

PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST

Form N-CSR

November 27, 2013

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

FORM N-CSR

CERTIFIED SHAREHOLDER REPORT OF REGISTERED
MANAGEMENT INVESTMENT COMPANIES

Investment Company Act file number 811-21409

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

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

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

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

Date of fiscal year end: March 31

Date of reporting period: April 1, 2013 through September 30, 2013

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

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under the clearance requirements of 44 U.S.C. ss. 3507.

ITEM 1. REPORTS TO STOCKHOLDERS.

Pioneer Municipal High
Income Advantage Trust

Semiannual Report | September 30, 2013

Ticker Symbol: MAV

[LOGO] PIONEER
Investments (R)

visit us: us.pioneerinvestments.com

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President's Letter

Dear Shareowner,

When we look at the U.S. economy heading into the final quarter of 2013, we continue to see slow, but steady, growth. Employment has also been rising steadily, but only modestly. Consumer incomes, savings, wealth, and debt-servicing capacity have been solid buttresses for the recovering housing and auto industries. Industrial activity is growing only modestly, but current corporate profits are generally solid and balance sheets appear able to support needed capital spending and dividend* payouts. The scaled-back "fiscal cliff" tax increases and spending cuts have meaningfully cut the budget deficit without driving the economy into recession. In addition, we feel that continuing slack in labor markets and capacity utilization offers the potential for continuing

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growth without bottlenecks and rising inflation.

After observing the strengthening economic trends, the Federal Reserve (the Fed) hinted that it might begin scaling back its "QE" quantitative easing program later in 2013 and could terminate its bond purchases altogether sometime in 2014. In September, however, the Fed surprised many market participants by deciding not to start scaling back QE yet. The Fed has also said that short-term interest rates are likely to remain near zero for some time to come, given that inflation remains subdued and unemployment remains too high.

As September ended, Congress had not yet passed a continuing resolution to prevent a government shutdown, nor had it raised the debt ceiling, and a quick resolution to the impasse appeared unlikely. The U.S. government's partial shutdown in October rattled the markets to a degree, but did not immediately have a significant negative impact on the economy or capital markets.

There are certainly risks and uncertainties that continue to plague the global economy as we head into the final months of the year. The European economy remains weak, though it is beginning to show signs of stabilization, and a number of countries in the emerging markets have experienced difficulties. Still, a potential ending of the European recession, continuing economic improvement in Japan in response to the new government's easing policies, and a "soft landing" of 7% growth in China could very well result in an improving global outlook over the remainder of 2013 and in 2014.

There are also geopolitical worries abroad and the aforementioned political fights at home, and while most of the widely recognized risks we've outlined may already be "priced into" the market, we believe investors should continue to expect market volatility.

* Dividends are not guaranteed.

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The Fed's aggressive monetary policies and fears about economic growth had helped drive long-term Treasury yields to unsustainably low levels; the return to more normal levels has resulted in disappointing returns for bond investors during the first nine months of 2013, but the stock market has delivered double-digit returns to equity investors who were willing to brave the "wall of worry".

At Pioneer, we have long advocated the benefits of staying diversified and investing for the long term. And while diversification alone does not assure a profit or protect against loss in a declining market, we believe there are still opportunities for prudent investors to earn attractive returns. 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, keeping in mind that there is no single best strategy that works for every investor.

Pioneer's investment teams have, since 1928, sought out attractive opportunities in global equity and bond markets, using in-depth research to identify undervalued individual securities, and using thoughtful risk management to construct portfolios which balance potential risks and reward in an ever-changing world.

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

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Sincerely,

/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 Fund's historical or future performance are statements of opinion 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.

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Portfolio Management Discussion | 9/30/13

Market sentiment toward municipal bonds - especially higher-yielding municipals - abruptly turned negative in the spring of 2013, undermining the performance of the asset class during the six-month period ended September 30, 2013. In the following interview, David Eurkus and Jonathan Chirunga discuss the factors that influenced the performance of Pioneer Municipal High Income Advantage Trust during the six-month period. Mr. Eurkus, a senior vice president and a portfolio manager at Pioneer, and Mr. Chirunga, a vice president and a portfolio manager at Pioneer, are responsible for the day-to-day management of the Trust.

Q How did the Pioneer Municipal High Income Advantage Trust perform during the six-month period ended September 30, 2013?

A Pioneer Municipal High Income Advantage Trust returned -7.87% at net asset value and -9.67% at market price during the six-month period ended September 30, 2013. During the same six-month period, the Trust's benchmarks, the Barclays Municipal Bond Index and the Barclays High Yield Municipal Bond Index, returned -3.15% and -6.92%, respectively. The Barclays Municipal Bond Index is an unmanaged measure of the performance of investment-grade municipal bonds, while the Barclays High Yield Municipal Bond Index is an unmanaged measure of the performance of lower-rated municipal bonds. Unlike the Trust, the two Barclays Indices do not use leverage. While use of leverage increases investment opportunity, it also increases investment risk. During the same six-month period, the average return (at market price) of the 11 closed end funds in Lipper's High Yield Municipal Debt Closed End Funds category (which may or may not be leveraged) was -6.71%.

The shares of the Trust were selling at a 12.40% premium to net asset value at the end of the period, on September 30, 2013.

On September 30, 2013, the Trust's standard 30-day SEC yield was 8.76*.

Q How would you describe the investment environment in the municipal bond market during the six-month period ended September 30, 2013?

A Municipal bonds - and especially high-yielding municipals - had been enjoying a favorable investment backdrop until a series of events began to undermine investors' confidence.

One major development was the well-publicized bankruptcy filing by the City of Detroit, which raised worries about the financial stability and credit quality of other communities. Those worries only increased after another

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

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significant piece of news hit the market--high-profile media warnings about the financial problems afflicting the Commonwealth of Puerto Rico, which might have trouble meeting its obligations without additional borrowing.

In the ensuing weeks, the market for municipal bonds became increasingly volatile, as liquidity dried up when institutional investors moved to sell their holdings, and buyers, at the same time, held back. Municipal bonds declined sharply in price, significantly underperforming U.S. Treasuries and many other segments of the fixed-income market. Because of their greater sensitivity to credit risk, lower-rated municipal bonds with higher yields performed much worse than investment-grade municipals during the period.

Q How did the market environment and your investment strategies affect the Trust's performance during the six-month period ended September 30, 2013?

A The changing market environment hindered the Trust's performance during the six-month period, despite the facts that the Fed eventually decided not to taper QE, and that the Trust's portfolio held no bonds issued by the City of Detroit. The Trust's portfolio also had only minimal exposure to the Commonwealth of Puerto Rico, holding one small position in AA-rated senior debt backed by sales tax revenues. In a declining market, the Trust's use of leverage also hurt performance relative to the two Barclays benchmarks, as portfolio bond holdings purchased with leverage also declined in price during the six-month period. At the same time, the Trust experienced disappointing results from specific portfolio holdings in the underperforming tobacco bond group (which are backed by revenues from tobacco liability cases), and in the hospital/health care industry. The disappointing results came despite our investment discipline, which emphasizes purchasing only those investments that are backed by project-specific revenue sources, which are less vulnerable to factors such as the financial health of issuing agencies or municipalities. Several portfolio positions in longer-maturity, investment-grade municipal bonds also declined in price during the period due to the general rise in market interest rates.

During the six-month period, the Trust's portfolio experienced no defaults, and shares of the Trust continued to sell at a premium price to net asset value.

Q How did the level of leverage employed by the Trust change during the six-month period ended September 30, 2013?

A At the end of the six-month period on September 30, 2013, 34.8% of the Trust's total managed assets were financed by leverage, compared with 32.1% of the Trust's total managed assets financed by leverage at the start of the period on April 1, 2013. The increase was due to a decrease in the value of securities in which the Trust had invested.

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Q What is your investment outlook?

A After one of the more severe corrections in the municipal market in recent history, we believe the resulting lower prices of municipal bonds represent

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a significant opportunity for investors. The investment fundamentals of municipal debt securities remain strong, and prices are at extremely attractive levels, especially when compared with the taxable bond market.

We believe the low prices to which municipal bonds have fallen are inconsistent with the underlying fundamentals of the asset class. The market continues to have very low default rates, and state revenues generally are improving. Further, municipal bonds currently are paying high tax-equivalent yields that should make them more attractive than other segments of the fixed-income market. We believe that the entire municipal market (\$3.7 trillion in debt outstanding) is large enough to absorb problems experienced by any individual community or agency. In fact, the financial problems of the City of Detroit and the Commonwealth of Puerto Rico were well known before the six-month period began, and should have come as no surprise to informed investors. We believe the credit quality of the sector is further enhanced because two-thirds of the market consists of revenue bonds, which are secured by income-producing facilities of the borrower and are not dependent upon tax revenue generated by municipalities.

Going forward, we intend to keep the Trust's portfolio concentrated almost exclusively in revenue bonds, and to maintain our focus on intensive, independent research into the credit-worthiness of individual securities as well as the issuing agencies or municipalities behind them.

We believe the Trust is very well positioned for solid performance as market sentiment changes and investors again begin to focus on the underlying fundamentals and competitive prices of municipal bonds.

Please refer to the Schedule of Investments on pages 11-22 for a full listing of Trust securities.

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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 the issuers of the underlying securities and the issuers' inability to meet their debt obligations.

The Trust currently uses leverage through the issuance of preferred shares. Leverage creates significant risks, including the risk that the Trust's income or capital appreciation will not be sufficient to cover the cost of leverage, which may adversely affect the return for the holders of common shares. Since February of 2008, regularly scheduled auctions for the Trust's preferred shares have failed and preferred shareowners have not been able to sell their shares at auction. The Board of Trustees of the Trust has considered, and

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continues to consider, this issue.

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 original offering documents relating to its common shares and shareowner reports issued from time to time.

These risks may increase share price volatility.

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

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Portfolio Summary | 9/30/13

Portfolio Diversification

(As a percentage of total investment portfolio)

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

Revenue Bonds:	
Health Revenue	19.8%
Development Revenue	14.8%
Facilities Revenue	13.1%
Insured	12.1%
Tobacco Revenue	9.3%
Other Revenue	7.2%
Education Revenue	7.0%
Transportation Revenue	6.9%
Airport Revenue	5.7%
Pollution Control Revenue	2.2%
Water Revenue	1.9%
Utilities Revenue	0.0%

Portfolio Maturity

(As a percentage of long-term holdings)

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

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20+ years	57.8%
10-20 years	39.5%
7-10 years	1.3%
5-7 years	0.9%
0-2 year	0.4%
2-5 years	0.1%

Quality Distribution

 (As a percentage of total investment portfolio; based on Standard & Poor's ratings)

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

Not Rated	37.9%
AA	15.9%
BBB	14.5%
A	10.8%
B	9.2%
BB	8.2%
AAA	2.4%
CCC	1.1%

Bond ratings are ordered highest to lowest in portfolio. Based on Standard & Poors's measures, AAA (highest possible rating) through BBB are considered investment grade; BB or lower ratings are considered non-investment grade. Cash equivalents and some bonds may not be rated.

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

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Prices and Distributions | 9/30/13

Share Prices and Distributions

 Market Value per Common Share

	9/30/13	3/31/13
	\$13.43	\$15.51
Premium	12.4%	14.6%

 Net Asset Value per Common Share

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9/30/13

3/31/13

\$11.95

\$13.54

Distributions per Common Share

	Net Investment Income	Short-Term Capital Gains	Long-Term Capital Gains
4/1/13 - 9/30/13	\$0.5700	\$--	\$--

10 Largest Holdings

(As a percentage of long-term holdings)*

1. Massachusetts Housing Finance Agency Revenue, 5.35%, 12/1/45	2.55%
2. North Texas Tollway Authority Transportation Revenue, 5.75%, 1/1/33	2.47
3. Houston Texas Airport System Special Facilities Revenue, 6.75%, 7/1/29	2.39
4. Lehman Municipal Trust Receipts, General Obligation, 13.031%, 7/28/31	2.17
5. Massachusetts Development Finance Agency Revenue, 5.75%, 1/1/42	2.09
6. Regional Transportation District, 5.00%, 11/1/31	1.95
7. Tobacco Settlement Financing Corp., Revenue, 6.25%, 6/1/42	1.92
8. New Jersey Transportation Trust Fund Authority Revenue, 0.00%, 12/15/27	1.89
9. Jefferson Parish Hospital Service District No. 2, 6.375%, 7/1/41	1.76
10. New Jersey Economic Development Authority Revenue, 5.75%, 9/15/27	1.73

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

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Performance Update | 9/30/13

Investment Returns

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

Average Annual Total Returns
(As of September 30, 2013)

Period	Net Asset Value (NAV)	Market Price
Life-of-Class (10/17/2003)	6.05%	6.81%
5 Years	9.95	14.96
1 Year	-4.73	-9.00

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

Market Value of \$10,000 Investment

	Pioneer Municipal High Income Advantage Trust	Barclays Municipal Bond Index	Barclays High Yield Municipal Bond Index
10/31/2003	\$ 10,000	\$ 10,000	\$ 10,000
9/30/2004	\$ 9,965	\$ 10,513	\$ 10,863
9/30/2005	\$ 11,335	\$ 10,939	\$ 12,031
9/30/2006	\$ 12,310	\$ 11,425	\$ 13,322
9/30/2007	\$ 13,392	\$ 11,779	\$ 13,705
9/30/2008	\$ 9,595	\$ 11,559	\$ 12,329
9/30/2009	\$ 12,443	\$ 13,275	\$ 12,890
9/30/2010	\$ 15,558	\$ 14,046	\$ 14,454
9/30/2011	\$ 16,720	\$ 14,592	\$ 15,058
9/30/2012	\$ 21,180	\$ 15,805	\$ 17,258
9/30/2013	\$ 19,274	\$ 15,455	\$ 17,018

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

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

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

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

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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 Municipal Bond Index is an unmanaged, broad measure of the municipal bond market. The Barclays High Yield Municipal Bond Index is unmanaged, totals over \$26 billion in market value and maintains over 1300 securities. Municipal bonds in this index have the following requirements: maturities of one year or greater, sub investment grade (below Baa or non-rated), fixed coupon rate, issue date later than 12/31/90, deal size over \$20 million, maturity size of at least \$3 million. Index returns are calculated monthly, assume reinvestment of dividends and, unlike Trust returns, do not reflect any fees, expenses or sales charges. The indices do not employ leverage. You cannot invest directly in the indices.

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Schedule of Investments | 9/30/13 (unaudited)

Principal Amount USD (\$)	S&P/Moody's Ratings		Value

		TAX EXEMPT OBLIGATIONS -- 146.9% of Net Assets	
2,500,000	NR/B2	Alabama -- 1.6% Alabama Industrial Development Authority Solid Waste Disposal Revenue, 6.45%, 12/1/23	\$ 2,502,400
2,500,000	NR/NR	Huntsville-Redstone Village Special Care Facilities Financing Authority Nursing Home Revenue, 5.5%, 1/1/43	2,025,075
			----- \$ 4,527,475

5,000,000	NR/NR	Arizona -- 3.0% Casa Grande Industrial Development Authority Hospital Revenue, 7.625%, 12/1/29	\$ 4,975,500
2,640,000	NR/NR	Pima County Industrial Development Authority, 7.0%, 1/1/38	2,576,508
32,000	NR/Baa3	Pima County Industrial Development Authority Education Revenue, 6.75%, 7/1/31	31,428
1,000,000	NR/NR	San Luis Facility Development Corp., 7.25%, 5/1/27	803,590
			----- \$ 8,387,026

6,990,000	CCC/NR	California -- 15.5% California County Tobacco Securitization Agency Revenue, 5.25%, 6/1/46	\$ 4,505,894

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1,550,000	NR/NR	California Enterprise Development Authority Recovery Zone Facility Revenue, 8.5%, 4/1/31	1,675,953
5,000,000	NR/Baa3	California Pollution Control Financing Authority, 5.0%, 7/1/37	4,620,450
3,000,000	BB+/NR	California School Finance Authority, 7.375%, 10/1/43	3,023,970
2,425,000	A/A1	California State General Obligation Various Purpose, 5.75%, 4/1/31	2,693,399
1,875,000	NR/NR	California Statewide Communities Development Authority, 5.875%, 11/1/43	1,624,069
757,342 (a)	NR/NR	California Statewide Communities Development Authority Environmental Facilities Revenue, 9.0%, 12/1/38	6,573
4,000,000	B+/NR	California Statewide Communities Development Authority Revenue Higher Education Revenue, 7.25%, 10/1/38 (144A)	3,889,560
20,000,000 (b)	NR/NR	Inland Empire Tobacco Securitization Authority, 0.0%, 6/1/36	3,184,400
3,140,000	AA-/WR	Lehman Municipal Trust Receipts Revenue, RIB, 13.124%, 9/20/28 (144A)	3,333,204
8,575,000 (c)	AA-/NR	Lehman Municipal Trust Receipts, General Obligation, 13.031%, 7/28/31	9,082,040
1,500,000	A-/NR	Madera Irrigation Financing Authority Water Revenue, 6.25%, 1/1/31	1,623,720

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

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Schedule of Investments | 9/30/13 (unaudited) (continued)

Principal Amount USD (\$)	S&P/Moody's Ratings		Value

		California -- (continued)	
1,500,000	A-/NR	Madera Irrigation Financing Authority Water Revenue, 6.5%, 1/1/40	\$ 1,631,985
2,500,000	A-/A2	San Jose California Airport Revenue, RIB, 5.0%, 3/1/37	2,501,450

			\$ 43,396,667

		Colorado -- 3.3%	
1,000,000	NR/NR	Kremmling Memorial Hospital District Certificate of Participation, 7.125%, 12/1/45	\$ 1,021,940
7,500,000	AA+/Aa2	Regional Transportation District, 5.0%, 11/1/31	8,167,800

			\$ 9,189,740

		Connecticut -- 0.4%	
1,000,000	NR/NR	Hamden Connecticut Facility Revenue, 7.75%, 1/1/43	\$ 1,017,590

		District of Columbia -- 3.5%	
2,700,000	BBB/Baa1	District of Columbia Tobacco Settlement	

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6,825,000	BBB/Baa1	Financing Corp., 6.5%, 5/15/33 District of Columbia Tobacco Settlement Financing Corp., 6.75%, 5/15/40	\$ 2,814,453 6,893,114 ----- \$ 9,707,567

1,500,000	NR/NR	Florida -- 4.2% Alachua County Health Facilities Authority Revenue, 8.125%, 11/15/41	\$ 1,634,040
1,500,000	NR/NR	Alachua County Health Facilities Authority Revenue, 8.125%, 11/15/46	1,628,940
500,000	NR/B1	Capital Trust Agency Revenue Bonds, 7.75%, 1/1/41	529,695
2,000,000	NR/NR	Florida Development Finance Corp., Educational Facilities Revenue, 7.625%, 6/15/41	2,021,080
1,000,000 (d)	NR/WR	Hillsborough County Industrial Development Authority Revenue, 8.0%, 8/15/32	1,356,050
2,200,000	BB/NR	Lee County Industrial Development Authority, 5.375%, 6/15/37	2,029,654
2,500,000	A/A2	Miami-Dade County Florida Aviation Revenue, 5.5%, 10/1/41	2,604,875 ----- \$ 11,804,334

5,210,000	AA-/WR	Georgia -- 6.5% Atlanta Georgia Water and Wastewater Revenue, RIB, 12.752%, 11/1/43 (144A)	\$ 5,243,552
5,000,000	B/NR	Clayton County Development Authority Revenue, 9.0%, 6/1/35	5,351,600
900,000	NR/NR	DeKalb County Georgia Hospital Authority Revenue, 6.0%, 9/1/30	928,692
<p>The accompanying notes are an integral part of these financial statements.</p> <p>12 Pioneer Municipal High Income Advantage Trust Semiannual Report 9/30/13</p>			

Principal Amount USD (\$)	S&P/Moody's Ratings		Value

750,000	NR/NR	Georgia -- (continued) DeKalb County Georgia Hospital Authority Revenue, 6.125%, 9/1/40	\$ 755,198
2,000,000	NR/NR	Fulton County Residential Care Facilities for the Elderly Authority, 5.125%, 7/1/42	1,608,360
3,360,000	NR/NR	Fulton County Residential Care Facilities for the Elderly Authority, 7.0%, 7/1/29	2,724,456
1,650,000	NR/NR	Savannah Georgia Economic Development Authority Revenue, 7.4%, 1/1/34	1,659,537 ----- \$ 18,271,395

1,000,000	B/NR	Guam -- 1.9% Guam Government of Department Education Certificates of Participation, 6.625%, 12/1/30	\$ 1,028,990
4,400,000 (d)	AA+/B2	Northern Mariana Islands, 6.75%, 10/1/33	4,400,748

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			\$ 5,429,738

2,000,000	A-/Baa1	Idaho -- 1.2% Power County Industrial Development Corp., Revenue, 6.45%, 8/1/32	\$ 2,001,480
1,500,000	A-/Baa1	Power County Pollution Control Revenue, 5.625%, 10/1/14	1,500,075

			\$ 3,501,555

1,000,000	NR/Baa1	Illinois -- 7.0% City of Country Club Hills, General Obligation, 5.0%, 12/1/31	\$ 1,001,910
365,400 (b)	NR/NR	Illinois Finance Authority Revenue, 0.0%, 11/15/52	37,792
417,400 (c)	NR/NR	Illinois Finance Authority Revenue, 4.0%, 11/15/52	212,874
1,450,000	A+/A1	Illinois Finance Authority Revenue, 5.5%, 4/1/39	1,487,308
1,605,000	AA-/A3	Illinois Finance Authority Revenue, 6.0%, 8/15/25	1,650,502
280,000	BBB+/NR	Illinois Finance Authority Revenue, 6.0%, 8/15/38	297,615
2,000,000	AA+/Aa2	Illinois Finance Authority Revenue, 6.0%, 8/15/39	2,237,320
2,500,000	NR/NR	Illinois Finance Authority Revenue, 6.125%, 11/15/25	2,468,275
45,000	NR/NR	Illinois Finance Authority Revenue, 7.0%, 11/15/17	43,476
165,000	NR/NR	Illinois Finance Authority Revenue, 7.0%, 11/15/27	148,759
6,000,000	NR/NR	Illinois Finance Authority Revenue, 8.25%, 5/15/45	5,844,840

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

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Schedule of Investments | 9/30/13 (unaudited) (continued)

Principal Amount USD (\$)	S&P/Moody's Ratings		Value

2,500,000	NR/NR	Illinois -- (continued) Illinois Finance Authority Revenue, 8.25%, 2/15/46	\$ 2,507,550
2,135,000	NR/NR	Southwestern Illinois Development Authority Revenue, 5.625%, 11/1/26	1,673,648

			\$ 19,611,869

250,000	NR/NR	Indiana -- 1.0% City of Carmel Indiana Nursing Home Revenue, 7.0%, 11/15/32	\$ 249,190

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750,000	NR/NR	City of Carmel Indiana Nursing Home Revenue, 7.125%, 11/15/42	741,292
500,000	NR/NR	City of Carmel Indiana Nursing Home Revenue, 7.125%, 11/15/47	490,220
250,000	NR/Baa3	East Chicago Indiana Exempt Facilities Revenue, 7.0%, 1/1/14	249,613
1,700,000	NR/NR	Vincennes Industrial Economic Development Revenue, 6.25%, 1/1/24	995,639
			\$ 2,725,954
1,000,000		Kansas -- 0.4% NR/A2 Kansas Development Finance Authority Revenue, 5.0%, 5/15/35	\$ 1,008,720
7,000,000	BBB-/Baa3	Louisiana -- 6.0% Jefferson Parish Hospital Service District No. 2, 6.375%, 7/1/41	\$ 7,386,190
2,500,000	BBB/Baa3	Louisiana Local Government Environmental Facilities & Community Development Authority Revenue, 6.75%, 11/1/32	2,618,400
6,000,000	NR/Baa1	Louisiana Public Facilities Authority Revenue, 5.5%, 5/15/47	6,048,540
750,000	BBB-/NR	Opelousas Louisiana General Hospital Authority Revenue, 5.75%, 10/1/23	758,138
			\$ 16,811,268
1,500,000	NR/Ba1	Maine -- 0.6% Maine Health & Higher Educational Facilities Authority Revenue, 7.5%, 7/1/32	\$ 1,682,085
4,500,000	A-/A2	Maryland -- 2.8% Maryland Health & Higher Educational Facilities Authority Revenue, 5.0%, 7/1/43	\$ 4,431,150
1,250,000	NR/Baa3	Maryland Health & Higher Educational Facilities Authority Revenue, 5.75%, 7/1/38	1,211,400
2,000,000	NR/NR	Maryland Health & Higher Educational Facilities Authority Revenue, 6.25%, 1/1/45	2,104,380
			\$ 7,746,930

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

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Principal Amount USD (\$)	S&P/Moody's Ratings		Value
8,000,000	A/WR	Massachusetts -- 9.2% Massachusetts Development Finance Agency Revenue, 5.75%, 1/1/42	\$ 8,742,160
1,800,000	NR/NR	Massachusetts Development Finance Agency Revenue, 7.1%, 7/1/32	1,769,562

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2,195,000	BBB-/Baa3	Massachusetts Health & Educational Facilities Authority Revenue, 5.375%, 7/15/28	2,195,176
2,000,000	AAA/Aaa	Massachusetts Health & Educational Facilities Authority Revenue, 5.5%, 7/1/32	2,449,880
3,420,000 (a)	NR/NR	Massachusetts Health & Educational Facilities Authority Revenue, 6.5%, 1/15/38	12,688
10,760,000	AA-/Aa3	Massachusetts Housing Finance Agency Revenue, 5.35%, 12/1/45	10,689,737
			\$ 25,859,203

		Michigan -- 3.6%	
2,000,000	NR/Ba1	Flint Michigan Hospital Building Authority Revenue, 7.375%, 7/1/35	\$ 2,163,260
2,235,000	BB+/NR	Kent Hospital Finance Authority Revenue, 6.25%, 7/1/40	2,282,628
675,000	NR/NR	Michigan Public Educational Facilities Authority Revenue, 7.0%, 10/1/36	645,367
5,000,000	AA/Aa1	Michigan State University, 5.0%, 8/15/41	5,169,100
			\$ 10,260,355

		Minnesota -- 0.4%	
1,000,000	NR/NR	Port Authority of the City of Bloomington, Minnesota Recovery Zone Facility Revenue, 9.0%, 12/1/35	\$ 1,093,770

		Missouri -- 1.2%	
1,000,000	NR/NR	Kansas City Tax Increment Financing Commission Tax Increment Revenue, 6.5%, 6/1/25	\$ 1,004,490
1,500,000 (a)	NR/Ca	St. Louis Industrial Development Authority Revenue, 7.2%, 12/15/28	463,095
6,640,000 (a)	NR/Ca	St. Louis Industrial Development Authority Revenue, 7.25%, 12/15/35	2,049,967
			\$ 3,517,552

		Montana -- 0.7%	
2,445,000 (b)	NR/NR	Hardin Increment Industrial Infrastructure Development Revenue, 0.0%, 9/1/31	\$ 1,934,875
1,000,000 (a)	NR/NR	Two Rivers Authority Inc., Project Revenue, 7.375%, 11/1/27	99,970
			\$ 2,034,845

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

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Schedule of Investments | 9/30/13 (unaudited) (continued)

Principal Amount USD (\$)	S&P/Moody's Ratings	Value
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		Nevada -- 2.3%		
2,000,000	A+/A1	Nevada Highway Revenue, 5.0%, 2/1/43	\$	2,008,220
4,500,000	A-/A3	Reno Nevada Hospital Revenue, 5.25%, 6/1/41		4,334,490
				\$ 6,342,710

		New Hampshire -- 0.4%		
1,125,000 (d)	NR/NR	New Hampshire Health & Education Facilities Authority Revenue, 5.875%, 7/1/34	\$	1,222,301

		New Jersey -- 11.0%		
1,500,000	NR/NR	Burlington County New Jersey Bridge Commission Revenue, 5.625%, 1/1/38	\$	1,299,795
6,500,000	NR/NR	New Jersey Economic Development Authority Revenue, 10.5%, 6/1/32 (144A)		6,369,285
7,500,000	B/B2	New Jersey Economic Development Authority Revenue, 5.75%, 9/15/27		7,265,400
3,500,000	NR/NR	New Jersey Health Care Facilities Financing Authority, 7.25%, 7/1/27		3,403,260
3,500,000	AA-/WR	New Jersey State Turnpike Authority Transportation Revenue, RIB, 13.755%, 7/1/23 (144A)		4,728,220
15,375,000 (b)	AA+/Aa1	New Jersey Transportation Trust Fund Authority Revenue, 0.0%, 12/15/27		7,925,505
				\$ 30,991,465

		New York -- 6.8%		
1,630,000	NR/NR	Dutchess County Industrial Development Agency, 7.5%, 3/1/29	\$	1,650,131
7,000,000	BB/B2	New York City Industrial Development Agency Revenue, 5.25%, 12/1/32		6,089,650
3,950,000	BB/B2	New York City Industrial Development Agency Revenue, 7.625%, 12/1/32		3,980,810
5,000,000	AAA/Aaa	New York State Dormitory Authority Revenue, 5.0%, 10/1/41		5,301,350
2,000,000	NR/Ba1	New York State Dormitory Authority Revenue, 6.125%, 12/1/29		2,010,760
				\$ 19,032,701

		North Carolina -- 2.7%		
5,010,000	NR/NR	Charlotte North Carolina Special Facilities Revenue, 7.75%, 2/1/28	\$	5,013,908
2,575,000	NR/NR	Charlotte Special Facilities Revenue, 5.6%, 7/1/27		2,460,644
				\$ 7,474,552

		Ohio -- 1.9%		
1,500,000	NR/NR	Adams County Hospital Facilities Revenue, 6.5%, 9/1/36	\$	1,186,755

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Principal Amount USD (\$)	S&P/Moody's Ratings		Value
5,000,000	B-/B3	Ohio -- (continued) Buckeye Tobacco Settlement Financing Authority Revenue, 6.5%, 6/1/47	\$ 4,079,800
			\$ 5,266,555
3,000,000 (c)	NR/WR	Oklahoma -- 1.9% Tulsa Airports Improvement Trust, 7.75%, 6/1/35	\$ 3,145,590
2,220,000	NR/WR	Tulsa Airports Improvement Trust Revenue, 6.25%, 6/1/20	2,172,536
			\$ 5,318,126
2,000,000	A-/NR	Oregon -- 0.7% Oregon State Facilities Authority Revenue, 5.25%, 10/1/40	\$ 2,019,820
1,965,000	B-/NR	Pennsylvania -- 6.5% Pennsylvania Economic Development Financing Authority, 8.0%, 5/1/29	\$ 2,185,100
5,000,000	B-/Caa2	Pennsylvania Economic Development Financing Authority Solid Waste Disposal Revenue, 6.0%, 6/1/31	4,903,550
5,000,000	A-/A3	Pennsylvania Turnpike Commission, 5.3%, 12/1/41	5,069,400
1,000,000	BB-/NR	Philadelphia Authority for Industrial Development, 6.5%, 6/15/33 (144A)	991,110
1,000,000	BB-/NR	Philadelphia Authority for Industrial Development, 6.75%, 6/15/43 (144A)	986,610
5,000,000	BB+/Ba2	Philadelphia Hospitals & Higher Education Facilities Authority Revenue, 5.0%, 7/1/34	4,099,950
			\$ 18,235,720
5,000,000	AA-/Aa3	Puerto Rico -- 1.5% Puerto Rico Sales Tax Financing Corp., 5.25%, 8/1/57	\$ 4,114,550
1,370,000 (e)	NR/NR	Rhode Island -- 3.8% Central Falls Rhode Island Detention Facility Corp., Revenue, 7.25%, 7/15/35	\$ 1,031,432
1,500,000	NR/NR	Rhode Island Health & Educational Building Corp., Revenue, 8.375%, 1/1/46	1,649,445
8,285,000	BB/Ba1	Tobacco Settlement Financing Corp., Revenue, 6.25%, 6/1/42	8,058,239
			\$ 10,739,116
4,400,000 (f)	BBB/WR	South Carolina -- 1.9% Tobacco Settlement Revenue Management Authority, 6.375%, 5/15/30	\$ 5,431,184

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Schedule of Investments | 9/30/13 (unaudited) (continued)

Principal Amount USD (\$)	S&P/Moody's Ratings		Value
5,000,000	BBB+/Baa1	Tennessee -- 3.0% Johnson City Health & Educational Facilities Board Hospital Revenue, 6.5%, 7/1/38	\$ 5,478,800
3,000,000	BBB+/NR	Sullivan County Health, Educational & Housing Facilities Board Revenue, 5.25%, 9/1/36	3,003,060
			\$ 8,481,860
2,500,000	BB+/Baa3	Texas -- 17.9% Central Texas Regional Mobility Authority Revenue, 6.75%, 1/1/41	\$ 2,584,925
2,663,453 (a)	NR/NR	Gulf Coast Industrial Development Authority Revenue, 7.0%, 12/1/36	23,945
10,000,000	B/B2	Houston Texas Airport System Special Facilities Revenue, 6.75%, 7/1/29	10,025,100
460,000	NR/NR	IAH Public Facility Corp., Facilities Revenue, Series 2006, 6.0%, 5/1/16	346,679
1,000,000	NR/NR	IAH Public Facility Corp., Facilities Revenue, Series 2006, 6.0%, 5/1/21	710,960
1,350,000	NR/NR	IAH Public Facility Corp., Facilities Revenue, Series 2006, 6.125%, 5/1/26	933,444
3,000,000	NR/NR	Jefferson County Industrial Development Corp., Revenue, 8.25%, 7/1/32	3,081,990
845,000	NR/NR	Lubbock Health Facilities Development Corp., Nursing Home Revenue, 6.5%, 7/1/26	864,308
2,000,000	NR/NR	Lubbock Health Facilities Development Corp., Nursing Home Revenue, 6.625%, 7/1/36	2,020,500
9,750,000	BBB+/A3	North Texas Tollway Authority Transportation Revenue, 5.75%, 1/1/33	10,355,670
1,711,000	NR/Aa1	Panhandle Regional Housing Finance Corp., Multifamily Housing Revenue, 6.6%, 7/20/31	1,780,809
1,500,000	NR/NR	Red River Health Facilities Development Corp., Revenue, 8.0%, 11/15/41	1,597,305
1,000,000	A+/A1	Richardson Hospital Authority Revenue, 6.0%, 12/1/34	1,006,390
2,000,000	AAA/Aaa	Richardson Independent School District Revenue, 5.0%, 2/15/38	2,124,440
4,000,000	NR/NR	Sanger Industrial Development Corp., Revenue, 8.0%, 7/1/38	4,000,440
1,000,000	NR/NR	Tarrant County Cultural Education Facilities Finance Corp., Revenue, 8.125%, 11/15/39	1,041,530
1,500,000	NR/NR	Tarrant County Cultural Education Facilities Finance Corp., Revenue, 8.25%, 11/15/44	1,564,665
1,000,000 (a)	NR/NR	Texas Midwest Public Facility Corp. Revenue, 9.0%, 10/1/30	458,190
3,000,000	BBB-/Baa3	Texas Private Activity Bond Surface Transportation Corp., 7.0%, 12/31/38	3,166,530

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

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Principal Amount USD (\$)	S&P/Moody's Ratings		Value

		Texas -- (continued)	
2,500,000	NR/NR	Travis County Health Facilities Development Corp., Revenue, 7.125%, 1/1/46	\$ 2,416,350

			\$ 50,104,170

2,000,000	BBB+/Baa1	Virginia -- 0.8% Washington County Industrial Development Authority Revenue, 7.75%, 7/1/38	\$ 2,278,820

3,000,000	BBB/Baa1	Washington -- 5.4% Tobacco Settlement Authority of Washington, 6.625%, 6/1/32	\$ 2,992,470
1,025,000	BBB/A3	Tobacco Settlement Authority Revenue, 6.5%, 6/1/26	1,022,427
1,500,000	NR/Baa3	Washington State Health Care Facilities Authority Revenue, 5.5%, 12/1/39	1,426,125
2,000,000	BBB/Baa2	Washington State Health Care Facilities Authority Revenue, 6.125%, 8/15/37	2,074,680
2,000,000	BBB/Baa2	Washington State Health Care Facilities Authority Revenue, 6.25%, 8/15/42	2,076,240
1,100,000	NR/NR	Washington State Housing Finance Commission Revenue, 6.75%, 10/1/47	1,007,193
5,000,000	NR/NR	Washington State Housing Finance Commission Nonprofit Revenue, 5.625%, 1/1/27	4,552,600

			\$ 15,151,735

2,000,000	NR/NR	West Virginia -- 1.0% City of Philippi West Virginia, 7.75%, 10/1/44	\$ 1,892,920
740,000	NR/NR	West Virginia Hospital Finance Authority Hospital Revenue, 9.125%, 10/1/41	886,468

			\$ 2,779,388

2,900,000 (g) (h)	NR/NR	Wisconsin -- 3.4% Aztalan Township, 7.5%, 5/1/18	\$ --
2,500,000	NR/NR	Wisconsin Public Finance Authority Continuing Care Retirement Community Revenue, 8.25%, 6/1/46	2,755,900
1,000,000 (d)	NR/NR	Wisconsin State Health & Educational Facilities Authority Revenue, 6.125%, 4/1/24	1,029,420
1,000,000 (d)	NR/NR	Wisconsin State Health & Educational Facilities Authority Revenue, 6.25%, 4/1/34	1,030,050
1,500,000	A+/A1	Wisconsin State Health & Educational Facilities Authority Revenue, 6.625%, 2/15/39	1,626,765
1,500,000	NR/NR	Wisconsin State Public Finance Authority Revenue, 8.375%, 6/1/20	1,501,785

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Schedule of Investments | 9/30/13 (unaudited) (continued)

Principal Amount USD (\$)	S&P/Moody's Ratings		Value
1,500,000	NR/NR	Wisconsin -- (continued) Wisconsin State Public Finance Authority Revenue, 8.625%, 6/1/47	\$ 1,552,800
			\$ 9,496,720
		TOTAL TAX EXEMPT OBLIGATIONS (Cost \$407,888,010)	\$ 412,067,131
13,000,000 (c) (e)	NR/NR	MUNICIPAL COLLATERALIZED DEBT OBLIGATION -- 2.5% of Net Assets Non-Profit Preferred Funding Trust I, 6.75%, 9/15/37 (144A)	\$ 7,060,300
		TOTAL MUNICIPAL COLLATERALIZED DEBT OBLIGATION (Cost \$13,000,000)	\$ 7,060,300
		TOTAL INVESTMENTS IN SECURITIES -- 149.4% (Cost \$420,888,010) (i) (j)	\$ 419,127,431
		OTHER ASSETS AND LIABILITIES -- 4.1%	\$ 11,416,726
		PREFERRED SHARES AT REDEMPTION VALUE, INCLUDING DIVIDENDS PAYABLE -- (53.5)%	\$ (150,000,259)
		NET ASSETS APPLICABLE TO COMMON SHAREOWNERS -- 100.0%	\$ 280,543,898

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

WR Rating withdrawn by either S&P or Moody's.

(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, 2013, the value of these securities amounted to \$32,601,841, or 11.6% of total net assets applicable to common shareowners.

RIB Residual Interest Bond. The interest rate is subject to change periodically and inversely based upon prevailing market rates. The interest rate shown is the rate at September 30, 2013.

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- (a) Security is in default and is non income producing.
- (b) Security issued with a zero coupon. Income is recognized through accretion of discount.
- (c) The interest rate is subject to change periodically. The interest is shown is the rate at September 30, 2013.
- (d) Prerefunded bonds have been collateralized by U.S. Treasury or U.S. Government Agency securities which are held in escrow to pay interest and principal on the tax exempt issue and to retire the bonds in full at the earliest refunding date.
- (e) Indicates a security that has been deemed illiquid. As of September 30, 2013 the aggregate cost of illiquid securities in the Trust's portfolio was \$14,370,000. As of that date, the aggregate value of illiquid securities in the Trust's portfolio of \$8,091,732 represented 2.9% of total net assets applicable to common shareowners.
- (f) Escrow to maturity.
- (g) Security is valued using fair value methods (other than prices supplied by independent pricing services). See Notes to Financial Statements - Note 1A.

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

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- (h) The company is scheduled for approval of a reorganization plan.
- (i) At September 30, 2013 the concentration of investments by type of obligation/ market sector was as follows:

Insured	
FSA	3.2%
FSA-CR	2.2
AMBAC GO OF INSTN	2.1
BHAC-CR MBIA	1.9
AMBAC	0.6
GO OF INSTN	0.6
PSF-GTD	0.5
ASSURED GTY	0.4
GNMA COLL	0.4
NATL-RE	0.2
Revenue Bonds:	
Health Revenue	19.8
Development Revenue	14.8
Facilities Revenue	13.1
Tobacco Revenue	9.3
Other Revenue	7.2
Education Revenue	7.0
Transportation Revenue	6.9
Airport Revenue	5.7
Pollution Control Revenue	2.2
Water Revenue	1.9
Utilities Revenue	0.0*

 100.0%
 =====

* Amount is less than 0.1%.

(j) At September 30, 2013, the net unrealized depreciation on investments based on cost for federal tax purposes of \$423,004,423 was as follows:

Aggregate gross unrealized appreciation for all investments in which there is an excess of value over tax cost	\$ 27,228,644
Aggregate gross unrealized depreciation for all investments in which there is an excess of tax cost over value	(31,105,636)
Net unrealized depreciation	\$ (3,876,992)

For financial reporting purposes net unrealized depreciation on investments was \$1,760,579 and cost of investments aggregated \$420,888,010.

Purchases and sales of securities (excluding temporary cash investments) for the six months ended September 30, 2013 aggregated \$60,932,045 and \$76,489,748 respectively.

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

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Schedule of Investments | 9/30/13 (unaudited) (continued)

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

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

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

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

Generally, equity securities are categorized as Level 1, fixed income securities and senior loans are categorized as Level 2, and securities valued using fair value methods (other than prices supplied by independent pricing services) are categorized as Level 3. See Notes to Financial Statements -- Note 1A.

The following is a summary of the inputs used as of September 30, 2013, in valuing the Trust's investments.

-----	Level 1	Level 2	Level 3	Total
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Tax Exempt Obligations:	\$	--	\$412,067,131	\$	--**	\$412,067,131
Municipal Collateralized Debt Obligation:		--	7,060,300		--	7,060,300
Total Investments in Securities	\$	--	\$419,127,431	\$	--	\$419,127,431

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

	Balance as of 3/31/13	Realized gain (loss)	Change in Unrealized appreciation (depreciation)	Purchases	Sales	Accrued discounts/premiums	Transfers in to Level 3*	Transfers out of Level 3*
Tax exempt obligations	\$ --	\$ --	\$ --	\$ ---**	\$ --	\$ --	\$ --	\$ --
Total	\$ ---**	\$ --	\$ --	\$ --	\$ --	\$ --	\$ --	\$ --

* Transfers are calculated on the end of period value.

** Includes security that is fair valued at \$0.

During the six months ended September 30, 2013, there were no transfers between Levels 1, 2, and 3.

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

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Statement of Assets and Liabilities | 9/30/13 (unaudited)

ASSETS:	
Investments in securities, at value (cost \$420,888,010)	\$419,127,431
Cash	3,567,670
Receivables --	
Investment securities sold	10,000
Interest receivable	8,107,791
Reinvestment of distributions	150,491
Total assets	\$430,963,383
LIABILITIES:	
Due to affiliates	208,134
Administration fee payable	68,270
Accrued expenses	142,235
Other liabilities	587

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Total liabilities	\$ 419,226

PREFERRED SHARES AT REDEMPTION VALUE:	
\$25,000 liquidation value per share applicable to 6,000 shares, including dividends payable of \$259	\$150,000,259

NET ASSETS APPLICABLE TO COMMON SHAREOWNERS:	
Paid-in capital	\$333,197,146
Undistributed net investment income	8,457,708
Accumulated net realized loss on investments	(59,350,377)
Net unrealized depreciation on investments	(1,760,579)

Net assets applicable to common shareowners	\$280,543,898
=====	
NET ASSET VALUE PER COMMON SHARE:	
No par value (unlimited number of shares authorized)	
Based on \$280,543,898 / 23,474,274 common shares	\$ 11.95
=====	

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

Pioneer Municipal High Income Advantage Trust | Semiannual Report | 9/30/13 23

Statement of Operations (unaudited)

For the Six Months Ended 9/30/13

INVESTMENT INCOME:	
Interest	\$ 14,585,424

EXPENSES:	
Management fees	\$ 1,344,153
Administrative reimbursements	103,052
Transfer agent fees and expenses	12,304
Shareowner communications expense	4,812
Auction agent fees	191,387
Custodian fees	3,213
Registration fees	919
Professional fees	43,774
Printing expenses	8,769
Trustees' fees	6,540
Pricing fees	6,363
Miscellaneous	27,279

Total expenses	\$ 1,752,565

Net investment income	\$ 12,832,859

REALIZED AND UNREALIZED GAIN (LOSS) ON INVESTMENTS:	
Net realized gain on investments	\$ 2,622,553
Change in net unrealized appreciation on investments	\$ (39,186,201)

Net loss on investments	\$ (36,563,648)

DISTRIBUTIONS TO PREFERRED SHAREOWNERS FROM NET INVESTMENT INCOME:	
	\$ (147,118)

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Net decrease in net assets applicable to common
shareowners resulting from operations \$ (23,877,907)

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

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Statements of Changes in Net Assets

	Six Months Ended 9/30/13 (unaudited)	Year Ended 3/31/13
FROM OPERATIONS:		
Net investment income	\$ 12,832,859	\$ 25,500,104
Net realized gain on investments	2,622,553	418,450
Change in unrealized appreciation (depreciation) on investments	(39,186,201)	16,515,110
Distributions to preferred shareowners from net investment income	(147,118)	(436,645)
Net increase (decrease) in net assets applicable to common shareowners resulting from operations	\$ (23,877,907)	\$ 41,997,019
DISTRIBUTIONS TO COMMON SHAREOWNERS:		
Net investment income (\$0.57 and \$1.14 per share, respectively)	\$ (13,357,122)	\$ (26,607,280)
Total distributions to common shareowners	\$ (13,357,122)	\$ (26,607,280)
FROM TRUST SHARE TRANSACTIONS:		
Reinvestment of distributions	\$ 905,168	\$ 1,846,794
Net increase in net assets applicable to common shareowners from Trust share transactions	\$ 905,168	\$ 1,846,794
Net increase (decrease) in net assets applicable to common shareowners	\$ (36,329,861)	\$ 17,236,533
NET ASSETS APPLICABLE TO COMMON SHAREOWNERS:		
Beginning of period	316,873,759	299,637,226
End of period	\$ 280,543,898	\$ 316,873,759
Undistributed net investment income	\$ 8,457,708	\$ 9,129,089

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

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Financial Highlights

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	Six Months Ended 9/30/13 (unaudited)	Year Ended 3/31/13	Year Ended 3/31/12
Per Share Operating Performance			
Net asset value, beginning of period	\$ 13.54	\$ 12.87	\$ 11.54
Increase (decrease) from investment operations:(a)			
Net investment income	\$ 0.55	\$ 1.07	\$ 1.08
Net realized and unrealized gain (loss) on investments	(1.56)	0.76	1.58
Distributions to preferred shareowners from:			
Net investment income	(0.01)	(0.02)	(0.02)
Net increase (decrease) from investment operations	\$ (1.02)	\$ 1.81	\$ 2.64
Distributions to common shareowners from:			
Net investment income	(0.57)	(1.14)	(1.31)
Net increase (decrease) in net asset value	\$ (1.59)	\$ 0.67	\$ 1.33
Net asset value, end of period(b)	\$ 11.95	\$ 13.54	\$ 12.87
Market value, end of period(b)	\$ 13.43	\$ 15.51	\$ 14.72
Total return at market value(c)	(9.67)%	13.53%	28.48%
Ratios to average net assets of common shareowners:			
Net expenses (d)	1.18%(e)	1.23%	1.36%
Net investment income before preferred share distributions	8.62%(e)	8.08%	8.73%
Preferred share distributions	0.10%(e)	0.14%	0.15%
Net investment income available to common shareowners	8.52%(e)	7.94%	8.58%
Portfolio turnover	14%	14%	15%
Net assets of common shareowners, end of period (in thousands)	\$280,544	\$316,874	\$299,637

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

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	Six Months Ended 9/30/13 (unaudited)	Year Ended 3/31/13	Year Ended 3/31/12
Preferred shares outstanding (in thousands)	\$150,000	\$150,000	\$150,000
Asset coverage per preferred share, end of period	\$ 71,757	\$ 77,813	\$ 74,941
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			
Total expenses(d)	1.18%(e)	1.23%	1.36%
Net investment income before preferred share distributions	8.62%(e)	8.08%	8.73%

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Preferred share distributions	0.10% (e)	0.14%	0.15%
Net investment income available to common shareowners	8.52% (e)	7.94%	8.58%

- (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. Past performance is not a guarantee of future results.
- (d) Expense ratios do not reflect the effect of distribution payments to preferred shareowners.
- (e) Annualized.
- (f) Market value is redemption value without an active market.

The information above represents the audited operating performance data for a share of common stock 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.

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Notes to Financial Statements | 9/30/13 (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, as a secondary objective, also seek capital appreciation to the extent that it is consistent with its primary investment objective.

The Trust's financial statements have been prepared in conformity with U.S. generally accepted accounting principles that require the management of the Trust to, among other things, make estimates and assumptions that affect the reported amounts of assets and liabilities, the disclosure of contingent assets and liabilities at the date of the financial statements, and the reported amounts of income, expenses and gain or loss on investments during the reporting 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. Fixed income securities with remaining maturity of more than sixty days are valued at prices supplied by independent pricing services, which consider such factors as market prices, market events, quotations from one or more brokers, Treasury spreads, yields, maturities and ratings. Valuations may be supplemented by dealers and other sources, as required. The values of interest rate swaps are determined by obtaining dealer quotations. Equity securities that have traded on an exchange are valued at the last sale price on the principal exchange where they are traded. Equity securities that have not traded on the date of valuation, or securities for which sale prices are not available, generally are valued using the mean between the last bid and asked prices. Short-term fixed income securities with remaining maturities of sixty days or less generally are valued at amortized cost. Shares of money market mutual funds are valued at such funds' net asset value.

Securities for which independent pricing services are unable to supply prices or for which market prices and/or quotations are not readily available or are considered to be unreliable are valued by or at the direction or with the

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approval of the Valuation Committee using fair value methods pursuant to procedures adopted by the Board of Trustees. The Valuation Committee is comprised of certain members of the Board of Trustees. The Trust may use fair value methods if it is determined that a significant event has occurred after the close of the exchange or market on which the security trades and prior to the determination of the Trust's net asset value. Examples of a significant event might include political or economic news, corporate restructurings, natural disasters, terrorist activity or trading halts. Thus, the valuation of the Trust's securities may differ significantly from exchange prices and such differences could be material. Pioneer Investment Management, Inc. (PIM), the Trust's investment adviser, is responsible for monitoring developments that may impact fair valued securities and for discussing and assessing fair values on an ongoing basis, and at least quarterly, with the Valuation Committee.

At September 30, 2013, one security was valued using fair value methods (other than securities valued using prices supplied by independent pricing services) representing 0.0% of net assets. Inputs used when applying fair value methods to value a security may include credit ratings, the financial condition of the company, current market conditions and comparable securities.

Discount and premium on debt securities are accreted or amortized, respectively, daily into interest income on a yield-to-maturity basis with a corresponding increase or decrease in the cost basis of the security. Interest income, including interest or income bearing cash accounts, is recorded on an accrual basis.

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.

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

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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. As of September 30, 2013, the Trust did not have any interest and penalties related to uncertain tax positions, which if applicable, would be recorded as an income tax expense in the Statement of Operations. Tax years for the prior three fiscal years remain subject to examination by federal and state tax authorities.

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

The tax character of current year distributions payable to common and preferred shareowners will be determined at the end of the current taxable year. The tax character of distributions paid during the year ended March 31, 2013 was as follows:

	-----	2013

Distribution paid from:		
Tax exempt income		\$25,637,813
Ordinary income		1,406,112

Total		\$27,043,925
	=====	

The following shows the components of distributable earnings (losses) on a federal income tax basis at March 31, 2013.

	-----	2013

Distributable earnings:		
Undistributed tax-exempt income	\$	8,909,384
Undistributed ordinary income		980,395
Capital loss carryforward		(61,526,320)
Post-October loss deferred		(2,049,542)
Dividends payable		(5,961)
Unrealized appreciation		38,273,825

Total		\$ (15,418,219)

=====

The difference between book-basis and tax-basis unrealized appreciation 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 whose shares are registered in their own names automatically participate in the Automatic Dividend Reinvestment Plan (the Plan), under which participants receive all dividends and capital gain distributions (collectively, dividends) in full and fractional common shares of

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the Trust in lieu of cash. Shareowners may elect not to participate in the Plan. Shareowners not participating in the Plan receive all dividends and capital gain distributions in cash. Participation in the Plan is completely voluntary and may be terminated or resumed at any time without penalty by notifying American Stock Transfer & Trust Company, the agent for shareowners in administering the Plan (the Plan Agent), in writing prior to any dividend record date; otherwise such termination or resumption will be effective with respect to any subsequently declared dividend or other distribution.

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

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 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.

D. Risks

At times, the Trust's investments may represent industries or industry sectors that are interrelated or have common risks, making the Trust more susceptible to any economic, political, or regulatory developments or other risks affecting those industries and sectors. 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 issued from time to time. Please refer to those documents when considering the Trust's principal risks.

The Trust may invest in both investment grade 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.

2. Management Agreement

PIM, the Trust's investment adviser, 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" means (a) the total assets of the Trust, including any form of investment leverage, minus (b) all accrued liabilities incurred in the normal course of operations, which shall not include any liabilities or obligations attributable to investment leverage obtained through (i) indebtedness of any type (including, without limitation, borrowing through a credit facility of the issuance of debt securities), (ii) the issuance of preferred stock or other similar preference securities, and/or (iii) any other means. For the period ended September 30, 2013, the net management fee was 0.60% of the Trust's average daily managed assets, which was equivalent to 0.90% 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, 2013, \$276,404 was payable to PIM related to management costs, administrative costs and certain other reimbursements and is included in "Due to affiliates" and "Administration fee" on the Statement of Assets and Liabilities.

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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 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.

In addition, the Trust reimburses PIMSS for out-of-pocket expenses incurred by PIMSS related to shareowner communications activities such as proxy and

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statement mailings and outgoing phone calls.

4. Expense Offset Agreements

The Trust has entered into an arrangement with its custodian whereby credits realized as a result of uninvested cash balances are used to reduce a portion of the Trust's custodian expenses. For the six months ended September 30, 2013, the Trust expenses were not reduced under such arrangement.

5. 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 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

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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 open during the six months ended September 30, 2013 or outstanding at September 30, 2013.

6. Trust Shares

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

Transactions in common shares of beneficial interest for the periods ended September 30, 2013 and March 31, 2013 were as follows:

	9/30/13	3/31/13
Shares outstanding at beginning of period	23,406,918	23,282,302
Reinvestment of distributions	67,356	124,616

 Shares outstanding at end of period 23,474,274 23,406,918
 =====

The Trust may classify or reclassify any unissued shares of beneficial interest into one or more series of preferred shares of beneficial interest. As of September 30, 2013, there were 6,000 APS as follows: Series A -- 3,000 and Series B -- 3,000.

Dividends on Series A and Series B are cumulative at a rate which is to be reset every seven days based on the results of an auction. An auction fails if there are more APS offered for sale than there are buyers. When an auction fails, the dividend rate for the period will be the maximum rate on the auction dates described in the prospectus for the APS. Preferred shareowners are not able to sell their APS at an auction if the auction fails. Since February 2008, the Trust's auctions related to the APS have failed. The maximum rate for each series is 125% of the 7 day commercial paper rate or adjusted Kenny rate. Dividend rates on APS ranged from 0.94% to 0.429% during the six months ended September 30, 2013.

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,

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whether or not declared, if certain requirements relating to the composition of the assets and liabilities of the Trust as set forth in the Statement of Preferences are not satisfied.

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

7. Subsequent Events

The Board of Trustees of the Trust declared on October 4, 2013 a dividend from undistributed net investment income of \$0.0950 per common share payable October 31, 2013, to common shareowners of record on October 17, 2013.

Subsequent to September 30, 2013, dividends declared and paid on preferred shares totaled \$30,769 in aggregate for the two outstanding preferred share series through November 13, 2013.

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ADDITIONAL INFORMATION (unaudited)

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

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

Results of Shareholder Meeting (unaudited)

At the annual meeting of shareowners held on September 24, 2013, shareowners of Pioneer Municipal High Income Advantage were asked to consider the proposal described below. A report of the total votes cast by the Trust's shareholders follows:

Proposal 1 -- To elect Class I Trustee.

Nominee	For	Withheld
Daniel K. Kingsbury	20,543,427.000	944,481.000
David R. Bock*	3,517.000	292.000

* Elected by preferred shares only

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Trustees, Officers and Service Providers

Trustees

Thomas J. Perna, Chairman
David R. Bock
Benjamin M. Friedman
Margaret B.W. Graham
Daniel K. Kingsbury
Marguerite A. Piret

Officers

John F. Cogan, Jr., President*
Daniel K. Kingsbury, Executive
Vice President
Mark E. Bradley, Treasurer**
Christopher J. Kelley, Secretary

Investment Adviser and Administrator
Pioneer Investment Management, Inc.

Custodian and Sub-Administrator
Brown Brothers Harriman & Co.

Legal Counsel
Bingham McCutchen LLP

Transfer Agent
Pioneer Investment Management Shareholder Services, Inc

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Shareowner Services and Transfer Agent
American Stock Transfer & Trust Company

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

* Chief Executive Officer of the Trust

** Chief Financial and Accounting Officer of the Trust

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How to Contact Pioneer

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

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

Account Information

1-800-225-6292

Or write to AST:

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For

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

Dividend reinvestment plan (DRIP)

Website

Write to

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

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

www.amstock.com

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

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

[LOGO] PIONEER
Investments(R)

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

us.pioneerinvestments.com

Securities offered through Pioneer Funds Distributor, Inc.
60 State Street, Boston, MA 02109
Underwriter of Pioneer Mutual Funds, Member SIPC
(C) 2013 Pioneer Investments 19435-07-1113

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:

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

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

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

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

Not applicable.

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

Not applicable.

(f) The registrant must:

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

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report on this Form N-CSR (see attachment);

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

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

ITEM 3. AUDIT COMMITTEE FINANCIAL EXPERT.

- (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

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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

(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.

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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 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) 	

- 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 posses 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 	<ul style="list-style-type: none"> o A summary of all such services and related fees (including comparison to specified dollar limits) reported quarterly.

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"Unique Qualifications" Other
 Services not denoted as
 pre-approved to the left, or to
 add a specific service
 subcategory as "pre-approved"

SECTION III - POLICY DETAIL, CONTINUED

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

AUDIT COMMITTEE APPROVAL POLICY	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.

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- o Potential services will be classified into the four non-restricted service categories and the "Approval of Audit, Audit-Related, Tax and Other Services" Policy above will be applied. Any services outside the specific pre-approved service subcategories set forth above must be specifically approved by the Audit Committee.
- o At least quarterly, the Audit Committee shall review a report summarizing the services by service category, including fees, provided by the Audit firm as set forth in the above policy.

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

N/A

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

N/A

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

N/A

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

The Funds 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,

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identify each committee member. If the entire board of directors is acting as the registrant's audit committee as specified in Section 3(a)(58)(B) of the Exchange Act (15 U.S.C. 78c(a)(58)(B)), so state.

N/A

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

N/A

ITEM 6. SCHEDULE OF INVESTMENTS.

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

Included in Item 1

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

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

Not applicable to open-end management investment companies.

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.

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

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

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

Describe any material changes to the procedures by which shareholders may recommend nominees to the registrant's board of directors, where those changes were implemented after the registrant last provided disclosure in response to the requirements of Item 407(c)(2)(iv) of Regulation S-R(17 CFR 229.407) (as required by Item 22(b)(15)) of Schedule 14A (17 CFR 240.14a-101), or this Item.

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

ITEM 11. CONTROLS AND PROCEDURES.

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

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

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

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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.

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

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

(2) A separate certification for each principal executive officer and principal financial officer of the registrant as required by Rule 30a-2(a) under the Act (17 CFR 270.30a-2(a)) , exactly as set forth below:

Filed herewith.

SIGNATURES

[See General Instruction F]

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

(Registrant) Pioneer Municipal High Income Advantage Trust

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

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John F. Cogan, Jr, President

Date November 29, 2013

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 29, 2013

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

Date November 29, 2013

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