

PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST
Form N-CSR
November 27, 2009

OMB APPROVAL
OMB Number: 3235-0570
Expires: August 31, 2010
Estimated average burden
hours per response.....18.9

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)

Dorothy E. Bourassa, 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, 2009 through September 30, 2009

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.

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

ITEM 1. REPORTS TO SHAREOWNERS.

Pioneer Municipal High
Income Advantage Trust

Semiannual Report | September 30, 2009

Ticker Symbol: MAV

[LOGO] PIONEER
Investments (R)

visit us: pioneerinvestments.com

Table of Contents

Letter to Shareowners	2
Portfolio Management Discussion	4
Portfolio Summary	7
Prices and Distributions	8
Performance Update	9
Schedule of Investments	10
Financial Statements	21
Notes to Financial Statements	26
Trustees, Officers and Service Providers	35
Pioneer Municipal High Income Advantage Trust Semiannual Report 9/30/09	1

President's Letter

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

Dear Shareowner,

Stock and bond markets around the globe have begun to recover this year from one of their most tumultuous periods in history. This is a welcome relief, and we are generally optimistic about the prospects for the economy going forward. Still, challenges remain. Unemployment is high. Consumer demand and loan growth are weak. And housing has not yet returned to normal.

At Pioneer, we have long advocated the benefits of investing for the long term. This strategy has generally performed well for many investors. Those who remained invested in the market during the downturn have most likely seen their portfolios start to recover this year as the Dow Jones Industrial Average climbed back towards the 10,000 level. Many bond investors have similarly seen a strong rebound, with a broad-based recovery across many different fixed-income asset classes. The riskiest asset classes, such as high-yield bonds, outperformed other fixed-income asset classes through the first eight months of 2009.

At Pioneer, we are not changing the approach to investing that we have used for more than 80 years. We remain focused on company fundamentals and risk management. Our investment process is based on careful research into individual companies, quantitative analysis, and active portfolio management. This three-pillared process, which we apply to each of our portfolios, is supported by an integrated team approach and is designed to carefully balance risk and reward. While we see potential opportunities for making money in many corners of the markets around the globe, it takes research and experience to separate solid investment opportunities from speculation.

Following this difficult period, many investors are rethinking their approach to investing and risk management. Some are questioning whether the basic investment principles they were taught in the past are still useful in today's markets. Complicating matters is that financial markets remain unpredictable. Our advice, as always, is to work closely with a trusted financial advisor to discuss your goals and work together to develop an investment strategy that meets your individual needs. There is no single best strategy that works for every investor.

2 Pioneer Municipal High Income Advantage Trust | Semiannual Report | 9/30/09

We invite you to learn more about Pioneer and our time-tested approach to investing by consulting with your financial advisor or visiting us online at www.pioneerinvestments.com. We greatly appreciate you putting your trust in us and we thank you for investing with Pioneer.

Respectfully,

/s/ Daniel K. Kingsbury

Daniel K. Kingsbury
President and CEO
Pioneer Investment Management USA, Inc.

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 the opinion of Trust management as of the date of this report. These statements should not be relied upon for any other purposes. Past performance is no guarantee of future results, and there is no guarantee that market forecasts discussed will be realized.

Pioneer Municipal High Income Advantage Trust | Semiannual Report | 9/30/09 3

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

Portfolio Management Discussion | 9/30/09

Municipal bond investors were rewarded with relatively strong performance over the past six months, as the municipal bond market recovered from one of the most turbulent periods in history. In the following interview, David Eurkus, who is responsible for the daily management of Pioneer Municipal High Income Advantage Trust, discusses some of the factors that had an impact on the municipal bond market and the Trust during the six months ended September 30, 2009.

Q How did the Trust perform over the six months that ended September 30, 2009?

A For the six-month period that ended September 30, 2009, Pioneer Municipal High Income Advantage Trust produced a total return of 37.00% at net asset value and 41.15% at market price, and Trust shares were selling at a 0.9% premium of market price to net asset value at September 30, 2009. Over the same period, the Barclays Capital (formerly Lehman Brothers) Municipal Bond Index, which tracks the performance of investment-grade bonds, returned 9.38%, and the Barclays Capital High Yield Municipal Bond Index, which tracks the performance of below-investment-grade bonds, returned 23.33%. On September 30, 2009, the Trust held 141 issues in 34 states, territories and the District of Columbia and the average credit quality of the portfolio was BBB+.

During the six-month period, investors earned a relatively high level of dividend income. The Trust's 30-day SEC yield was 9.74% on September 30, 2009, and its current dividend yield based on market close was 7.86%. This translates into a taxable equivalent yield of 12.09%, based on the maximum Federal income tax rate of 35%. About 25% of the Trust's investments were subject to the Federal Alternative Minimum Tax (AMT).

Q What was the investment environment like during the six months ended September 30, 2009?

A After weathering one of the most difficult periods in history, the municipal bond market staged a dramatic rally over the past six months, as investors moved out of low-yielding, tax-exempt money market funds and sought the higher yields that tax-exempt bonds can provide. The substantial increase in investor demand came at a time when there was a sharp reduction in newly issued tax-exempt bonds, as roughly one-third of new municipal bonds were taxable "Build America Bonds," which are subsidized by the U.S. Treasury. The reduction in supply and robust demand for tax-exempt bonds benefited both the investment-grade and high-yield areas of the tax-exempt market during the six months ended September 30, 2009.

4 Pioneer Municipal High Income Advantage Trust | Semiannual Report | 9/30/09

Q How did you manage the Trust during the six months ended September 30, 2009?

A We did not make any material changes to the portfolio during the period. As has been the case in the past, the Trust was invested primarily in sectors that underpin the U.S. economy. At 32.4% of the total investment portfolio, health care was the biggest sector position in the Trust as of September 30, 2009. Tobacco also was a relatively large position, at 11.5% of total investment portfolio, and airport bonds accounted for about 11.4% of total investment portfolio. The Trust also had investments in housing, pollution control, public power and water & sewer bonds. Below-investment-grade securities accounted for 50% of the Trust's total investments based on S&P, and investment-grade securities accounted for 50% of the Trust's total investments based on S&P.

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

Q What investments most affected the Trust's performance during the six months ended September 30, 2009?

A While both high-yield and investment-grade bonds contributed to returns, the Trust's position in the high-yield sector gave performance its biggest boost. The performance of the Trust's investment-grade tobacco bonds, whose prices had declined substantially in the first quarter of 2009, was also noteworthy. Airline bonds also fared well. The airline industry has been one of the hardest-hit areas of the economy, and prices of airline bonds experienced sharp declines. By cutting costs, reducing the number of flights and raising ticket prices, some airlines are now on a more stable footing, and investors bid up the prices of their bonds during the six-month period ended September 30, 2009. American Airlines and Continental Airlines are examples of carriers that benefited from investors' increased appetite for airline bonds. The Trust's substantial weight in lower-quality bonds in the health care sector also was a key contributor to benchmark-relative outperformance during the six-month period. As bond prices rose, the Trust's relatively long duration (sensitivity to changes in interest rates) also aided its return. One negative for the Trust's benchmark-relative performance during the period was its holdings in AAA-rated, pre-refunded/escrow-to-maturity (ETM) securities. While the performance of these securities was positive overall, they fell short of the benchmarks' returns.

Q What is your outlook?

A The tax-exempt municipal market has had a substantial run-up, and while we believe it may moderate, we continue to be constructive in our outlook for municipal bonds and the Trust; the investment environment for the Trust remains positive. We believe the economy is improving modestly. Inflation has remained benign, and the Federal Reserve Board appears to be holding interest rates within the 0.00% to 0.25% range. As we look ahead, we believe that municipal bonds have the potential to continue providing a

Pioneer Municipal High Income Advantage Trust | Semiannual Report | 9/30/09 5

relatively high level of tax-free income -- and healthy returns -- for appropriate investors.

Please refer to the Schedule of Investments on pages 10-20 for a full listing of Trust securities.

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. 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 underlying securities and their inability to meet their debt obligations.

The Trust may use leverage through the issuance of preferred shares. Leverage creates significant risks, including the risk that the Trust's income or capital appreciation will not be sufficient to cover the cost of leverage,

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

which may adversely affect the return for the holders of common shares.

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

Risks of investing in the Trust are discussed in greater detail in the Trust's registration statement on Form N-2 relating to its common shares.

Past performance is no guarantee of future results, and there is no guarantee that market forecasts discussed will be realized.

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 the opinion of Trust management as of the date of this report. These statements should not be relied upon for any other purposes.

6 Pioneer Municipal High Income Advantage Trust | Semiannual Report | 9/30/09

Portfolio Summary | 9/30/09

Portfolio Diversification

(As a percentage of total investment portfolio)

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

Health Revenue	32.4%
Insured	11.7
Tobacco Revenue	11.5
Airport Revenue	11.4
Pollution Control Revenue	8.8
Other Revenue	6.8
Development Revenue	5.2
Housing Revenue	2.9
Transportation Revenue	2.6
Facilities Revenue	1.8
Water Revenue	1.2
Education Revenue	1.2
Utilities Revenue	1.2
Power Revenue	1.1
Airlines Revenue	0.2

Portfolio Maturity

(As a percentage of long-term holdings)

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

0-1 year	4.9%
1-3 years	16.1
3-6 years	19.9

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

6-8 years	12.3
8-10 years	12.6
10+ years	34.2

Quality Distribution

(As a percentage of total investment portfolio; based on S&P ratings)

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

AAA	16.0%
AA	3.7
A	3.7
BBB	26.6
BB	6.5
B	8.0
CCC	4.5
CC	0.1
C	1.0
Not Rated	29.9

The portfolio is actively managed and current holdings may be different.

Pioneer Municipal High Income Advantage Trust | Semiannual Report | 9/30/09 7

Prices and Distributions | 9/30/09

Share Prices and Distributions

Market Value per Common Share

9/30/09	3/31/09
\$12.22	\$9.04

Net Asset Value per Common Share

9/30/09	3/31/09
\$12.11	\$9.23

Distributions per Common Share

	Net Investment Income	Short-Term Capital Gains	Long-Term Capital Gains
4/1/09-9/30/09	\$0.4550	\$ --	\$ --

10 Largest Holdings

(As a percentage of long-term holdings)*

1.	New Jersey Economic Development Authority Revenue, 6.25%, 9/15/29	2.87%
2.	University of California, RIB, 12.821%, 5/15/38	2.74
3.	Massachusetts Housing Finance Agency, 5.35%, 12/1/45	2.47
4.	North Texas Tollway Authority Revenue, 5.75%, 1/1/33	2.47
5.	Indiana State Development Finance Authority Revenue, 5.75%, 10/1/11	2.34
6.	Houston Texas Airport System Special Facilities Revenue, 6.75%, 7/1/29	2.34
7.	Non-Profit Preferred Funding Trust I, Series E, 12.0%, 9/15/37 (144A)	2.30
8.	Tobacco Settlement Financing Corp., 5.875%, 5/15/39	2.18
9.	California State Various Purpose, RIB, 11.118%, 6/1/37 (144A)	2.15
10.	South Carolina Jobs Economic Development Authority Revenue, 6.375%, 8/1/34	2.00

* This list excludes temporary cash and derivative investments. The portfolio is actively managed, and currently holdings may be different. The holdings listed should not be considered recommendations to buy or sell any security listed.

8 Pioneer Municipal High Income Advantage Trust | Semiannual Report | 9/30/09

Performance Update | 9/30/09

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, compared to that of the Barclays Capital Municipal Bond Index and Barclays Capital High Yield Municipal Bond Index.

Cumulative Total Returns

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

(As of September 30, 2009)

Period	Net Asset Value	Market Price
Life-of-Trust (10/20/03)	29.07%	24.43%
5 Years	25.44	24.88
1 Year	15.55	29.69

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

Value of \$10,000 Investment

	Pioneer Municipal High Income Advantage Trust	Barclays Capital Municipal Bond Index	Barclays Capital High Yield Municipal Bond Index
10/03	\$10,000	\$10,000	\$10,000
9/04	\$ 9,965	\$10,513	\$10,098
9/05	\$11,335	\$10,939	\$9,875
9/06	\$12,310	\$11,425	\$10,101
9/07	\$13,392	\$11,779	\$10,116
9/08	\$ 9,595	\$11,559	\$9,517
9/09	\$12,443	\$13,275	\$10,956

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

Performance data shown represents past performance. Past performance is no guarantee of future results. Investment return and market price will fluctuate, and your shares may trade below net asset value ("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.

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 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 includes 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 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.

Index comparison begins October 31, 2003. The Barclays Capital Municipal Bond Index is a broad measure of the municipal bond market. Barclays Capital High Yield Municipal Bond Index totals over \$26 billion in market value and maintains over 1300 securities. Municipal bonds in this index have the

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

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 are not leveraged. You cannot invest directly in the Indices.

Pioneer Municipal High Income Advantage Trust | Semiannual Report | 9/30/09 9

Schedule of Investments | 9/30/09 (unaudited)

Principal Amount	S&P/Moody's Ratings (unaudited)		Valu

		TAX-EXEMPT OBLIGATIONS -- 146.5% of Net Assets	
		Arizona -- 3.3%	
\$ 5,000,000	NR/NR	Casa Grande Industrial Development Authority, Hospital Revenue, 7.625%, 12/1/29	\$ 4
1,531,000	NR/Baa3	Pima County Industrial Development Authority, 6.75%, 7/1/31	1
2,640,000	NR/NR	Pima County Industrial Development Authority, 7.0%, 1/1/38	2
1,000,000	NR/NR	San Luis Facility Development Corp., 7.25%, 5/1/27	-----
			\$ 9

		California -- 14.9%	
3,140,000 (a)	AAA/NR	California State University Revenue, RIB, 11.489%, 11/1/39 (144A)	\$ 3
2,425,000	A/Baa1	California State Various Purpose, 5.75%, 4/1/31	2
8,575,000 (a)	AAA/NR	California State Various Purpose, RIB, 11.118%, 6/1/37 (144A)	8
6,000,000	NR/NR	California Statewide Communities Development Authority, 9.0%, 12/1/38	4
2,680,000+	AAA/Aaa	Golden State Tobacco Securitization Corp., 6.75%, 6/1/39	3
2,500,000	A/A2	San Jose California Airport Revenue, 5.0%, 3/1/37	2
10,500,000 (a)	AAA/NR	University of California, RIB, 12.821%, 5/15/38	11
7,670,000	C/NR	Valley Health System Hospital Revenue, 6.875%, 5/15/23	4

			\$ 41

		Colorado -- 1.1%	
2,850,000+	NR/NR	Denver Health & Hospital Authority Healthcare Revenue, 6.0%, 12/1/31	\$ 3

		Connecticut -- 2.8%	
7,750,000	BBB/Baa1	Connecticut State Development Authority Revenue, 5.75%, 11/1/37	\$ 7

		District of Columbia -- 3.5%	
2,700,000	BBB/Baa3	District of Columbia Tobacco Settlement Financing Corp., 6.5%, 5/15/33	\$ 2
6,825,000	BBB/Baa3	District of Columbia Tobacco Settlement Financing Corp., 6.75%, 5/15/40	6

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

Principal Amount	S&P/Moody's Ratings (unaudited)	Description	Value
4,500,000	BBB/Baa1	Florida -- 3.8% Hillsborough County Industrial Development Authority Pollution Control Revenue, 5.5%, 10/1/23	\$ 4
1,980,000	NR/NR	Hillsborough County Industrial Development Authority Pollution Control Revenue, 6.75%, 7/1/29	1

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

10 Pioneer Municipal High Income Advantage Trust | Semiannual Report | 9/30/09

Principal Amount	S&P/Moody's Ratings (unaudited)	Description	Value
Florida -- (continued)			
\$ 1,000,000	BBB/Baa3	Hillsborough County Industrial Development Authority Revenue, 8.0%, 8/15/32	\$ 1
500,000	BB/NR	Miami Beach Health Facilities Authority, 5.375%, 11/15/28	1
2,500,000	A-/A2	Miami-Dade County Florida Aviation Revenue, 5.5%, 10/1/41	2

\$ 10			
Georgia -- 3.9%			
5,210,000 (a)	NR/Aa3	Atlanta Georgia Water and Wastewater Revenue, RIB, 11.304%, 11/1/43 (144A)	\$ 5
1,065,000	NR/B2	Effingham County Industrial Development Authority, 6.5%, 6/1/31	1
3,360,000	NR/NR	Fulton County Residential Care Facilities, 7.0%, 7/1/29	2
1,650,000	NR/NR	Savannah Georgia Economic Development Authority Revenue, 7.4%, 1/1/34	1

\$ 10			
Guam -- 1.9%			
4,500,000+	AAA/B2	Northern Mariana Islands, 6.75%, 10/1/33	\$ 5

Idaho -- 1.8%			
2,000,000	BBB/Baa2	Power County Industrial Development Corp., 6.45%, 8/1/32	\$ 2
3,000,000	BBB/Baa2	Power County Pollution Control Revenue, 5.625%, 10/1/14	2

\$ 5			
Illinois -- 5.8%			
3,000,000 (b)	NR/NR	Centerpoint Intermodal Center, 10.0%, 6/15/23 (144A)	\$ 1
3,000,000	AA-/Aa3	City of Chicago Illinois, 5.0%, 1/1/28	3
2,000,000	NR/Caa2	City of Chicago Illinois, 5.5%, 12/1/30	1
2,000,000	AAA/NR	Illinois Finance Authority Revenue, 6.0%, 8/15/25	2
1,000,000	NR/NR	Illinois Finance Authority Revenue, 6.0%, 11/15/27	2
2,000,000	AA+/Aa2	Illinois Finance Authority Revenue, 6.0%, 8/15/39	2

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

2,500,000	NR/NR	Illinois Finance Authority Revenue, 6.125%, 11/15/25	2
1,500,000 (c)	NR/NR	Illinois Health Facilities Authority Revenue, 6.9%, 11/15/33	
2,700,000	NR/NR	Southwestern Illinois Development Authority Revenue, 5.625%, 11/1/26	1
			\$ 16

10,000,000	BBB/NR	Indiana -- 6.7% Indiana State Development Finance Authority Revenue, 5.75%, 10/1/11	\$ 9
5,000,000	NR/B2	Jasper County Industrial Economic Development Revenue, 5.6%, 4/1/29	4

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

Pioneer Municipal High Income Advantage Trust | Semiannual Report | 9/30/09 11

Schedule of Investments | 9/30/09 (unaudited) (continued)

Principal Amount	S&P/Moody's Ratings (unaudited)		V

\$ 2,500,000 (b)	BBB/Baa2	Indiana -- (continued) Rockport Indiana Pollution Control Revenue, 6.25%, 6/2/25	\$
2,085,000	NR/NR	Vincennes Industrial Economic Development Revenue, 6.25%, 1/1/24	

500,000	BB-/NR	Kentucky -- 1.6% Kentucky Economic Development Finance Authority Hospital System Revenue, 5.7%, 10/1/10	\$
4,400,000	BB-/NR	Kentucky Economic Development Finance Authority Hospital System Revenue, 5.875%, 10/1/22	\$

2,500,000	BB/Ba3	Louisiana -- 6.5% Louisiana Local Government Environmental Facilities Development Authority Revenue, 6.75%, 11/1/32	\$
6,000,000	NR/A3	Louisiana Public Facilities Authority Revenue, 5.5%, 5/15/47	
750,000	BBB+/NR	Opelousas Louisiana General Hospital Authority Revenue, 5.75%, 10/1/23	
9,415,000	BBB/Baa3	Tobacco Settlement Financing Corp., 5.875%, 5/15/39	

460,000	NR/NR	Maryland -- 0.5% Maryland Health & Higher Educational Facilities Authority Revenue, 5.25%, 1/1/27	\$
1,250,000	NR/NR	Maryland Health & Higher Educational Facilities Authority Revenue, 5.3%, 1/1/37	

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

2,195,000	BBB-/Baa3	Massachusetts -- 5.6% Massachusetts Health & Educational Facilities Authority Revenue, 5.375%, 7/15/28	\$
1,000,000+	NR/Baa3	Massachusetts Health & Educational Facilities Authority Revenue, 6.35%, 7/15/32	\$
10,760,000	AA-/Aa3	Massachusetts Housing Finance Agency, 5.35%, 12/1/45	
830,000	BB/NR	Massachusetts Development Finance Agency, 5.25%, 10/1/18	
1,955,000	NR/NR	Massachusetts Development Finance Agency, 7.1%, 7/1/32	\$

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

12 Pioneer Municipal High Income Advantage Trust | Semiannual Report | 9/30/09

Principal Amount	S&P/Moody's Ratings (unaudited)		V
\$ 1,500,000+	AAA/A3	Michigan -- 3.5% Delta County Michigan Economic Development Corp., 6.25%, 4/15/27	\$
3,000,000+	NR/NR	Macomb County Hospital Finance Authority Revenue, 5.875%, 11/15/34	
745,000	NR/NR	Michigan Public Educational Facilities Authority Revenue, 7.0%, 10/1/36	
4,130,000	BB-/Ba3	Michigan State Hospital Finance Authority Revenue, 5.5%, 8/15/23	
1,000,000	NR/NR	Michigan State Strategic Fund Solid Waste Disposal Revenue, 7.375%, 1/15/22	\$
1,850,000	NR/NR	Missouri -- 1.1% Kansas City Industrial Development Authority Revenue, 5.875%, 1/1/37 (144A)	\$
1,500,000 (c)	NR/Ca	St. Louis Industrial Development Authority Revenue, 7.2%, 12/15/28	
6,640,000 (c)	NR/Ca	St. Louis Industrial Development Authority Revenue, 7.25%, 12/15/35	\$
2,445,000 (d)	NR/NR	Montana -- 0.5% Hardin Increment Industrial Infrastructure Development Revenue, 0.0%, 9/1/31	\$
1,000,000 (c)	NR/NR	Two Rivers Authority, Inc., Project Revenue, 7.375%, 11/1/27	

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

Principal Amount	S&P/Moody's Ratings (unaudited)	Description	Value
1,500,000	A/A2	Nevada -- 2.3% Henderson Nevada Health Care Facilities Revenue, 5.625%, 7/1/24	\$
1,600,000 (c)	NR/NR	Nevada State Department of Business & Industry, 7.25%, 1/1/23	\$
1,000,000 (c)	NR/NR	Nevada State Department of Business & Industry, 7.375%, 1/1/30	
1,320,000 (c)	NR/NR	Nevada State Department of Business & Industry, 7.375%, 1/1/40	
5,000,000	A-/A3	Reno Nevada Hospital Revenue, 5.25%, 6/1/41	
<hr/>			
1,125,000	NR/NR	New Hampshire -- 0.4% New Hampshire Health & Educational Facilities Authority Revenue, 5.875%, 7/1/34	\$

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

Pioneer Municipal High Income Advantage Trust | Semiannual Report | 9/30/09 13

Schedule of Investments | 9/30/09 (unaudited) (continued)

Principal Amount	S&P/Moody's Ratings (unaudited)	Description	Value
\$ 2,500,000	NR/NR	New Jersey -- 12.6% Burlington County New Jersey Bridge Commission Revenue, 5.625%, 1/1/38	\$ 2,
13,000,000	B/B3	New Jersey Economic Development Authority Revenue, 6.25%, 9/15/29	11,
3,500,000 (a)	NR/Aa3	New Jersey State Turnpike Authority, RIB, 12.492%, 1/1/28 (144A)	5,
10,375,000	AAA/Aa1	New Jersey Transportation Trust Fund Authority Revenue, 0.0%, 12/15/27	4,
1,000,000+	AAA/Aaa	Tobacco Settlement Financing Corp., 6.25%, 6/1/43	1,
3,250,000+	AAA/Aaa	Tobacco Settlement Financing Corp., 6.75%, 6/1/39	3,
5,000,000+	AAA/Aaa	Tobacco Settlement Financing Corp., 7.0%, 6/1/41	5,
<hr/>			
1,900,000	NR/NR	New York -- 6.4% Dutchess County Industrial Development Agency, 7.5%, 3/1/29	\$ 1,
1,000,000	NR/NR	Nassau County New York Industrial Development Agency Revenue, 6.7%, 1/1/43	
5,000,000	BB/Ba3	New York City Industrial Development Agency, 5.25%, 12/1/32	3,
2,000,000	BBB/Baa1	New York City Industrial Development Agency, 5.375%, 6/1/23	1,
3,950,000	BB/Ba3	New York City Industrial Development Agency, 7.625%, 12/1/32	3,

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

5,000,000	AAA/Aaa	New York State Environmental Facilities Corp., 5.0%, 6/15/33	5,
500,000	NR/NR	Ulster County New York Industrial Development Agency, 6.0%, 9/15/37	
			\$ 17,

6,000,000	NR/NR	North Carolina -- 2.0% Charlotte North Carolina Special Facilities Revenue, 7.75%, 2/1/28	\$ 5,

3,115,000	B-/NR	Ohio -- 2.2% Belmont County Health System Revenue, 5.7%, 1/1/13	\$ 2,
1,000,000	B-/NR	Belmont County Health System Revenue, 5.8%, 1/1/18	
3,000,000	CCC+/B3	Cleveland Airport Special Revenue, 5.375%, 9/15/27	2,
			\$ 6,

1,500,000	BB/NR	Oklahoma -- 2.8% Jackson County Memorial Hospital Authority Revenue, 7.3%, 8/1/15	\$ 1,
2,220,000	B-/Caa2	Tulsa Municipal Airport Trust Revenue, 6.25%, 6/1/20	1,
1,500,000	B-/Caa2	Tulsa Municipal Airport Trust Revenue, 7.35%, 12/1/11	1,
3,000,000 (b)	B-/Caa2	Tulsa Municipal Airport Trust Revenue, 7.75%, 6/1/35	2,
			\$ 7,

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

14 Pioneer Municipal High Income Advantage Trust | Semiannual Report | 9/30/09

Principal Amount	S&P/Moody's Ratings (unaudited)		Va
\$ 3,000,000+	AAA/NR	Pennsylvania -- 10.1% Allegheny County Hospital Development Authority Revenue, 9.25%, 11/15/22	\$
500,000+	AAA/NR	Allegheny County Hospital Development Authority Revenue, 9.25%, 11/15/30	
1,000,000	BBB-/NR	Clarion County Hospital Authority Revenue, 5.625%, 7/1/21	
3,600,000	B-/NR	Columbia County Hospital Authority Revenue, 5.85%, 6/1/24	
945,000	BBB/Ba2	Hazleton Health Services Authority Hospital Revenue, 6.125%, 7/1/16	
1,405,000	NR/Baa3	Montgomery County Higher Education & Health Authority Hospital Revenue, 6.6%, 7/1/10	
1,430,000	BB+/NR	Pennsylvania Economic Development Financing Authority Revenue, 5.125%, 6/1/18	
1,805,000	BB+/NR	Pennsylvania Economic Development Financing Authority Revenue, 5.3%, 6/1/10	
2,330,000	BB+/NR	Pennsylvania Economic Development Financing Authority Revenue, 5.35%, 6/1/11	
5,000,000	B+/Caa1	Pennsylvania Economic Development Financing Authority	

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

5,000,000	BBB/Baa3	Revenue, 6.0%, 6/1/31 Philadelphia Hospitals & Higher Education Facilities Authority Revenue, 5.0%, 7/1/34	
2,005,000	B-/NR	Scranton-Lackawanna Health & Welfare Authority Revenue, 6.1%, 7/1/11	
2,245,000	B-/NR	Scranton-Lackawanna Health & Welfare Authority Revenue, 6.15%, 7/1/12	

1,385,000	NR/NR	Rhode Island -- 3.3% Central Falls Rhode Island Detention Facilities Revenue, 7.25%, 7/15/35	\$
8,285,000	BBB/Baa3	Tobacco Settlement Financing Corp., 6.25%, 6/1/42	\$

1,500,000	CC/NR	South Carolina -- 6.8% Connector 2000 Association, Inc., Toll Road Revenue, 5.375%, 1/1/38	\$
7,140,000+	BBB+/Baa1	South Carolina Jobs Economic Development Authority Revenue, 6.375%, 8/1/34	
860,000+	BBB+/Baa1	South Carolina Jobs Economic Development Authority Revenue, 6.375%, 8/1/34	
3,000,000+	AAA/NR	South Carolina Jobs Economic Development Authority Revenue, 8.0%, 10/1/31	
4,400,000 (e)	BBB/Baa3	Tobacco Settlement Revenue Management, 6.375%, 5/15/30	\$

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

Pioneer Municipal High Income Advantage Trust | Semiannual Report | 9/30/09 15

Schedule of Investments | 9/30/09 (unaudited) (continued)

Principal Amount	S&P/Moody's Ratings (unaudited)		Value

\$ 1,000,000+	NR/A2	Tennessee -- 3.7% Johnson City Health & Educational Facilities Board Hospital Revenue, 7.5%, 7/1/33	\$ 1
7,000,000	NR/A1	Knox County Health Educational & Housing Facilities Board Hospital Revenue, 6.5%, 4/15/31	7
2,400,000	BBB+/NR	Sullivan County Health Educational and Housing Facilities Board Hospital Revenue, 5.25%, 9/1/36	1

8,650,000	CCC/Caa3	Texas -- 19.1% Brazos River Authority Pollution Control Revenue, 6.75%, 10/1/38	\$ 4
4,000,000	CCC/Caa3	Brazos River Authority Pollution Control Revenue,	

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

			7.7%, 4/1/33	2
7,350,000	NR/NR		Gulf Coast Industrial Development Authority, 7.0%, 12/1/36	3
10,000,000	CCC+/B3		Houston Texas Airport System Special Facilities Revenue, 6.75%, 7/1/29	9
960,000	NR/NR		IAH Public Facility Corp., Project Revenue Bonds, Series 2006, 6.0%, 5/1/16	
1,000,000	NR/NR		IAH Public Facility Corp., Project Revenue Bonds, Series 2006, 6.0%, 5/1/21	
1,350,000	NR/NR		IAH Public Facility Corp., Project Revenue Bonds, Series 2006, 6.125%, 5/1/26	1
2,750,000	AAA/Aa3		Lower Colorado River Authority, 5.0%, 5/15/31	2
845,000	NR/NR		Lubbock Health Facilities Development Corp., 6.5%, 7/1/26	
2,000,000	NR/NR		Lubbock Health Facilities Development Corp., 6.625%, 7/1/36	1
7,750,000	BBB-/Ba1		Matagorda County Navigation District Number 1 Revenue, 5.95%, 5/1/30	7
9,750,000	BBB+/A3		North Texas Tollway Authority Revenue, 5.75%, 1/1/33	10
1,711,000	NR/Aaa		Panhandle Regional Housing Finance Corp. Multifamily Housing Revenue, 6.6%, 7/20/31	1
1,000,000	BB+/Baa2		Richardson Hospital Authority Revenue, 6.0%, 12/1/34	
1,000,000	BB/NR		Texas Midwest Public Facility Corp. Revenue, 9.0%, 10/1/30	1
4,700,000	NR/Baa3		Tomball Hospital Authority, 6.0%, 7/1/25	4
				\$ 53

1,600,000	NR/NR		Utah -- 0.5% Spanish Fork Charter School Revenue, 5.7%, 11/15/36 (144A)	\$ 1

2,000,000	BBB+/Baa1		Virginia -- 0.8% Washington County Industrial Development Authority Revenue, 7.75%, 7/1/38	\$ 2

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

16 Pioneer Municipal High Income Advantage Trust | Semiannual Report | 9/30/09

Principal Amount	S&P/Moody's Ratings (unaudited)	
		Washington -- 3.4%
\$ 1,195,000	BBB/Baa3	Tobacco Settlement Authority Revenue, 6.5%, 6/1/26
2,000,000	BBB/Baa2	Washington State Health Care Facilities Authority, 6.125%, 8/15/37
2,000,000	BBB/Baa2	Washington State Health Care Facilities Authority, 6.25%, 8/15/42
5,000,000	NR/NR	Washington State Housing Finance Commission Nonprofit Revenue Bonds, 5.625%, 1/1/27

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

2,900,000	NR/NR	Wisconsin -- 1.3% Aztalan Wisconsin Exempt Facilities Revenue, 7.50%, 5/1/18
1,000,000	NR/NR	Wisconsin State Health & Educational Facilities Authority Revenue, 6.125%, 4/1/24
1,000,000	NR/NR	Wisconsin State Health & Educational Facilities Authority Revenue, 6.25%, 4/1/34
1,500,000	A+/A1	Wisconsin State Health & Educational Facilities Authority Revenue, 6.625%, 2/15/39
		TOTAL TAX-EXEMPT OBLIGATIONS (Cost \$410,429,304)
13,000,000 (b) (f)	NR/NR	MUNICIPAL COLLATERALIZED DEBT OBLIGATION -- 3.4% of Net Non-Profit Preferred Funding Trust I, Series E, 12.0%, 9/15/37 (144A)
		TOTAL MUNICIPAL COLLATERALIZED DEBT OBLIGATION (Cost \$13,000,000)
Shares		
109,625 (g)		COMMON STOCK -- 0.4% of Net Assets Delta Airlines, Inc.
		TOTAL COMMON STOCK (Cost \$3,210,349)
		TOTAL INVESTMENTS IN SECURITIES -- 150.3% (Cost \$426,639,653) (h) (i)
		OTHER ASSETS AND LIABILITIES 3.7%
		PREFERRED SHARES AT REDEMPTION VALUE, INCLUDING DIVIDENDS PAYABLE -- (54.0)%
		NET ASSETS APPLICABLE TO COMMON SHAREOWNERS -- 100.0%

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

Pioneer Municipal High Income Advantage Trust | Semiannual Report | 9/30/09 17

Schedule of Investments | 9/30/09 (unaudited) (continued)

(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 September 30, 2009, the value of these securities amounted to \$37,715,641, or 13.6% of total net assets applicable to common shareowners.

RIB Residual Interest Bonds.

NR Security not rated by S&P or Moody's.

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

- + 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.
- (a) The interest rate is subject to change periodically and inversely based upon prevailing market rates. The rate shown is the coupon rate at September 30, 2009.
- (b) The interest rate is subject to change periodically. The interest rate shown is the rate at September 30, 2009.
- (c) Security is in default and is non-income producing.
- (d) Debt obligation initially issued at one coupon which converts to a higher coupon at a specific date. The rate shown is the coupon rate at September 30, 2009.
- (e) Escrow to maturity.
- (f) Indicates a security that has been deemed illiquid. The aggregate cost of illiquid securities is \$13,000,000. The aggregate value is \$9,588,670, or 3.5% of the total net assets applied to common shareowners.
- (g) Non-income producing.

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

18 Pioneer Municipal High Income Advantage Trust | Semiannual Report | 9/30/09

- (h) The concentration of investments by type of obligation/market sector is as follows:

Insured	
FSA	8.2%
AMBAC	1.3
MBIA	1.0
ASSURED GTY	0.5
ACA	0.5
Q-SBLF	0.2
Revenue Bonds:	
Health Revenue	32.5
Tobacco Revenue	11.5
Airport Revenue	11.4
Pollution Control Revenue	8.8
Other Revenue	6.8
Development Revenue	5.2
Housing Revenue	2.9
Transportation Revenue	2.6
Facilities Revenue	1.8
Water Revenue	1.3
Education Revenue	1.2
Utilities Revenue	1.2
Power Revenue	1.1

	100.0%
	=====

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

- (i) At September 30, 2009, the net unrealized loss on investments based on cost for federal income tax purposes of \$421,950,983 was as follows:

Aggregate gross unrealized gain for all investments in which there is an excess of value over tax cost	\$41,979,769
Aggregate gross unrealized loss for all investments in which there is an excess of tax cost over value	(46,485,359)

Net unrealized loss	\$ (4,505,590)
	=====

For financial reporting purposes net unrealized loss on investments was \$9,194,260 and cost of investments aggregated \$426,639,653.

Purchases and sales of securities (excluding temporary cash investments) for the period ended September 30, 2009, aggregated \$19,411,648 and \$11,009,869, respectively.

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

Pioneer Municipal High Income Advantage Trust | Semiannual Report | 9/30/09 19

Schedule of Investments | 9/30/09 (unaudited) (continued)

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

Highest priority is given to Level 1 inputs and lowest priority is given to Level 3.

- 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 risk, etc.)
- Level 3 -- significant unobservable inputs (including the Trust's own assumptions in determining fair value of investments)

The following is a summary of the inputs used as of September 30, 2009, in valuing the Trust's investments:

	Level 1	Level 2	Level 3	Total
Tax-exempt obligations	\$ --	\$406,874,483	\$ --	\$406,874,483
Municipal collateralized debt obligation	--	9,588,670	--	9,588,670
Common stock	982,240	--	--	982,240
Total	\$982,240	\$416,463,153	\$ --	\$417,445,393

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

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

20 Pioneer Municipal High Income Advantage Trust | Semiannual Report | 9/30/09

Statement of Assets and Liabilities | 9/30/09 (unaudited)

ASSETS:

Investments in securities, at value (cost \$426,639,653)	\$417,445,393
Cash	772,760
Receivables --	
Investment securities sold	170,000
Interest	9,439,264
Reinvestment of distributions	124,563
Prepaid expenses	43,440
<hr/>	
Total assets	\$427,995,420

LIABILITIES:

Due to affiliates	\$ 212,519
Administration fee payable	23,613
Accrued expenses	99,066
<hr/>	
Total liabilities	\$ 335,198

PREFERRED SHARES AT REDEMPTION VALUE:

\$25,000 liquidation value per share applicable to 6,000 shares, including dividends payable of \$6,364	\$150,006,364
--	---------------

NET ASSETS APPLICABLE TO COMMON SHAREOWNERS:

Paid-in capital	\$325,992,583
Undistributed net investment income	11,760,710
Accumulated net realized loss on investments and interest rate swaps	(50,905,175)
Net unrealized loss on investments	(9,194,260)
<hr/>	
Net assets applicable to common shareowners	\$277,653,858

NET ASSET VALUE PER SHARE:

No par value, (unlimited number of shares authorized)	
Based on \$277,653,858/22,932,807 common shares	\$ 12.11

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

Pioneer Municipal High Income Advantage Trust | Semiannual Report | 9/30/09 21

Statement of Operations (unaudited)

For the Six Months Ended 9/30/09

INVESTMENT INCOME:

Interest	\$15,688,671
----------	--------------

EXPENSES:

Management fees	\$ 1,156,550
Administrative fees	205,382

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

Transfer agent fees and expenses	20,241	
Auction agent fees	195,968	
Custodian fees	7,227	
Registration fees	11,908	
Professional fees	74,652	
Printing expense	18,541	
Trustees' fees	7,169	
Pricing fees	9,759	
Miscellaneous	17,756	

Total expenses		\$ 1,725,153

Net investment income		\$13,963,518

REALIZED AND UNREALIZED GAIN (LOSS) ON INVESTMENTS AND INTEREST RATE SWAPS:		
Net realized loss from:		
Investments	\$ (1,893,055)	
Interest rate swaps	(135,950)	\$ (2,029,005)

Change in net unrealized loss from:		
Investments	\$ 64,816,586	
Interest rate swaps	131,406	\$64,947,992

Net gain on investments and interest rate swaps		\$62,918,987

DISTRIBUTIONS TO PREFERRED SHAREOWNERS FROM NET INVESTMENT INCOME		
		\$ (518,696)

Net increase in net assets applicable to common shareowners resulting from operations		\$76,363,809
=====		

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

22 Pioneer Municipal High Income Advantage Trust | Semiannual Report | 9/30/09

Statement of Changes in Net Assets

For the Six Months Ended 9/30/09 and the Year Ended 3/31/09, respectively

	Six Months Ended 9/30/09 (unaudited)	Year Ended 3/31/09

FROM OPERATIONS:		
Net investment income	\$ 13,963,518	\$ 27,756,168
Net realized loss on investments and interest rate swaps	(2,029,005)	(30,870,281)
Change in net unrealized loss on investments and interest rate swaps	64,947,992	(70,216,736)
Distributions to preferred shareowners from net investment income	(518,696)	(4,573,950)

Net increase (decrease) in net assets applicable to common shareowners resulting from operations	\$ 76,363,809	\$ (77,904,799)

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

DISTRIBUTIONS TO COMMON SHAREOWNERS:

Net investment income (\$0.455 and \$0.900 per share, respectively)	\$ (10,418,906)	\$ (20,552,506)
Total distributions to common shareowners	\$ (10,418,906)	\$ (20,552,506)

FROM TRUST SHARE TRANSACTIONS:

Reinvestment of distributions	\$ 562,083	\$ 1,103,907
Net increase in net assets applicable to common shareowners resulting from Trust share transactions	\$ 562,083	\$ 1,103,907

Net increase (decrease) in net assets applicable to common shareowners	\$ 66,506,986	\$ (97,353,398)
---	---------------	-----------------

NET ASSETS APPLICABLE TO COMMON SHAREOWNERS:

Beginning of period	211,146,872	308,500,270
End of period	\$277,653,858	\$211,146,872
Undistributed net investment income	\$ 11,760,710	\$ 8,734,794

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

Pioneer Municipal High Income Advantage Trust | Semiannual Report | 9/30/09 23

Financial Highlights

	Six Months Ended 9/30/09 (unaudited)	Year Ended 3/31/09	Year Ended 3/31/08
Per Common Share Operating Performance			
Net asset value, beginning of period	\$ 9.23	\$ 13.54	\$15.91
Increase (decrease) from investment operations:(a)			
Net investment income	\$ 0.61	\$ 1.22	\$ 1.29
Net realized and unrealized gain (loss) on investments and interest rate swaps	2.75	(4.43)	(2.51)
Dividends and distributions to preferred shareowners from:			
Net investment income	(0.02)	(0.20)	(0.26)
Net realized gains	--	--	--
Net increase (decrease) from investment operations	\$ 3.34	\$ (3.41)	\$ (1.48)
Dividends and distributions to common shareowners from:			
Net investment income	(0.46)	(0.90)	(0.89)
Net realized gains	--	--	--
Capital charge with respect to issuance of common shares:	--	--	--
Net increase (decrease) in net asset value	\$ 2.88	\$ (4.31)	\$ (2.37)
Net asset value, end of period(b)	\$12.11	\$ 9.23	\$13.54
Market value, end of period(b)	\$12.22	\$ 9.04	\$13.74
Total return at market value(c)	41.15%	(28.40)%	(6.51)

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

Ratios to average net assets of common shareowners

Net expenses(d)	1.47%(e)	1.38%	1.13%
Net investment income before preferred share dividends	11.88%(e)	10.70%	8.27%
Preferred share dividends	0.44%(e)	1.76%	1.64%
Net investment income available to common shareowners	11.44%(e)	8.94%	6.63%
Portfolio turnover	3%(e)	24%	12%

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

24 Pioneer Municipal High Income Advantage Trust | Semiannual Report | 9/30/09

	Six Months Ended 9/30/09 (unaudited)	Year Ended 3/31/09	Year Ended 3/31/08
Net assets of common shareowners, end of period (in thousands)	\$277,654	\$211,147	\$308,147
Preferred shares outstanding (in thousands)	\$150,000	\$150,000	\$150,000
Asset coverage per preferred share, end of period	\$ 71,277	\$ 60,192	\$ 76,147
Average market value per preferred share(f)	\$ 25,000	\$ 25,000	\$ 25,000
Liquidation value, including dividends payable, per preferred share	\$ 25,001	\$ 25,001	\$ 25,001
Ratios to average net assets of common shareowners before waivers and reimbursement of expenses			
Net expenses(d)	1.47%(e)	1.38%	1.13%
Net investment income before preferred share dividends	11.88%(e)	10.70%	8.27%
Preferred share dividends	0.44%(e)	1.76%	1.64%
Net investment income available to common shareowners	11.44%(e)	8.94%	6.63%

- (a) The per common share data presented above is based upon the average common shares outstanding for the periods presented.
- (b) 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.
- (c) Total investment return is calculated assuming a purchase of common shares at the current market value on the first day and a sale at the current 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. Total investment returns covering less than a full period are not annualized. Past performance is not a guarantee of future results.
- (d) Expense ratios do not reflect the effect of dividend payments to preferred shareowners.
- (e) Annualized.
- (f) Market value is redemption value without an active market.

The information above represents the operating performance data for a common share outstanding, total investment return, ratios to average net assets and other supplemental data for the periods indicated. This information has been determined based upon financial information provided in the financial statements and market value data for the Trust's common shares.

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

Notes to Financial Statements | 9/30/09 (unaudited)

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 seek capital appreciation to the extent that it is consistent with its primary investment objective.

The Trust may invest in both investment and below investment grade (high-yield) municipal securities with a broad range of maturities and credit ratings. Debt securities rated below investment grade are commonly referred to as "junk bonds" and are considered speculative. These securities involve greater risk of loss, are subject to greater price volatility, and are less liquid, especially during periods of economic uncertainty or change, than higher rated debt securities.

Information regarding the Trust's principal risks is contained in the Trust's original offering prospectus, with additional information included in the Trust's shareowner reports from time to time. Please refer to those documents when considering the Trust's risks. At times, the Trust's investments may represent industries or industry sectors that are interrelated or have common risks, making it more susceptible to any economic, political, or regulatory developments or other risks affecting those industries and sectors.

The Trust's financial statements have been prepared in conformity with U.S. generally accepted accounting principles that require the management of the Trust to, among other things, make estimates and assumptions that affect the reported amounts of assets and liabilities, and the reported amounts of income, expenses and gains and losses on investments during the reporting year. Actual results could differ from those estimates.

The following is a summary of significant accounting policies followed by the Trust in the preparation of its financial statements, which are consistent with those policies generally accepted in the investment company industry:

A. Security Valuation

Security transactions are recorded as of trade date. Securities are valued at prices supplied by independent pricing services, which consider such factors as Treasury spreads, yields, maturities and ratings. Valuations may be

26 Pioneer Municipal High Income Advantage Trust | Semiannual Report | 9/30/09

supplemented by values obtained from dealers and other sources, as required. The values of interest rate swaps are determined by obtaining dealer quotations. Securities for which there are no other readily available valuation methods are valued using fair value methods pursuant to procedures adopted by the Board of Trustees (board determined). The Trust may also use fair value methods to value a security including a non-U.S. security, when the closing market price on the principal exchange where the security is traded no longer reflects the value of the security. At September 30, 2009, there were no securities values that were board determined. Temporary cash

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

investments are valued at amortized cost which approximates market value.

Dividend income is recorded on the ex-dividend date, except that certain dividends from foreign securities where the ex-dividend date may have passed are recorded as soon as the Trust becomes aware of the ex-dividend data in the exercise of reasonable diligence. Discount and premium on debt securities are accreted or amortized, respectively, daily on an effective yield to maturity basis and are included in interest income. Interest income, including interest-bearing cash accounts, is recorded on an accrual basis.

Gains and losses on sales of investments are calculated on the identified cost method for both financial reporting and federal income tax purposes.

B. 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 taxable income and net realized capital gains, if any, to its shareowners. Therefore, no federal income tax provision is required. Tax years for the prior three fiscal years remain subject to examination by tax authorities.

The amounts and characterizations of distributions to shareowners for financial reporting purposes are determined in accordance with federal income tax rules. Therefore, the sources of the Trust's distributions may be shown in the accompanying financial statements as either from or in excess of net investment income or net realized gain (loss) on investments transactions, or as from paid-in capital, depending on the type of book/tax differences that may exist.

The tax character of distributions paid to common and preferred shareowners will be determined at the end of the fiscal year. Distributions during the year ended March 31, 2009 were as follows:

	-----	2009

Distributions paid from:		
Tax exempt income	\$24,983,891	
Ordinary income	142,565	

Total	\$25,126,456	
	=====	

The following shows the components of distributable earnings (losses) on a federal income tax basis at March 31, 2009:

	-----	2009

Distributable earnings:		
Undistributed tax-exempt income	\$4,256,946	

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

Undistributed ordinary income	29,674
Capital loss carryforward	(32,280,990)
Post-October-loss deferred	(16,483,090)
Dividends payable	(5,409)
Unrealized depreciation	(69,800,759)

Total	\$ (114,283,628)
=====	

The difference between book-basis and tax-basis unrealized depreciation is primarily attributable to the difference between book and tax amortization methods for premiums and discounts on fixed income securities, the difference between book and tax accounting for swap agreements, book/tax difference in accrual of income on securities in default, and other temporary differences.

C. Automatic Dividend Reinvestment Plan

All common shareowners 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 common 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.

Whenever the Trust declares a dividend on common shares payable in cash, participants in the Plan will receive the equivalent in common shares acquired by the Plan Agent either (i) through receipt of additional unissued but authorized common shares from the Trust or (ii) by purchase of outstanding common shares on the New York Stock Exchange or elsewhere. If, on the payment date for any dividend, the net asset value per common 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 common shares. The number of newly issued common shares to be credited to each account will be determined by dividing the dollar amount of the dividend by the net asset value per common share on the date the shares are issued, provided that the maximum discount from

28 Pioneer Municipal High Income Advantage Trust | Semiannual Report | 9/30/09

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 common share is greater than the market value (market discount), the Plan Agent will invest the dividend amount in common shares acquired in open-market purchases. There are no brokerage charges with respect to newly issued common 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 not be able to transfer the shares to another broker and continue to participate in the Plan.

2. Management Agreement

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

Pioneer Investment Management, Inc. (PIM), a wholly owned indirect subsidiary of UniCredit S.p.A. (UniCredit), 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" is the average daily value of the Trust's total assets (including any asset attributable to any leverage that may be outstanding) minus the sum of accrued liabilities (other than debt representing financial leverage). For the six months ended September 30, 2009, the net management fee was equivalent to 0.60% of the Trust's average daily managed assets, which was equivalent to 0.98% of the Trust's average daily net assets attributable to the common shareowners.

In addition, under PIM's management and administration agreements, certain other services and costs are paid by PIM and reimbursed by the Trust. At September 30, 2009, \$212,519 was payable to PIM related to management costs, administrative cost and certain other services and is included in "Due to affiliates" on the Statement of Assets and Liabilities.

PIM has retained Princeton Administrators, LLC (Princeton) to provide certain administrative and accounting services to the Trust on its behalf. The Trust pays Princeton a monthly fee equal to 0.07% of the Trust's average daily managed assets up to \$500 million and 0.03% for average daily managed assets in excess of \$500 million, subject to a minimum monthly fee of \$10,000.

3. Transfer Agents

Pioneer Investment Management Shareholder Services, Inc. (PIMSS), a wholly owned indirect subsidiary of UniCredit, through a sub-transfer agency agreement with American Stock Transfer & Trust Company provides substantially all transfer agent and shareowner services related to the Trust's common shares at negotiated rates. Deutsche Bank Trust Company Americas (Deutsche Bank) is the transfer agent, registrar, dividend paying agent and auction agent with

Pioneer Municipal High Income Advantage Trust | Semiannual Report | 9/30/09 29

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. Interest Rate Swaps

The Trust may enter into interest rate swap transactions to attempt to protect itself from increasing dividend or interest expense on its leverage resulting from increasing short-term interest rates. The cost of leverage may rise with an increase in interest rates, generally having the effect of lower yields and potentially lower dividends to common shareowners. Interest rate swaps can be used to "lock in" the cost of leverage and reduce the negative impact that rising short-term interest rates would have on the Trust's leveraging costs.

An interest rate swap is an agreement between two parties, which involves exchanging floating rate and fixed rate interest payments for a specified period of time. Interest rate swaps involve the accrual of the net interest payments between the parties on a daily basis, with the net amount recorded within the unrealized appreciation/depreciation of interest rate swaps on the Statement of Assets and Liabilities. Once the interim payments are settled in cash, at the pre-determined dates specified in the agreement, the net amount is recorded as realized gain or loss from interest rate swaps on the Statement of Operations. During the term of the swap, changes in the value of the swap are recognized as unrealized gains and losses by "marking-to-market" the value of the swap based on values obtained from dealer quotations. When the swap is terminated, the Trust will record a realized gain or loss equal to the

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

difference, if any, between the proceeds from (or cost of) closing the contract and the cost basis of the contract. The Trust is exposed to credit risk in the event of non-performance by the other party to the interest rate swap. Risk may also arise with regard to market movements in the value of the swap arrangement that do not exactly offset the changes in the related dividend requirement or interest expense on the Trust's leverage.

There were no interest rate swap contracts outstanding at September 30, 2009.

5. Trust Shares

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

Transactions in common shares of beneficial interest for the six months ended September 30, 2009 and the year ended March 31, 2009 were as follows:

	9/2009	3/2009
Shares outstanding at beginning of period	22,879,496	22,786,930
Reinvestment of distributions	53,311	92,566
Shares outstanding at end of period	22,932,807	22,879,496

30 Pioneer Municipal High Income Advantage Trust | Semiannual Report | 9/30/09

The Trust may classify or reclassify any unissued common shares of beneficial interest into one or more series of preferred shares of beneficial interest. As of September 30, 2009, 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 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 will not be able to sell their APS at an auction if the auction fails. Since February 2008, the Trust's auctions related to the APS have failed. The maximum rate for the 7-Day Series is 125% of the 7 day commercial paper rate or adjusted Kenny rate. Dividend rates ranged from 0.485% to 1.08% during the six months ended September 30, 2009.

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.

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

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. However, 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.

Pioneer Municipal High Income Advantage Trust | Semiannual Report | 9/30/09 31

6. Additional Disclosures about Derivative Instruments and Hedging Activities:

The effect of derivative instruments on the Statement of Operations for the six months ended September 30, 2009 was as follows:

Derivatives Not Accounted for as Hedging Instruments Under Statement 133	Location of Gain or (Loss) On Derivatives Recognized in Income	Realized Gain or (Loss) on Derivatives Recognized in Income
Interest Rate Swap	Net realized (loss) from interest rate swaps	\$(135,950)

7. Subsequent Events

Subsequent to September 30, 2009, the Board of Trustees of the Trust declared a dividend from undistributed net investment income of \$0.080 per common share payable October 30, 2009, to common shareowners of record on October 15, 2009.

Subsequent to September 30, 2009, dividends declared and paid on preferred shares totaled \$63,810 in aggregate for the two outstanding preferred share series through November 9, 2009.

In preparing these financial statements, PIM has evaluated the impact of all events and transactions for potential recognition or disclosure through November 23, 2009, and has determined that there were no events requiring recognition or disclosure in the financial statements.

32 Pioneer Municipal High Income Advantage Trust | Semiannual Report | 9/30/09

ADDITIONAL INFORMATION (unaudited)

During the period, there have been no material changes in the Trust's investment objective or fundamental policies that have not been approved by the shareowners. There have been no changes in the Trust's charter or By-Laws that would delay or prevent a change in control of the Trust which has not been approved by the shareowners. There have been no changes in the principal risk factors associated with investment in the Trust. Day-to-day management of the Trust's portfolio is the responsibility of David Eurkus. Mr. Eurkus is

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

supported by the fixed income team. Members of this team manage other Pioneer funds investing primarily in fixed income securities. The portfolio manager and the team also may draw upon the research and investment management expertise of Pioneer's affiliate, Pioneer Investment Management Limited. Mr. Eurkus joined Pioneer as a senior vice president in January 2000 and has been an investment professional since 1969.

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

CEO CERTIFICATION DISCLOSURE (unaudited)

The Trust's Chief Executive Officer has submitted to the New York Stock Exchange the annual CEO certification as required by Section 303A.12(a) of the NYSE Listed Company Manual. In addition, the Trust has filed with the Securities and Exchange Commission the certification of its Chief Executive Officer and Chief Financial Officer required by Section 302 of the Sarbanes-Oxley Act.

Pioneer Municipal High Income Advantage Trust | Semiannual Report | 9/30/09 33

Results of Shareholder Meeting (unaudited)

At the annual meeting of shareowners held on September 22, 2009 shareowners of Pioneer Municipal High Income Advantage Trust were asked to consider the proposals described below. A report of the total votes cast by the Trust's shareholders follows:

Proposal 1 -- To elect Class III Trustees.

Nominee	For	Withheld
Mary K. Bush	13,238,097	643,607
Thomas J. Perna	13,293,348	588,356
Marguerite A. Piret+	4,605	109

+ Elected by Preferred Shares only

Proposal 2 -- To approve an Amended and Restated Management Agreement with Pioneer Investment Management, Inc.

For	Against	Abstain	Broker Non-Votes
9,532,084	305,035	318,467	3,726,118

34 Pioneer Municipal High Income Advantage Trust | Semiannual Report | 9/30/09

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

Trustees, Officers and Service Providers

Trustees

John F. Cogan, Jr., Chairman
David R. Bock
Mary K. Bush
Benjamin M. Friedman
Margaret B.W. Graham
Daniel K. Kingsbury
Thomas J. Perna
Marguerite A. Piret
Stephen K. West

Officers

John F. Cogan, Jr., President
Daniel K. Kingsbury, Executive
Vice President
Mark E. Bradley, Treasurer
Dorothy E. Bourassa, Secretary

Investment Adviser

Pioneer Investment Management, Inc.

Custodian

Brown Brothers Harriman & Co.

Legal Counsel

Bingham McCutchen LLP

Transfer Agent

Pioneer Investment Management Shareholder Services, Inc.

Shareowner Services and Sub-Transfer Agent

American Stock Transfer & Trust Company

Preferred Share Auction/Transfer Agent and Registrar

Deutsche Bank Trust Company Americas

Sub-Administrator

Princeton Administrators, LLC

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

Pioneer Municipal High Income Advantage Trust | Semiannual Report | 9/30/09 35

This page for your notes.

36 Pioneer Municipal High Income Advantage Trust | Semiannual Report | 9/30/09

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:

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

Account Information

1-800-710-0935

Or write to AST:

For

Write to

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

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

Dividend reinvestment plan (DRIP)

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

Website

www.amstock.com

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

The Trust files a complete statement 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 <http://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.

The Trust's Chief Executive Officer is required by the New York Stock Exchange's Listing Standards to file annually with the Exchange a certification that he is not aware of any violation by the Trust of the Exchange's Corporate Governance Standards applicable to the Trust. The Trust has filed such certification.

ITEM 2. CODE OF ETHICS.

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

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

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

(1) Honest and ethical conduct, including the ethical handling of actual or apparent conflicts of interest between personal and professional relationships;

(2) Full, fair, accurate, timely, and understandable disclosure in reports and documents that a registrant files with, or submits to, the

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

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 10(a), 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;

(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

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

(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.

N/A

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

N/A

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

(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.

N/A

(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.

N/A

(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 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 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.

- o A summary of all such 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

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

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

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

SECTION III - POLICY DETAIL, CONTINUED

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

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

service subcategory as
"pre-approved"

SECTION III - POLICY DETAIL, CONTINUED

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

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

SECTION III - POLICY DETAIL, CONTINUED

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

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

GENERAL AUDIT COMMITTEE APPROVAL POLICY:

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

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

approved by the Audit Committee.

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

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

N/A

(f) If greater than 50 percent, disclose the percentage of hours expended on the principal accountant's 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 registrant's accountant for services rendered to the registrant, and rendered to the registrant's 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.

N/A

(h) Disclose whether the registrant's audit committee of the board of trustees has considered whether the provision of non-audit services that were rendered to the registrant's 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 registrants audit committee as specified in Section 3(a) (58) (B) of the Exchange Act (15 U.S.C. 78c(a) (58) (B)), so state.

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

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

Included in Item 1

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

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

Information not required in semi annual reports on form NCSR.

Item 8. Portfolio Managers of Closed-End Management Investment Companies.

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

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

Information not required in semi annual reports on form NCSR.

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,

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

in the following tabular format, provide the information specified in paragraph (b) of this Item with respect to any purchase made by or on behalf of the registrant or any affiliated purchaser, as defined in Rule 10b-18(a)(3) under the Exchange Act (17 CFR 240.10b-18(a)(3)), of shares or other units of any class of the registrants equity securities that is registered by the registrant pursuant to Section 12 of the Exchange Act (15 U.S.C. 781). Instruction to paragraph (a). Disclose all purchases covered by this Item, including purchases that do not satisfy the conditions of the safe harbor of Rule 10b-18 under the Exchange Act (17 CFR 240.10b-18), made in the period covered by the report. Provide disclosures covering repurchases made on a monthly basis. For example, if the reporting period began on January 16 and ended on July 15, the chart would show repurchases for the months from January 16 through February 15, February 16 through March 15, March 16 through April 15, April 16 through May 15, May 16 through June 15, and June 16 through July 15.

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 registrants board of directors, where those changes were implemented after the registrant last provided disclosure in response to the requirements of Item 7(d)(2)(ii)(G) 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 registrants board of directors since the registrant last provided disclosure in response to the requirements of Item 7(d)(2)(ii)(G) 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 officer or officers and principal financial officer or officers, or persons performing similar functions, about the effectiveness of the registrant's disclosure controls and procedures (as defined in Rule 30a-2(c) under the Act (17 CFR 270.30a-2(c))) based on their evaluation of these controls and procedures as of a date within 90 days of the filing date of the report that includes the disclosure required by this paragraph.

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

(b) Disclose whether or not there were significant changes in the registrant's internal controls or in other factors that could significantly affect these

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

controls subsequent to the date of their evaluation, including any corrective actions with regard to significant deficiencies and material weaknesses.

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

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

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

ITEM 12. EXHIBITS.

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

(a) 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.

(b) A separate certification for each principal executive officer and principal financial officer of the registrant as required by Rule 30a-2 under the Act (17 CFR 270.30a-2).

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

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

By (Signature and Title)* /s/ John F. Cogan, Jr.
John F. Cogan, Jr, President

Date November 27, 2009

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/ John F. Cogan, Jr.
John F. Cogan, Jr., President

Date November 27, 2009

By (Signature and Title)* /s/ Mark Bradley
Mark Bradley, Treasurer

Date November 27, 2009

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