased slightly, the increase in leverage as a percentage of total managed assets was primarily due to the decline in values of securities in which the Trust had invested.

Q Did the Trust invest in any derivative securities during the 12-month period ended March 31, 2017?

A No, the Trust had no investments in any derivative securities during the period.

Q What is your investment outlook?

A We have a favorable near-term outlook for municipal bonds in an improving economy, which generally enhances the overall credit-worthiness of municipal debt issuers. We anticipate that the U.S. Federal Reserve System (the Fed) is likely to continue raising short-term interest rates this year. After raising the influential Federal funds rate in March 2017 (following earlier hikes in December 2016 and December 2015), we think the Fed may very well increase rates twice more during the remainder of 2017. The rate hikes should not be disruptive to the market, which anticipates further rate increases.

One uncertainty hovering over the market is the question of whether the Trump Administration and the Congress can agree on pro-growth legislation to reform the tax code, increase infrastructure spending, and replace or repeal the ACA. As more time goes by without major legislation

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

passed to address those issues, investors could become less confident about whether the changes will occur. Resolution of the ACA debate alone could have a significant impact on hospitals and other health care institutions, issuers that represent a significant portion of the municipal bond market.

Despite these caveats, we retain a positive view of opportunities in the municipal bond market. We believe municipal bond prices should continue to strengthen in an environment where the attractive relative values of municipals versus taxable bonds become more apparent to both traditional and non-traditional municipal market participants, and in which an improving economy strengthens overall credit quality.

As noted earlier, we anticipate that the Fed will continue to raise the Federal funds rate during 2017. While rising interest rates could increase the potential for the portfolio to realize greater income, investors should be aware that higher rates also increase the Trust's cost of borrowing, which occurred during the past fiscal year. That, in turn, may continue to lower the amount of funds available for dividend distributions. In addition, the portfolio's income can come under pressure if bond issuers continue to recall older, higher-yielding debt and replace those bonds with securities paying lower yields.

We believe our emphasis on holding better-financed revenue bonds in the Trust's portfolio may lead to solid performance over the long term. We intend to continue to focus on maintaining a highly diversified*** portfolio of investments in securities backed by predictable and reliable revenue sources.

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

Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/17 9

Please refer to the Schedule of Investments on pages 15-25 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.

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.

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

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. 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. Since February of 2008, regularly scheduled auctions for the Trust's preferred shares have failed and preferred shareowners have not been able to sell their shares at auction. The Board of Trustees of the Trust has considered, and continues to consider, this issue.

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

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

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.

Risks of investing in the Trust are discussed in greater detail in the Trust's original offering documents relating to its common shares and shareowner reports issued from time to time.

These risks may increase share price volatility.

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 | 3/31/17 11

Portfolio Summary | 3/31/17

Portfolio Diversification

(As a percentage of total investment portfolio)

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

Insured:	14.9%
Revenue Bonds:Other Revenue	25.9%
Health Revenue	15.4%
Education Revenue	11.2%

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

Tobacco Revenue	9.5%
Development Revenue	6.9%
Facilities Revenue	5.9%
Transportation Revenue	5.0%
Water Revenue	2.7%
Pollution Control Revenue	1.7%
Airport Revenue	0.9%

Portfolio Maturity

(As a percentage of total investments)

5-7 years	0.9%
7-10 years	3.6%
10-20 years	34.6%
20+ years	60.9%

10 Largest Holdings

(As a percentage of long-term holdings)*

1. New Jersey Transportation Trust Fund Authority, 12/15/27 (BHAC Insured)
2. Massachusetts Development Finance Agency, WGBH Foundation, Series A, 5.75%, 1/1/42 (AMBAC Insured)
3. North Texas Tollway Authority, Series F, 5.75%, 1/1/33
4. Buckeye Tobacco Settlement Financing Authority, Asset-Backed, Series A-2, 6.5%, 6/1/47
5. Private Colleges & Universities Authority, Emory University, Series A, 5.0%, 10/1/43
6. Lehman Municipal Trust Receipts, RIB, 11.827%, 6/1/37 (144A) (AGM Insured)
7. New York State Dormitory Authority, Series C, 5.0%, 3/15/39
8. New Jersey Economic Development Authority, Continental Airlines, 5.75%, 9/15/27
9. State of Connecticut, Series E, 4.0%, 9/1/30
10. Jefferson Parish Hospital Service District No. 2, East Jefferson General Hospital, 6.375%, 7/1/41

* This list excludes temporary cash investments and derivative instruments. 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.

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

Prices and Distributions | 3/31/17

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

Share Prices and Distributions

Market Value per Common Share^

	3/31/17	3/31/16
Market Value	\$10.99	\$13.87
Premium/(Discount)	(7.3)%	10.5%

Net Asset Value per Common Share^

	3/31/17	3/31/16
Net Asset Value	\$11.86	\$12.55

Distributions per Common Share: 4/1/16 - 3/31/17

	Net Investment Income	Short-Term Capital Gains	Long-Term Capital Gains
	\$0.74	\$ --	\$ --

Yields

	3/31/17	3/31/16
30-Day SEC Yield	4.56%	4.17%

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

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

Trust's website at us.pioneerinvestments.com.

Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/17 13

Performance Update | 3/31/17

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.

Average Annual Total Returns (As of March 31, 2017)

Period	Net Asset Value (NAV)	Market Price	Bloomberg Barclays Municipal Bond Index	Bloomberg Barclays U.S. Municipal High Yield Bond Index
10 Years	5.06%	4.46%	4.33%	4.29%
5 Years	6.04	1.63	3.24	5.64
1 Year	0.28	-15.92	0.15	4.31

[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
3/07	\$10,000	\$10,000	\$10,000
3/08	\$ 9,349	\$10,190	\$ 9,351
3/09	\$ 6,694	\$10,422	\$ 7,559
3/10	\$10,560	\$11,432	\$ 9,699
3/11	\$11,085	\$11,618	\$10,018
3/12	\$14,271	\$13,020	\$11,569
3/13	\$16,203	\$13,703	\$13,223
3/14	\$16,622	\$13,756	\$12,976
3/15	\$19,065	\$14,667	\$14,103
3/16	\$18,401	\$15,250	\$14,590
3/17	\$15,471	\$15,274	\$15,218

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

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

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 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.

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

Schedule of Investments | 3/31/17

Principal
Amount
USD (\$)

	TAX EXEMPT OBLIGATIONS -- 150.6%
	of Net Assets (a)
	Alabama -- 1.8%
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 -- 0.7%
2,000,000	City of Phoenix, AZ, Industrial Development Authority, 3rd & Indian School Assisted Living Project, 5.4%, 10/1/36
32,000	County of Pima, AZ, Industrial Development Authority,

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

Arizona Charter Schools Project, Series C, 6.75%, 7/1/31

6,990,000	California -- 18.8%
38,610,000 (b)	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	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 (c)	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, CA, Irrigation Financing Authority, 6.25%, 1/1/31
2,695,000 (e)	City of Madera, CA, Irrigation Financing Authority, 6.5%, 1/1/40
1,000,000	Coast Community College District, Election, Series D, 5.0%, 8/1/31
8,575,000 (e) (f)	Golden State Tobacco Securitization Corp., Asset-Backed, Series A-1, 5.125%, 6/1/47
3,140,000 (f)	Lehman Municipal Trust Receipts, RIB, 11.827%, 6/1/37 (144A) (AGM Insured)
2,500,000	Lehman Municipal Trust Receipts, RIB, 11.883%, 11/1/39 (144A) (AGM Insured)
1,000,000	Norman Y Mineta San Jose International Airport SJC, Series B, 5.0%, 3/1/37 (AMBAC Insured)
	River Islands Public Financing Authority, Community Facilities, 5.5%, 9/1/45

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

Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/17 15

Schedule of Investments | 3/31/17 (continued)

Principal
Amount
USD (\$)

2,425,000 (e)	California -- (continued)
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

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

1,500,000	Colorado -- 0.6% Colorado Educational & Cultural Facilities Authority, Rocky Mountain Classical Academy Project, 8.0%, 9/1/43
2,235,000 7,200,000 (e) 1,000,000	Connecticut -- 3.8% Mohegan Tribal Finance Authority, 7.0%, 2/1/45 (144A) State of Connecticut, Series E, 4.0%, 9/1/30 Town of Hamden, CT, Whitney Center Project, Series A, 7.75%, 1/1/43
2,635,000 6,825,000	District of Columbia -- 3.5% District of Columbia Tobacco Settlement Financing Corp., Asset-Backed, 6.5%, 5/15/33 District of Columbia Tobacco Settlement Financing Corp., Asset-Backed, 6.75%, 5/15/40
1,500,000 1,500,000 2,500,000 (d) 5,000,000 1,000,000 (d)	Florida -- 4.5% Alachua County Health Facilities Authority, Terraces Bonita Springs Project, Series A, 8.125%, 11/15/41 Alachua County Health Facilities Authority, Terraces Bonita Springs Project, Series A, 8.125%, 11/15/46 County of Miami-Dade, FL, Aviation Revenue, Series B, 5.5%, 10/1/41 Florida's Turnpike Enterprise, Department of Transportation, Series A, 4.0%, 7/1/32 Hillsborough County Industrial Development Authority, Various Health Facilities, 8.0%, 8/15/32
900,000 750,000 8,750,000	Georgia -- 4.1% DeKalb County Georgia Hospital Authority, DeKalb Medical Center, Inc. Project, 6.0%, 9/1/30 DeKalb County Georgia Hospital Authority, DeKalb Medical Center, Inc. Project, 6.125%, 9/1/40 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

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

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

Principal
Amount
USD (\$)

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

2,000,000	Idaho -- 0.7% Power County Industrial Development Corp., FMC Corp. Project, 6.45%, 8/1/32
<hr/>	
417,400 (f)	Illinois -- 3.3% Illinois Finance Authority, Clare Oaks Project, Series B, 4.0%, 11/15/52
261,000 (b)	Illinois Finance Authority, Clare Oaks Project, Series C-1, 11/15/52
52,200 (b)	Illinois Finance Authority, Clare Oaks Project, Series C-2, 11/15/52
52,200 (b)	Illinois Finance Authority, Clare Oaks Project, Series C-3, 11/15/52
3,000,000 (c)	Illinois Finance Authority, Greenfields of Geneva Project, Series A, 8.125%, 2/15/40
2,500,000 (c)	Illinois Finance Authority, Greenfields of Geneva Project, Series A, 8.25%, 2/15/46
1,450,000	Illinois Finance Authority, Memorial Health System, 5.5%, 4/1/39
2,000,000	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
1,530,000	Southwestern Illinois Development Authority, Village of Sauget Project, 5.625%, 11/1/26
<hr/>	
250,000	Indiana -- 0.6% City of Carmel, IN, Barrington Carmel Project, Series A, 7.0%, 11/15/32
750,000	City of Carmel, IN, Barrington Carmel Project, Series A, 7.125%, 11/15/42
500,000	City of Carmel, IN, Barrington Carmel Project, Series A, 7.125%, 11/15/47
<hr/>	
1,000,000	Kansas -- 0.4% Kansas Development Finance Authority, Hayes Medical Center, Inc., Series Q, 5.0%, 5/15/35
<hr/>	
7,000,000	Louisiana -- 5.9% Jefferson Parish Hospital Service District No. 2, East Jefferson General Hospital, 6.375%, 7/1/41
2,500,000	Louisiana Local Government Environmental Facilities & Community Development Authority, Westlake Chemical Corp. Project, 6.75%, 11/1/32
1,650,000 (d)	Louisiana Public Facilities Authority, Ochsner Clinic Foundation Project, Series A, 5.5%, 5/15/47
4,350,000	Louisiana Public Facilities Authority, Ochsner Clinic Foundation Project, Series A, 5.5%, 5/15/47

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

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

Schedule of Investments | 3/31/17 (continued)

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

Principal
Amount
USD (\$)

750,000	Louisiana -- (continued) Opelousas Louisiana General Hospital Authority, Opelousas General Health System Project, 5.75%, 10/1/23
---------	--

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
2,225,000	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 (b)	Massachusetts -- 9.6% Massachusetts Bay Transportation Authority, Series A, 7/1/28
2,575,000	Massachusetts Development Finance Agency, Broad Institute, Inc., Series A, 5.25%, 4/1/37
975,142	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

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

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

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

Principal Amount USD (\$)	
	Minnesota -- 2.2%
2,000,000	Bloomington Port Authority, Radisson Blu Mall of America, 9.0%, 12/1/35
3,755,000 (e)	State of Minnesota, Series B, 4.0%, 8/1/27
	Mississippi -- 1.1%
725,000 (f)	Mississippi Business Finance Corp., Chevron USA, Inc. Project, Series B, 0.91%, 12/1/30
1,000,000 (f)	Mississippi Business Finance Corp., Chevron USA, Inc. Project, Series C, 0.88%, 12/1/30
1,515,000 (f)	Mississippi Business Finance Corp., Chevron USA, Inc. Project, Series C, 0.88%, 12/1/30
	Montana -- 0.2%
2,445,000 (c)	City of Hardin, MT, Tax Allocation, Rocky Mountain Power, Inc. Project, 6.25%, 9/1/31
1,000,000 (c)	Two Rivers Authority, Inc., 7.375%, 11/1/27
	Nevada -- 2.3%
4,500,000 (d)	City of Reno, NV, Renown Regional Medical Center Project, Series A, 5.25%, 6/1/41
2,000,000	County of Washoe, NV, Fuel Tax, 5.0%, 2/1/43
	New Jersey -- 8.8%
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, 12.382%, 1/1/28 (144A) (AGM Insured)
15,375,000 (b)	New Jersey Transportation Trust Fund Authority, 12/15/27 (BHAC Insured)
	New York -- 6.9%
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

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

1,357,463

Westchester County Healthcare Corp., Series A,
5.0%, 11/1/44

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

Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/17 19

Schedule of Investments | 3/31/17 (continued)

Principal
Amount
USD (\$)

Principal Amount USD (\$)	Description
	Ohio -- 7.2%
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
2,000,000 (f)	Ohio Air Quality Development Authority, FirstEnergy Solutions Corp. Project, Series D, 4.25%, 8/1/29
2,500,000 (e)	State of Ohio, Common Schools, Series B, 5.0%, 6/15/29

	Oregon -- 1.1%
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 -- 11.1%
3,000,000 (f)	Beaver County Industrial Development Authority, FirstEnergy Solutions Corp. Project, Series B, 4.25%, 10/1/47
600,000 (f)	Geisinger Authority, Geisinger Health System, Series B, 0.87%, 8/1/22
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	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 Esperanza, 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

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

5,000,000	Arts Charter School Project, 6.75%, 6/15/43 (144A) Philadelphia Hospitals & Higher Education Facilities Authority, Temple University Health System, Series A, 5.0%, 7/1/34
-----------	---

6,500,000 (c) (e)	Puerto Rico -- 1.4% Commonwealth of Puerto Rico, Series A, 8.0%, 7/1/35
-------------------	--

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

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

Principal
Amount
USD (\$)

1,355,000 (c)	Rhode Island -- 0.8%
1,500,000 (d)	Central Falls Detention Facility Corp., 7.25%, 7/15/35 Rhode Island Health & Educational Building Corp., Tockwatten Home Issue, 8.375%, 1/1/46

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 -- 1.4% 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 -- 20.1%
1,500,000	Arlington Higher Education Finance Corp., Universal Academy, Series A, 7.0%, 3/1/34
2,500,000 (d)	Arlington Higher Education Finance Corp., Universal Academy, Series A, 7.125%, 3/1/44
2,500,000 (e)	Central Texas Regional Mobility Authority, Sub Lien, 6.75%, 1/1/41
5,000,000 (e)	County of Harris, TX, Series A, 5.0%, 10/1/26
2,663,453 (c)	Goose Creek Consolidated Independent School District, Series C, 4.0%, 2/15/26 (PSF-GTD Insured)
1,000,000 (f)	Gulf Coast Industrial Development Authority, Microgy Holdings Project, 7.0%, 12/1/36
2,155,000 (f)	Harris County Health Facilities Development Corp., The Methodist Hospital System, Series A-1, 0.96%, 12/1/41
3,000,000	Harris County Health Facilities Development Corp., The Methodist Hospital System, Series A-2, 0.96%, 12/1/41 Houston Higher Education Finance Corp., St. John's School

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

	Project, Series A, 5.0%, 9/1/38
3,355,000	North Texas Tollway Authority, Series A, 5.0%, 1/1/30
9,750,000 (d)	North Texas Tollway Authority, Series F, 5.75%, 1/1/33
1,500,000 (d)	Red River Health Facilities Development Corp., MRC Crestview, Series A, 8.0%, 11/15/41
2,000,000 (e)	Richardson Independent School District, School Building, 5.0%, 2/15/38 (PSF-GTD Insured)
6,960,000 (h)	Sanger Industrial Development Corp., Texas Pellets Project, Series B, 8.0%, 7/1/38
1,000,000	Tarrant County Cultural Education Facilities Finance Corp., Mirador Project, Series A, 8.125%, 11/15/39
750,000	Tarrant County Cultural Education Facilities Finance Corp., Mirador Project, Series A, 8.25%, 11/15/44
1,000,000 (c)	Texas Midwest Public Facility Corp., Secure Treatment Facility Project, 9.0%, 10/1/30

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

Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/17 21

Schedule of Investments | 3/31/17 (continued)

Principal
Amount
USD (\$)

	Texas -- (continued)
3,365,000	Texas Private Activity Bond Surface Transportation Corp., NTE Mobility Partners LLC, 7.0%, 12/31/38
2,500,000	Travis County Health Facilities Development Corp., Longhorn Village Project, 7.125%, 1/1/46
5,000,000 (e)	Tyler Independent School District, School Building, 5.0%, 2/15/38 (PSF-GTD Insured)

	Utah -- 0.4%
1,000,000	Salt Lake City Corp., Airport Revenue, Series B, 5.0%, 7/1/36

	Virginia -- 4.2%
2,000,000	County of Washington, VA, 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	Virginia Public School Authority Revenue, 4.0%, 8/1/25 (State Aid Withholding)

	Washington -- 5.6%
3,000,000	City of Seattle, WA, Water System Revenue, 4.0%, 8/1/32 \$
2,500,000 (e)	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

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

2,000,000	Washington State Health Care Facilities Authority, VA Mason Medical, Series A, 6.125%, 8/15/37
2,000,000	Washington State Health Care Facilities Authority, VA Mason Medical, Series A, 6.25%, 8/15/42
1,100,000	Washington State Housing Finance Commission, Mirabella Project, Series A, 6.75%, 10/1/47 (144A)

2,000,000 (c)	West Virginia -- 0.7% City of Philippi, WV, Alderson-Broadus College, Inc., Series A, 7.75%, 10/1/44
725,000 (c)	West Virginia Hospital Finance Authority, Highland Hospital Group, 9.125%, 10/1/41

5,000,000	Wisconsin -- 3.5% 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

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

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

Principal
Amount
USD (\$)

1,500,000	Wisconsin -- (continued) 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

TOTAL TAX EXEMPT OBLIGATIONS
(Cost \$404,999,177)

13,000,000 (f)	MUNICIPAL COLLATERALIZED DEBT OBLIGATION -- 0.3% of Net Assets Non-Profit Preferred Funding Trust I, Series E, 0.0%, 9/15/37 (144A)
----------------	---

TOTAL MUNICIPAL COLLATERALIZED DEBT OBLIGATION
(Cost \$13,000,000)

TOTAL INVESTMENTS IN SECURITIES -- 150.9%
(Cost -- \$417,999,177) (i)

OTHER ASSETS AND LIABILITIES -- 2.0%

PREFERRED SHARES AT REDEMPTION VALUE,

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

INCLUDING DIVIDENDS PAYABLE -- (52.9)%

NET ASSETS APPLICABLE TO
COMMON SHAREOWNERS -- 100.0%

- (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, 2017, the value of these securities amounted to \$32,238,340, or 11.4% of total 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, 2017.
- (a) Consists of Revenue Bonds unless otherwise indicated.
- (b) Security issued with a zero coupon. Income is recognized through accretion of discount.
- (c) Security is in default.
- (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) Represents a General Obligation Bond.
- (f) The interest rate is subject to change periodically. The interest rate shown is the rate at March 31, 2017.
- (g) Escrow to maturity.
- (h) Security is valued using fair value methods (other than prices supplied by independent pricing services). See Notes to Financial Statements -- Note 1A.

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

Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/17 23

Schedule of Investments | 3/31/17 (continued)

- (i) At March 31, 2017, the net unrealized appreciation on investments based on cost for federal tax purposes of \$411,216,222 was as follows:

Aggregate gross unrealized appreciation for all investments in which there is an excess of value over tax cost	\$ 46,902,681
Aggregate gross unrealized depreciation for all investments in which there is an excess of tax cost over value	(30,166,458)
Net unrealized appreciation	\$ 16,736,223

=====

Purchases and sales of securities (excluding temporary cash investments) for the year ended March 31, 2017 aggregated \$54,293,618 and \$39,251,375 respectively.

The Trust is permitted to engage in purchase and sale transactions ("cross trades") with certain funds and accounts for which Pioneer Investment Management, Inc. (PIM) 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, 2017, the Trust engaged in purchases and sales pursuant to these procedures amounting to \$2,764,945 and \$0, respectively resulting in a gain of \$0.

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, 2017, in valuing the Trust's investments.

	Level 1	Level 2	Level 3	Total
Tax Exempt Obligations				
Texas	\$ --	\$ 52,895,403	\$4,176,000	\$ 57,071,403
All Other Tax Exempt Obligations	--	370,115,602	--	370,115,602
Municipal Collateralized Debt Obligation	--	765,440	--	765,440
Total	\$ --	\$423,776,445	\$4,176,000	\$427,952,445

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

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

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

	Tax Exempt Obligations

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

Balance as of 3/31/16	\$	--
Realized gain (loss) (1)		--
Change in unrealized appreciation (depreciation) (2)		(2,001,923)
Purchases		--
Sales		--
Accrued discounts/premiums		(2,557)
Changes between Level 3*		6,180,480

Balance as of 3/31/17	\$	4,176,000
=====		

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

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

* Transfers are calculated on the beginning of period value. During the year ended March 31, 2017, there were no transfers between Levels 1 and 2. A security with an aggregate market value of \$6,180,480 transferred from Level 2 to Level 3 as there were no longer observable inputs available to determine its value.

Net change in unrealized appreciation (depreciation) of investments still held as of 3/31/17	\$	(2,001,923)

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

Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/17 25

Statement of Assets and Liabilities | 3/31/17

ASSETS:

Investments in securities, at value (cost \$417,999,177)	\$	427,952,445
Receivables --		
Interest		6,223,799
Investment securities sold		25,000

Total assets	\$	434,201,244

LIABILITIES:

Due to custodian	\$	335,459
Payables --		
Administration fee		63,746
Trustees' fees		478
Professional fees		39,269
Auction agent fees		7,461
Printing expense		5,524
Pricing fees		4,107
Due to affiliates		210,854
Accrued expenses		20,655

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

Total liabilities	\$ 687,553

PREFERRED SHARES AT REDEMPTION VALUE:	
\$25,000 liquidation value per share applicable to 6,000 shares, including dividends payable of \$14,185	\$ 149,985,815

NET ASSETS APPLICABLE TO COMMON SHAREOWNERS:	
Paid-in capital	\$ 306,599,040
Undistributed net investment income	2,395,648
Accumulated net realized loss on investments	(35,420,080)
Net unrealized appreciation on investments	9,953,268

Net assets applicable to common shareowners	\$ 283,527,876
=====	
NET ASSET VALUE PER COMMON SHARE:	
No par value (unlimited number of shares authorized)	
Based on \$283,527,876 / 23,899,020 common shares	\$ 11.86
=====	

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

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

Statement of Operations

For the Year Ended 3/31/17

INVESTMENT INCOME:	
Interest	\$ 22,373,7

Total investment income	\$ 22,373,7

EXPENSES:	
Management fees	\$ 2,668,184
Administrative expense	189,871
Transfer agent fees	17,326
Shareholder communications expense	21,905
Auction agent fees	150,715
Custodian fees	6,604
Professional fees	73,998
Printing expense	9,330
Trustees' fees	17,501
Pricing fees	21,992
Miscellaneous	120,776

Total expenses	\$ 3,298,2

Net investment income	\$ 19,075,5

REALIZED AND UNREALIZED GAIN (LOSS) ON INVESTMENTS:	
Net realized gain (loss) on investments:	\$ (217,084)
Change in net unrealized appreciation (depreciation) on investments:	(16,216,394)

Net realized and unrealized gain (loss) on investments	\$ (16,433,4

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

DISTRIBUTIONS TO PREFERRED SHAREOWNERS FROM NET INVESTMENT INCOME:	\$ (1,559,1

Net increase in net assets resulting from operations	\$ 1,082,9
=====	

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

Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/17 27

Statements of Changes in Net Assets

	Year Ended 3/31/17	Year Ended 3/31/16

FROM OPERATIONS:		
Net investment income (loss)	\$ 19,075,550	\$ 19,744,618
Net realized gain (loss) on investments	(217,084)	463,301
Change in net unrealized appreciation (depreciation) on investments	(16,216,394)	(191,741)
Distributions to preferred shareowners from net investment income	(1,559,147)	(392,002)

Net increase in net assets resulting from operations	\$ 1,082,925	\$ 19,624,176

DISTRIBUTIONS TO COMMON SHAREOWNERS:		
Net investment income and previously undistributed net investment income (\$0.74 and \$0.96 per share, respectively)	\$ (17,540,094)	\$ (22,682,243)

Total distributions to common shareowners	\$ (17,540,094)	\$ (22,682,243)

FROM TRUST SHARE TRANSACTIONS:		
Reinvestment of distributions	\$ 967,385	\$ 1,744,907

Net increase in net assets applicable to common shareowners from Trust share transactions	\$ 967,385	\$ 1,744,907

Net decrease in net assets applicable to common shareowners	\$ (15,489,784)	\$ (1,313,160)

NET ASSETS APPLICABLE TO COMMON SHAREOWNERS:		
Beginning of year	299,017,660	300,330,820

End of year	\$ 283,527,876	\$ 299,017,660

Undistributed net investment income	\$ 2,395,648	\$ 2,160,740
=====		

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

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

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

Financial Highlights

	Year Ended 3/31/17	Year Ended 3/31/16	Year Ended 3/31/15
Per Share Operating Performance			
Net asset value, beginning of period	\$ 12.55	\$ 12.68	\$ 12.07
Increase (decrease) from investment operations: (a)			
Net investment income	\$ 0.80	\$ 0.83	\$ 0.95
Net realized and unrealized gain (loss) on investments	(0.68)	0.02	0.81
Distributions to preferred shareowners from:			
Net investment income	\$ (0.07)	\$ (0.02)	\$ (0.01)
Net increase (decrease) from investment operations	\$ 0.05	\$ 0.83	\$ 1.75
Distributions to common shareowners from:			
Net investment income and previously undistributed net investment income	\$ (0.74)	\$ (0.96)*	\$ (1.14)
Net increase (decrease) in net asset value	\$ (0.69)	\$ (0.13)	\$ 0.61
Net asset value, end of period	\$ 11.86	\$ 12.55	\$ 12.68
Market value, end of period	\$ 10.99	\$ 13.87	\$ 15.48
Total return at net asset value (b)	0.28%	6.61%	13.65%
Total return at market value (b)	(15.92)%	(3.48)%	14.70%
Ratios to average net assets of common shareowners:			
Total expenses (c)	1.12%	1.21%	1.22%
Net investment income before preferred share distributions	6.47%	6.72%	7.61%
Preferred share distributions	0.53%	0.13%	0.07%
Net investment income available to common shareowners	5.94%	6.59%	7.54%
Portfolio turnover	9%	11%	20%
Net assets of common shareowners, end of period (in thousands)	\$283,528	\$299,018	\$300,331

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

Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/17 29

Financial Highlights (continued)

	Year Ended 3/31/17	Year Ended 3/31/16	Year Ended 3/31/15
Preferred shares outstanding (in thousands)	\$150,000	\$150,000	\$150,000
Asset coverage per preferred share, end of period	\$ 72,252	\$ 74,837	\$ 75,055
Average market value per preferred share (d)	\$ 25,000	\$ 25,000	\$ 25,000

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

Liquidation value, including dividends payable, per preferred share \$ 24,998 \$ 25,001 \$ 25,000
=====

- * 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) Market value is redemption value without an active market.

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

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

Notes to Financial Statements | 3/31/17

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.

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.

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

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

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

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

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.

Shares of open-end registered investment companies (including money market mutual funds) are valued at such funds' net asset value. Repurchase agreements are valued at par. Cash may include overnight time deposits at approved financial institutions.

Securities 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 Pioneer Investment Management, Inc. (PIM), the Trust's investment adviser and wholly owned indirect subsidiary of UniCredit S.p.A. (UniCredit), pursuant to procedures adopted by the Trust's Board of Trustees. PIM's fair valuation team uses fair value methods approved by the Valuation Committee of the Board of Trustees. PIM'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.

At March 31, 2017, one security was 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 1.5% of net assets. The value of this fair valued security is \$4,176,000.

B. Investment Income and Transactions

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

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 cost basis of the security. Premiums and discounts related to certain mortgage-backed securities are amortized or accreted in proportion to the monthly paydowns.

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 federal income tax provision is required. As of March 31, 2017, 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 in 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 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.

At March 31, 2017, The Trust reclassified \$17,813,537 to decrease paid-in capital, \$258,599 to increase undistributed net investment income and \$17,554,938 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, 2017, the Trust was permitted to carry forward \$1,490,049 of short-term capital losses and \$19,270,346 of long-term capital losses without limitation. Additionally, at March 31, 2017, the Trust had a net capital loss carry forward of \$20,902,044 of which the following amounts will expire between 2018 and 2019 if not utilized: \$18,242,633 in 2018, and \$2,659,411 in 2019. 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 Trust has elected to defer \$599,676 of short-term capital losses recognized between October 1, 2016 and March 31, 2017, to its fiscal year ending March 31, 2018.

The tax character of distributions paid to shareowners during the years ended March 31, 2017 and March 31, 2016 were as follows:

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

	2017	2016
Distributions paid from:		
Tax exempt income	\$18,477,950	\$22,572,825
Ordinary income	621,291	501,420
Total	\$19,099,241	\$23,074,245

The following shows the components of distributable earnings (losses) on a federal income tax basis at March 31, 2017:

	2017
Distributable earnings:	
Undistributed ordinary income	\$ 224,502
Capital loss carryforward	(41,662,439)
Late year loss deferrals	(599,676)
Other book/tax temporary differences	6,782,955
Tax-exempt spillback	2,230,226
Unrealized appreciation	9,953,268
Total	\$ (23,071,164)

The difference between book-basis and tax-basis unrealized appreciation/depreciation is primarily attributable to the realization for tax purposes of unrealized gains on investments in passive foreign investment companies, 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.

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.

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.

Pioneer Municipal High Income Advantage Trust | Annual Report |3/31/17 35

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, Pennsylvania 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.

2. Management Agreement

PIM manages the Trust's portfolio. Management fees payable under the Trust's Advisory Agreement with PIM 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, 2017, the net management fee was 0.60% of the Trust's average daily managed assets, which was equivalent to 0.91% of the Trust's average daily net assets.

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

In addition, under PIM's management and administration agreements, certain other services and costs are paid by PIM and reimbursed by the Trust. At March 31, 2017, \$274,600 was payable to PIM related to management costs, administrative costs and certain other services is included in "Due to affiliates" and "Administration fee" on the Statement of Assets and Liabilities.

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 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) is the transfer agent, registrar, dividend-paying agent and auction agent with respect to the Trust's auction preferred shares (APS). The Trust pays Deutsche Bank an annual fee, as is agreed to from time to time by the Trust and Deutsche Bank, 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 year ended March 31, 2017 and the year ended March 31, 2016 were as follows:

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

	3/31/17	3/31/16
Shares outstanding at beginning of year	23,822,909	23,686,670
Reinvestment of distributions	76,111	136,239
Shares outstanding at end of year	23,899,020	23,822,909

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, 2017, there were 6,000 APS as follows: Series A -- 3,000 and Series B -- 3,000.

Dividends on Series A and Series B are cumulative at a rate which is to be reset every seven days based on the results of an auction. An auction fails if there are more APS offered for sale than there are buyers. When an auction fails, the dividend rate for the period will be the maximum rate on the auction dates described in the prospectus for the APS. Preferred shareowners are not able to sell their APS at an auction if the auction fails. Since February 2008, the Trust's

Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/17 37

auctions related to the APS have failed. The maximum rate for each series is 125% of the 7 day commercial paper rate or adjusted Kenny rate. Dividend rates on APS ranged from 0.400% to 1.676% during the year ended March 31, 2017.

The Trust may not declare dividends or make other distributions on its common shares or purchase any such shares if, at the time of the declaration, distribution or purchase, the Trust does not comply with the asset coverage ratios described in the prospectus for the APS.

The APS are redeemable at the option of the Trust, in whole or in part, on any dividend payment date at \$25,000 per share plus any accumulated or unpaid dividends, whether or not declared. The APS are also subject to mandatory redemption at \$25,000 per share plus any accumulated or unpaid dividends, whether or not declared, if certain requirements relating to the composition of the assets and liabilities of the Trust as set forth in the Statement of Preferences are not satisfied.

The holders of APS have voting rights equal to the holders of the Trust's common shares (one vote per share) and will vote together with holders of the common shares as a single class. Holders of APS are also entitled to elect two of the Trust's Trustees. In addition, the Investment Company Act of 1940, as amended, requires that along with approval by shareowners that might otherwise be required, the approval of the holders of a majority of any outstanding preferred shares, voting separately as a class, would be required to (a) adopt any plan of reorganization that would adversely affect the preferred shares and (b) take any action requiring a vote of security holders, including, among other things, changes in the Trust's subclassification as a closed-end management investment company or changes in its fundamental investment restrictions.

5. Subsequent Events

A monthly dividend was declared on April 4, 2017 from undistributed and accumulated net investment income of \$0.0475 per common share payable April 28, 2017, to common shareowners of record on April 19, 2017.

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

Subsequent to March 31, 2017, dividends declared and paid on preferred shares totaled \$332,360 in aggregate for the two outstanding preferred share series through May 18, 2017.

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

Report of Independent Registered Public Accounting Firm

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

We have audited the accompanying statement of assets and liabilities, including the schedule of investments, of Pioneer Municipal High Income Advantage Trust (the "Trust"), as of March 31, 2017, and the related statement of operations for the year then ended, the statements of changes in net assets for each of the two years in the period then ended and the financial highlights for each of the three years in the period then ended. These financial statements and financial highlights are the responsibility of the Trust's management. Our responsibility is to express an opinion on these financial statements and financial highlights based on our audits. The financial highlights for the years ended March 31, 2014, and 2013, were audited by other auditors. Those auditors expressed an unqualified opinion on those financial statements and financial highlights in their report dated May 22, 2014.

We conducted our audits in accordance with the standards of the Public Company Accounting Oversight Board (United States). Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements and financial highlights are free of material misstatement. The Trust is not required to have, nor were we engaged to perform, an audit of its internal control over financial reporting. Our audits included consideration of internal control over financial reporting as a basis for designing audit procedures that are appropriate in the circumstances, 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. An audit also includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements, assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation. Our procedures included confirmation of securities owned as of March 31, 2017, by correspondence with the custodian. We believe that our audits provide a reasonable basis for our opinion.

In our opinion, the financial statements and financial highlights referred to above present fairly, in all material respects, the financial position of Pioneer Municipal High Income Advantage Trust as of March 31, 2017, and the results of its operations for the year then ended, the changes in its net assets for each of the two years in the period then ended and the financial highlights for each of the three years in the period then ended, in conformity with accounting principles generally accepted in the United States of America.

/s/ Deloitte & Touche LLP

Boston, Massachusetts
May 26, 2017

Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/17 39

ADDITIONAL INFORMATION

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 shares

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

in the open market.

Pioneer Investment Management, Inc. (the "Adviser"), the Trust's investment adviser, is currently an indirect, wholly owned subsidiary of UniCredit S.p.A. ("UniCredit"). On December 12, 2016, UniCredit announced that it has entered into a binding agreement for the sale of its Pioneer Investments business, which includes the Adviser, to Amundi (the "Transaction"). Amundi is headquartered in Paris, France, and, as of September 30, 2016, had more than \$1.1 trillion in assets under management worldwide. The closing of the Transaction is expected to happen in 2017, subject to certain regulatory and antitrust approvals, and other conditions.

Under the Investment Company Act of 1940, the closing of the Transaction will cause the Trust's current investment advisory agreement with the Adviser to terminate. Accordingly, the Trust's Board of Trustees has approved a new investment advisory agreement for the Trust, which will be submitted to the shareholders of the Trust for their approval.

Change in Independent Registered Public Accounting Firm

Deloitte & Touche LLP, the Trust's independent registered public accounting firm, has informed the Board that it will no longer be independent with respect to the Trust upon the completion of the Transaction and, accordingly, that it intends to resign as the Trust's independent registered public accounting firm upon the completion of the Transaction. The Board will engage a new independent registered public accounting firm for the Trust upon the completion of the Transaction.

During the periods that Deloitte & Touche LLP has served as the Trust's independent registered public accounting firm, including the Trust's two most recent fiscal years, Deloitte & Touche LLP'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 Deloitte & Touche LLP on any matter of accounting principles or practices, financial statement disclosure, or auditing scope or procedure, which, if not resolved to the satisfaction of Deloitte & Touche LLP, would have caused Deloitte & Touche LLP 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 | 3/31/17

Approval of New and Interim Management Agreements

Pioneer Investment Management, Inc. (PIM) serves as the investment adviser to Pioneer Municipal High Income Advantage Trust (the Trust) pursuant to an investment management agreement between PIM and the Trust.

PIM is the principal U.S. asset management business of Pioneer Investments, a group of companies owned by Pioneer Global Asset Management S.p.A. ("PGAM"). PGAM is a wholly-owned subsidiary of UniCredit S.p.A. ("UniCredit"). UniCredit and PGAM have entered into a binding agreement to sell Pioneer Investments, including PIM, to Amundi (the "Transaction"). Upon the consummation of the transaction, PIM will become an indirect wholly-owned subsidiary of Amundi and Amundi's wholly-owned subsidiary, Amundi USA, Inc. The closing of the Transaction is expected to happen in 2017.

Under the Investment Company Act of 1940, the Trust's current investment management agreement (the "Current Management Agreement") will terminate

automatically upon the consummation of the Transaction. In order for PIM to continue to manage the Trust after the consummation of the Transaction, the Trustees and shareholders of the Trust must approve a new investment management agreement for the Trust (the "New Management Agreement"). As discussed below, the Board of Trustees of the Trust approved the New Management Agreement at a meeting held on March 6-7, 2017. The New Management Agreement has been submitted to the shareholders of the Trust for their approval at a meeting to be held on June 13, 2017. If the shareholders of the Trust do not approve the New Management Agreement and the Transaction is completed, an interim investment management agreement between PIM and the Trust (the "Interim Management Agreement") will take effect upon the closing of the Transaction. The Board of Trustees of the Trust also approved the Interim Management Agreement at the March 6-7, 2017 meeting.

Board Evaluation of the New and Interim Management Agreements

The Board evaluated the Transaction and the New Management Agreement and Interim Management Agreement for the Trust. In connection with their evaluation of the Transaction and the New Management Agreement for the Trust, the Trustees requested such information as they deemed reasonably necessary, including: (a) the structure of the Transaction and the strategy underlying the Transaction; (b) the anticipated benefits of the Transaction to the Trust and its shareholders; (c) the post-Transaction plans for PIM, including Amundi's plans for integration of Pioneer Investments and PIM with its existing asset management businesses and plans for the future development

Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/17 41

of PIM; (d) the effect of the Transaction on the ongoing services provided to the Trust, including the need to select a new independent registered public accounting firm for the Trust, and any plans to modify the operations of the Trust; (e) the stability and continuity of PIM's management and key employees, including compensation and benefits to PIM's key employees, and retention plans and incentive plan structure; (f) the post-Transaction indebtedness and financial resources of PIM; (g) Amundi's legal and operational structure, its principal shareholders and senior management, its investment management, risk management, administrative, legal and compliance functions; (h) certain regulatory matters relating to Amundi's affiliates; and (i) Amundi's commitment to the United States, including the role of PIM in the larger Amundi business.

The Trustees also requested and obtained the following information in connection with their evaluation of the Transaction and the New Management Agreement for the Trust: (i) memoranda provided by Fund counsel that summarized the legal standards and other considerations that are relevant to the Trustees in their deliberations regarding the New Management Agreement; (ii) the qualifications of the investment management teams for the Trust, as well as the level of investment by the Trust's portfolio managers in the Trust; (iii) the Trust's management fees and total expense ratios, the financial statements of PIM and its pre- and post-Transaction parent companies, profitability analyses from PIM, and analyses from PIM as to possible economies of scale; (iv) the profitability of the institutional business of PIM and PIM's affiliate, Pioneer Institutional Asset Management, Inc. ("PIAM") as compared to that of PIM's fund management business; and (v) the differences between the fees and expenses of the Trust and the fees and expenses of PIM's and PIAM's institutional accounts, as well as the different services provided by Adviser to the Trust and by PIM and PIAM to the institutional accounts. In addition, the Trustees considered the information provided at regularly scheduled meetings throughout the year regarding the Trust's performance and risk attributes, including through meetings with investment management personnel, and took into account other information related to the Trust provided to the Trustees at regularly scheduled meetings. The Trustees also considered information they had received in their review of the

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

continuance of the Current Management Agreement for the Trust in September 2016.

At meetings held on January 9, 2017 and January 10, 2017, the Trustees met with representatives of Amundi and PGAM, including separate meetings of the Trustees who are not "interested persons" of the Fund Complex ("Independent Trustees") and counsel with representatives of Amundi and PGAM, and subsequently with representatives of Amundi. In those meetings, they received an extensive presentation from the representatives of Amundi,

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

including the chief executive officer of Amundi, describing Amundi's background and history, its global asset management activities, the growth of its business, and its status as the largest asset management firm in Europe and one of the largest globally; its capital structure and financial resources, including information as to the financing of the Transaction; its principal investors, including its majority investor Credit Agricole S.A., and Credit Agricole's long-term commitment to the asset management business; the philosophy and strategy underlying the Transaction and the complementarity of Amundi's and Pioneer Investments' respective asset management businesses; Amundi's various operating and investment committees and how they would likely interact with PIM; the proposed integration process, including the progress to date and the establishment of various integration work streams; Amundi's plans for management of PIM; Amundi's philosophy as to compensation of key employees and its general intentions with respect to incentive plans for key employees of PIM; Amundi's preliminary plans to achieve cost and other synergies; and opportunities to further develop the business of PIM and PIAM, including in the area of institutional asset management, and how that would benefit shareholders of the Pioneer Funds.

In those meetings, the representatives of Amundi confirmed their intention that the Chief Executive Officer and Chief Investment Officer of PIM would remain in their current positions, and confirmed that they do not currently foresee major changes in the day-to-day investment management operations of PIM with respect to the Trust as a direct result of the Transaction. They discussed incentive arrangements for key personnel that would continue after the closing of the Transaction and their plans to establish a new long-term incentive plan following the closing. They also generally discussed ways in which PIM could potentially draw on the expanded global resources of Amundi post-Transaction. At those meetings, the Independent Trustees identified certain areas to which they requested further information, including as to trading and execution of securities transactions, research and portfolio management and potential changes in investment process, particularly where asset classes managed by PIM would overlap with asset classes managed by Amundi, the continued availability of resources currently at Pioneer Investments or elsewhere within Amundi to assist in management of certain Funds, and any anticipated significant changes in operations. The Independent Trustees considered the uncertainty as to whether the Trust's independent registered public accounting firm could continue to act in that capacity after the closing of the Transaction. The Independent Trustees also met with counsel to review the information they had received to date and to discuss next steps.

Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/17 43

Subsequently, the Trustees received further information from Amundi, including written responses to questions raised by the Independent Trustees, and received from PIM the information requested of it. The Independent Trustees reviewed the information provided with counsel at telephonic meetings held on February 16, 2017 and February 27, 2017. The Trustees held a special in-person Board meeting on March 6-7, 2017 for further consideration of the New Management Agreements,

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

the Interim Management Agreements and the Transaction. The Trustees met again with senior executives of Amundi at the March 6-7, 2017 meeting.

At the March 6-7, 2017 meeting, based on their evaluation of the information provided by PIM and Amundi, the Trustees including the Independent Trustees voting separately, approved the New Management Agreement and the Interim Management Agreement for the Trust. In considering the New Management Agreement for the Trust, the Trustees considered various factors that they determined were relevant, including the factors described below. The Trustees did not identify any single factor as the controlling factor in their determinations. The Trustees considered the same factors with respect to the Interim Management Agreement for the Trust.

Nature, Extent and Quality of Services

The Trustees considered the nature, extent and quality of the services that had been provided by PIM to the Trust and that are expected to be provided by PIM to the Trust following the consummation of the Transaction. The Trustees reviewed the terms of the New Management Agreement, and noted that such terms are substantially similar to the terms of the Current Management Agreement, except for different execution dates, effective dates and termination dates. The Trustees reviewed PIM's investment approach for the Trust and its research process. The Trustees considered the resources of PIM and the personnel of PIM who provide investment management services to the Trust. They also reviewed the amount of non-investment resources and personnel of PIM that are involved in PIM's services to the Trust, including PIM's compliance and legal resources and personnel. The Trustees noted the substantial attention and high priority given by PIM's senior management to the Pioneer Fund complex.

The Trustees considered that PIM supervises and monitors the performance of the Trust's service providers and provides the Trust with personnel (including Fund officers) and other resources that are necessary for the Trust's business management and operations and that PIM would continue to provide those investment management and research services and resources to the Trust following the consummation of the Transaction. The Trustees also considered that, as administrator, PIM would continue to be responsible for the

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

administration of the Trust's business and other affairs. The Trustees considered the fees to be paid to PIM for the provision of administration services.

The Trustees considered that Deloitte & Touche LLP has informed the Board that it will no longer be independent with respect to the Trust upon the completion of the Transaction and, accordingly, that it will be necessary for the Board to engage a new independent registered public accounting firm for the Trust.

The Trustees considered that the Transaction is not expected to have a material adverse impact on the nature, scope and overall quality of services provided to the Trust and its shareholders, including investment management, risk management, administrative, compliance, legal and other services, as a result of the Transaction.

In that regard, the Trustees considered that Amundi is one of the largest asset managers globally, and that PIM may have access to additional research and portfolio management capabilities as a result of the Transaction and that PIM, as part of Amundi, is expected to have an enhanced global presence that may contribute to an increase in the overall scale and resources of PIM. Furthermore, in considering whether the Transaction would be expected to have a material adverse impact on the nature, scope and overall quality of services

provided to the Trust and its shareholders, the Trustees considered the statements by representatives of Amundi that they expect the Chief Executive Officer and Chief Investment Officer of PIM to remain in their current positions and that they do not currently foresee major changes in the day-to-day investment management operations of PIM as a direct result of the Transaction, or the risk management, legal or compliance services provided by PIM, with respect to the Trust. They further considered the current incentive arrangements for key personnel of PIM that would continue after the closing of the Transaction. They also noted Amundi's stated intention to establish a new long-term incentive plan following the closing.

The Trustees also took into account their experience in evaluating the proposed combination of Pioneer Investments and Santander Asset Management, which was announced in September, 2014 and abandoned in July, 2016. In light of, among other things, this experience, the Trustees determined that they were not able to identify any realistic alternatives to approving the New Management Agreement that would provide the level of services to the Trust and its shareholders that are expected to be provided by PIM after the closing of the Transaction.

Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/17 45

Based on these considerations, the Trustees concluded that the nature, extent and quality of services that PIM would continue to provide to the Trust under the New Management Agreement would be satisfactory and consistent with the terms of the New Management Agreement.

Performance of the Trust

In considering the Trust's performance, the Trustees regularly reviewed and discussed throughout the year data prepared by PIM and information comparing the Trust's performance with the performance of its peer group of funds, as classified by each of Morningstar, Inc. (Morningstar) and Lipper, and the performance of the Trust's benchmark index. They also discussed the Trust's performance with PIM on a regular basis.

The Trustees' regular reviews and discussions were factored into the Trustees' deliberations concerning the approval of the New Management Agreement.

Management Fee and Expenses

The Trustees noted that the stated management fees to be paid by the Trust are identical under the Current Management Agreement and the New Management Agreement. The Trustees considered information showing the fees and expenses of the Trust in comparison to the management fees and expense ratios of its peer group of funds as classified by Morningstar and also to the expense ratios of a peer group of funds selected on the basis of criteria determined by the Independent Trustees for this purpose using data provided by Strategic Insight Mutual Fund Research and Consulting, LLC (Strategic Insight), an independent third party. In all quintile rankings referred to below, first quintile is most favorable to the Trust's shareowners. To the extent applicable, the Trustees also considered the impact of transfer agency, sub-transfer agency, and other non-management fee expenses on the expense ratios of the Trust. The Trustees noted that they separately review the Trust's transfer agency, sub-transfer agency and intermediary arrangements and that the results of the most recent such review were considered in the consideration of the Trust's expense ratio.

The Trustees considered that the Trust's management fee (based on managed assets) as of September 30, 2016 was in the fourth quintile relative to the management fees paid by other funds in its Strategic Insight peer group for the comparable period. The Trustees considered that the Trust's management fee was approximately five basis points higher than the median management fee paid by

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

other funds in its Morningstar category. The Trustees considered that the expense ratio (based on managed assets) of the Trust's common shares as of September 30, 2016 was in the third quintile relative to its Strategic Insight peer group for the comparable period.

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

The Trustees reviewed management fees charged by PIM and PIAM to institutional and other clients, including publicly offered European funds sponsored by PIM's affiliates, unaffiliated U.S. registered investment companies (in a sub-advisory capacity), and unaffiliated foreign and domestic separate accounts. The Trustees also considered PIM's costs in providing services to the Trust and PIM's and PIAM's costs in providing services to the other clients and considered the differences in management fees and profit margins for fund and non-fund services. In evaluating the fees associated with PIM's and PIAM's client accounts, the Trustees took into account the respective demands, resources and complexity associated with the Trust and other client accounts. The Trustees noted that in some instances the fee rates for those clients were lower than the management fee for the Trust and considered that, under both the Current Management Agreement and the New Management Agreement, PIM would perform additional services for the Trust that it does not provide to those other clients or services that are broader in scope, including oversight of the Trust's other service providers and activities related to compliance and the extensive regulatory and tax regimes to which the Trust is subject. The Trustees also considered the different risks associated with PIM's management of the Trust and PIM's and PIAM's management of the other client accounts.

The Trustees concluded that the management fee payable by the Trust to PIM was reasonable in relation to the nature and quality of the services to be provided by PIM.

Profitability

The Trustees considered information provided by PIM regarding the profitability of PIM with respect to the advisory services provided by PIM to the Trust, including the methodology used by PIM in allocating certain of its costs to the management of the Trust. The Trustees also considered PIM's profit margin in connection with the overall operation of the Trust. They further reviewed the financial results, including the profit margins, realized by PIM and PIAM from non-fund businesses. The Trustees considered PIM's profit margins with respect to the Trust in comparison to the limited industry data available and noted that the profitability of any adviser was affected by numerous factors, including its organizational structure and method for allocating expenses. The Trustees concluded that PIM's profitability with respect to the management of the Trust was not unreasonable.

Economies of Scale

The Trustees considered PIM's views relating to economies of scale in connection with the Pioneer Funds as fund assets grow and the extent to which any such economies of scale are shared with the Trust and Fund shareholders. The Trustees recognize that economies of scale are difficult to identify and quantify, and that, among other factors that may be relevant, are

Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/17 47

the following: fee levels, expense subsidization, investment by PIM in research and analytical capabilities and PIM's commitment and resource allocation to the Trust. The Trustees noted that profitability also may be an indicator of the

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

availability of any economies of scale, although profitability may vary for other reasons including due to reductions in expenses. The Trustees concluded that economies of scale, if any, were being appropriately shared with the Trust.

Other Benefits

The Trustees considered the other benefits that PIM enjoys from its relationship with the Trust. The Trustees considered the character and amount of fees paid or to be paid by the Trust, other than under the Current Management Agreement or the New Management Agreement, for services provided by PIM and its affiliates. The Trustees further considered the revenues and profitability of PIM's businesses other than the Fund business. To the extent applicable, the Trustees also considered the benefits to the Trust and to PIM and its affiliates from the use of "soft" commission dollars generated by the Trust to pay for research and brokerage services.

The Trustees considered that following the completion of the Transaction, PIM will be the principal U.S. asset management business of Amundi, and that Amundi's worldwide asset management business will manage over \$1.38 trillion in assets (including the Pioneer Funds). This may create opportunities for PIM, PIAM and Amundi that derive from PIM's relationships with the Trust, including Amundi's ability to market the services of PIM globally. The Trustees noted that PIM may have access to additional research capabilities as a result of the Transaction and Amundi's enhanced global presence that may contribute to an increase of the overall scale of PIM. The Trustees considered that PIM and the Trust are expected to receive reciprocal intangible benefits from the relationship, including mutual brand recognition and, for the Trust, direct and indirect access to the resources of a large global asset manager. The Trustees concluded that any such benefits received by PIM as a result of its relationship with the Trust were reasonable.

Conclusion

After consideration of the factors described above as well as other factors, the Trustees, including the Independent Trustees, concluded that the New Management Agreement and the Interim Management Agreement for the Trust, including the fees payable thereunder, were fair and reasonable and voted to approve the New Management Agreement and the Interim Management Agreement, and to recommend that shareholders approve the New Management Agreement.

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

Trustees, Officers and Service Providers

Investment Adviser
Pioneer Investment Management, Inc.

Custodian and Sub-Administrator
Brown Brothers Harriman & Co.

Independent Registered Public Accounting Firm
Deloitte & Touche LLP

Principal Underwriter
Pioneer Funds Distributor, Inc.

Legal Counsel
Morgan, Lewis & Bockius LLP

Shareowner Services and Transfer Agent
American Stock Transfer & Trust Company

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

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 us.pioneerinvestments.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 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 46 U.S. registered investment portfolios for which 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.

Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/17 49

Independent Trustees

Name, Age and Position Held With the Trust	Term of Office and Length of Service	Principal Occupation
Thomas J. Perna (66) Chairman of the Board and Trustee	Class III Trustee since 2006. Term expires in 2018.	Private investor (2004 - 2008 and 2009 - present); Chairman (2008 - 2013) and Executive Officer (2008 - 2012), Quadriserv, Inc. (technology product securities lending industry); and Senior Executive Vice President, The Bank of New York (financial and securities services) (1986 - 2004)
David R. Bock (73) 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, Oxera Analytica, Inc. (privately-held research and consulting company) (2010); Executive Vice President and Chief Financial Officer, I-trax, Inc. (publicly traded health services company) (2004 - 2007); and Executive Vice President and Chief Financial Officer, Pedestal Inc. (internet-based mortgage trading company) (2000 - 2002); Private consultant

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

(1995-1997), Managing Director, Lehman Brothers (investment banking firm) (1992-1995); and Executive, The World Bank (1979-1992)

Benjamin M. Friedman (72) Trustee	Class II Trustee since 2008. Term expires in 2017.	William Joseph Maier Professor of Public Economics, Harvard University (1972 - present)
--------------------------------------	---	---

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

Name, Age and Position Held With the Trust	Term of Office and Length of Service	Principal Occupation
Margaret B.W. Graham (69) Trustee	Class II Trustee since 2002. Term expires in 2017.	Founding Director, Vice President and Corporate Secretary, The Winthrop Group Inc. (consulting firm) (1982 - present); Desautels Faculty of Management, McGill University (1999 - present); and Manager, Research Operations and Organization Learning, Xerox PARC, Xerox's advanced research center (1990-1994)
Lorraine H. Monchak (60) Advisory Trustee	Class I Trustee since 2015. Term expires in 2019.	Chief Investment Officer, 1199 SEIU (healthcare workers union pension fund) (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 Funders 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) (1987-1987)
Marguerite A. Piret (68) 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 (70)	Class III Trustee since 2014.	Consultant (investment company services)
------------------------	-------------------------------	--

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

Trustee	Term expires in 2018.	(2012 - present); Executive Vice President, BNY Mellon (financial and investment services) (1969 - 2012); Director, BNY Mellon International Financing Corp. (financial services) (2002 - 2012); and Director, BNY Mellon Overseas Investment Corp. (financial services) (2009 - 2012)
---------	-----------------------	--

Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/17 51

Interested Trustees

Name, Age and Position Held With the Trust	Term of Office and Length of Service	Principal Occupation
Lisa M. Jones (55)* Trustee, President and Chief Executive Officer	Class I Trustee since 2015. Term expires in 2019.	Chair, Director, CEO and President of Pioneer Investment Management-USA (PIM-USA) (since September 2014); Director, CEO and President of Pioneer Investment Management, Inc. (since September 2014); Chair, Director, President of Pioneer Funds Distribution, Inc. (since September 2014); Chair, Director, CEO and President of Pioneer Institutional Asset Management, Inc. (since September 2014); and Chair, Director, and CEO of Pioneer Investment Management Shareholder Services, Inc. (since September 2014); Managing Director, Morgan Stanley Investment Management (2005 - 2013); and Director of Institutional Business, CEO of International, Eagan Vantage Management (2005 - 2010)
Kenneth J. Taubes (58)* Trustee	Class II Trustee since 2014. Term expires in 2017.	Director and Executive Vice President (since 2008) and Chief Investment Officer, U.S. (since 2010) of PIM-USA; Executive Vice President of Pioneer (since 2009); Executive Vice President of Pioneer Institutional Asset Management, Inc. (since 2009); and Portfolio Manager, Pioneer (since 1999)

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

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

Trust Officers

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
Christopher J. Kelley (52) Secretary and Chief Legal Officer	Since 2003. Serves at the discretion of the Board.	Vice President and Associate General Counsel of Pioneer since January 2010; Secretary and Chief Legal Officer of the Pioneer Funds since June 2010; Assistant Secretary of all of the Pioneer Funds from September 2003 to May 2010; Vice President and Senior Counsel of Pioneer from July 2002 to December 2009
Carol B. Hannigan (56) Assistant Secretary	Since 2010. Serves at the discretion of the Board.	Fund Governance Director of Pioneer December 2006 and Assistant Secretary of all the Pioneer Funds since June 2006; Manager - Fund Governance of Pioneer December 2003 to November 2006; and Paralegal of Pioneer from January 2003 to November 2003
Thomas Reyes (54) Assistant Secretary	Since 2010. Serves at the discretion of the Board.	Senior Counsel of Pioneer since May 2010 and Assistant Secretary of all the Funds since June 2010; and Counsel of Pioneer from June 2007 to May 2013
Mark E. Bradley (57) Treasurer and Chief Financial and Accounting Officer	Since 2008. Serves at the discretion of the Board.	Vice President - Fund Treasury of Pioneer Treasurer of all of the Pioneer Funds March 2008; Deputy Treasurer of Pioneer from March 2004 to February 2008; and Assistant Treasurer of all of the Pioneer Funds from March 2004 to February 2008
Luis I. Presutti (51) Assistant Treasurer	Since 2003. Serves at the discretion of the Board.	Director - Fund Treasury of Pioneer Assistant Treasurer of all of the Pioneer Funds
Gary Sullivan (58) Assistant Treasurer	Since 2003. Serves at the discretion of the Board.	Fund Accounting Manager - Fund Treasury Pioneer; and Assistant Treasurer of the Pioneer Funds

Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/17 53

Trust Officers (continued)

Name, Age and Position Held With the Trust	Term of Office and Length of Service	Principal Occupation
David F. Johnson (37) Assistant Treasurer	Since 2009. Serves at the discretion of the Board.	Fund Administration Manager - Fund of Pioneer since November 2008; Assistant Treasurer of all of the Pioneer Funds January 2009; and Client Service Manager Institutional Investor Services at

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

Street Bank from March 2003 to March 2005

Jean M. Bradley (64) Chief Compliance Officer	Since 2010. Serves at the discretion of the Board.	Chief Compliance Officer of Pioneer all the Pioneer Funds since March 2012; Chief Compliance Officer of Pioneer Institutional Asset Management, Inc. from January 2012; Chief Compliance Officer of Vanderbilt Capital Advisors, LLC since January 2012; Director of Adviser and Portfolio Compliance at Pioneer since October 2011 and Senior Compliance Officer for Capital Management Advisers, Inc. from October 2005 to October 2005
Kelly O'Donnell (46) Anti-Money Laundering Officer	Since 2006. Serves at the discretion of the Board.	Director - Transfer Agency Compliance for Pioneer and Anti-Money Laundering Officer for all the Pioneer Funds since 2006

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

This page is for your notes.

Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/17 55

This page is for your notes.

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

This page is for your notes.

Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/17 57

This page is for your notes.

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

This page is for your notes.

Pioneer Municipal High Income Advantage Trust | Annual Report | 3/31/17 59

This page is for your notes.

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

How to Contact 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:

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

For

General inquiries, lost dividend checks,
change of address, lost stock certificates,
stock transfer

Dividend reinvestment plan (DRIP)

Website

Write to

American Stock
Transfer & Trust
Operations Center
6201 15th Ave.
Brooklyn, NY 11219

American Stock
Transfer & Trust
Wall Street Station
P.O. Box 922
New York, NY 10269-0560

www.amstock.com

For additional information, please contact your investment advisor or visit our web site us.pioneerinvestments.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] PIONEER
Investments (R)

Pioneer Investment Management, Inc.
60 State Street
Boston, MA 02109
us.pioneerinvestments.com

Securities offered through Pioneer Funds Distributor, Inc.
60 State Street, Boston, MA 02109
Underwriter of Pioneer Mutual Funds, Member SIPC
(C) 2017 Pioneer Investments 19205-11-0517

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

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

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

(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);

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

(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.

- (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 \$48,714 payable to Deloitte & Touche LLP for the year ended March 31, 2017 and \$45,823 for the year ended March 31, 2016.

(b) Disclose, under the caption AUDIT-RELATED FEES, the aggregate fees billed in

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

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.

Audit-Related Fees

There were no fees for audit-related or other services provided to the Trust during the fiscal years ended March 31, 2017 and 2016.

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

Fees for tax compliance services, primarily for tax returns, totaled \$9,904 in 2017 and \$9,876 in 2016.

(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.

Other Fees

There were no fees for audit-related or other services provided to the Trsut during the fiscal years ended March 31, 2017 and 2016.

(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 Pioneer Investment Management, Inc ("PIM"), 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

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

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

o "One-time" pre-approval

o A summary of all such

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

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.

services and related fees reported at each regularly scheduled Audit Committee meeting.

o "One-time" pre-approval for the fund fiscal year within a specified dollar limit for all pre-approved specific service subcategories

o A summary of all such services and related fees (including comparison to specified dollar limits) reported quarterly.

o Specific approval is needed to exceed the pre-approved dollar limit 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 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

o "One-time" pre-approval for the fund fiscal year

o A summary of all such services and

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

within a specified dollar limit related fees (including comparison to specified dollar limits) reported quarterly.

- 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 tax 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
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 	<ul style="list-style-type: none"> o A summary of all such services and related fees (including comparison to specified dollar

limits) reported quarterly.

- 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"

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

o These services are not to be performed with the exception of the(*) services that may be permitted

AUDIT COMMITTEE REPORTING POLICY

o A summary of all services and related fees reported at each

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

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.

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 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 2017 and 2016, 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 and affiliates, as previously defined, totaled approximately

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

\$9,904 in 2017 and \$9,876 in 2016.

(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 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)

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

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 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

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

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

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

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

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

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 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

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

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.

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

- 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

- 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.
- 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.
- 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

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

- 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.

Capital Structure

Managements need considerable flexibility in determining the company's financial structure, and Pioneer normally supports managements' proposals

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

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 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

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

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.

$$\text{Dilution} = (A + B + C) / (A + B + C + D), \text{ where}$$

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 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.

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

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

Manager's business experience during the past 5 years.

9. PORTFOLIO MANAGEMENT

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, 2017. 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 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	\$2,211,655	
	Other Pooled Investment Vehicles	0	\$ 0	
	Other Accounts	0	\$ 0	
Jonathan Chirunga	Other Registered Investment Companies	3	\$2,211,655	
	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, 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 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

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

are increased to the extent that a portfolio manager has a financial incentive to favor one account over another. 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

0

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

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

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, 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

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 Pioneer. The compensation program for all 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. Pioneer seeks to set base compensation at market rates, taking into account the experience and responsibilities of

1

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 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

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

and marketing, that are mutually established and evaluated by each portfolio manager and management.

- o PIONEER RESULTS AND BUSINESS LINE RESULTS. 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. Senior executives or other key employees are granted performance units based on the stock price performance of UniCredit and the financial performance of Pioneer Global Asset Management S.p.A., which are affiliates of Pioneer. 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

The following table indicates as of March 31, 2017 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

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

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

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 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

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

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 shareholders.

ITEM 12. 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 (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, 2017

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

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, 2017

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

Date May 30, 2017

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