

PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST

Form N-CSR

November 28, 2008

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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)

Dorothy E. Bourassa, Pioneer Investment Management, Inc.,
60 State Street, Boston, MA 02109
(Name and address of agent for service)

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

Date of fiscal year end: March 31

Date of reporting period: April 1, 2008 through September 30, 2008

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

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

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ITEM 1. REPORTS TO SHAREOWNERS.

Pioneer Municipal High
Income Advantage Trust

Semiannual Report | September 30, 2008

Ticker Symbol: MAV

[Logo]PIONEER
Investments (R)

visit us: pioneerinvestments.com

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President's Letter

Dear Shareowner,

Stock and bond markets around the globe this year have experienced one of their most tumultuous periods in history. Investors have witnessed volatility of a magnitude that many have never before seen. Distance often provides the best vantage point for perspective. Still, we believe that the benefits of basic investment principles that have stood the test of time -- even in the midst of market turmoil -- cannot be underestimated.

First, invest for the long term. The founder of Pioneer Investments, Philip L. Carret, began his investment career during the 1920's. One lesson he learned is that while great prosperity affords an advantageous time for selling stocks, extreme economic slumps can create opportunities for purchase. Indeed, many of

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our portfolio managers, who follow the value-conscious investing approach of our founder, are looking at recent market conditions as an opportunity to buy companies whose shares we believe have been unjustifiably beaten down by indiscriminate selling, but that we have identified as having strong prospects over time. While investors may be facing a sustained market downturn, we continue to believe that patience, along with staying invested in the market, are important considerations for long-term investors.

A second principle is to stay diversified across different types of investments. The global scope of the current market weakness poses challenges for this basic investment axiom. But the turbulence makes now a good time to reassess your portfolio and make sure that your investments continue to meet your needs. We believe you should work closely with your financial advisor to find the mix of stocks, bonds and money market assets that is best aligned to your particular risk tolerance and investment objective.

As the investment markets sort through the continuing crisis in the financial industry, we are staying focused on the fundamentals and risk management. With more than 80 years of experience behind us, we have learned how to navigate turbulent markets. At Pioneer Investments, risk management has always been a critical part of our culture -- not just during periods of extraordinary volatility. Our investment process is based on fundamental research, quantitative analysis and active portfolio management. This three-pillared process, which we apply to each of our portfolios, is supported by an integrated team approach and is designed to carefully balance risk and reward. While we

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see potential chances for making money in many corners of the market, it takes research and experience to separate solid investment opportunities from speculation.

We invite you to learn more about Pioneer and our time-tested approach to investing by consulting with your financial advisor or visiting us online at www.pioneerinvestments.com. Thank you for investing with Pioneer.

Respectfully,

/s/ Daniel K. Kingsbury

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

Any information in this shareowner report regarding market or economic trends or the factors influencing the Trust's historical or future performance are statements of the opinion of Trust management as of the date of this report. These statements should not be relied upon for any other purposes. Past performance is no guarantee of future results, and there is no guarantee that market forecasts discussed will be realized.

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Portfolio Management Discussion | 9/30/08

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In the following interview, David Eurkus, who is responsible for the daily management of the Trust, discusses some of the factors that had an impact on the municipal bond market and the Trust during the six months ended September 30, 2008.

Q How did the Trust perform over the past six months ended September 30, 2008?

A For the six-month period ended September 30, 2008, Pioneer Municipal High Income Advantage Trust produced a total return of -12.05% at net asset value and -22.07% at market price. As of September 30, 2008, the Trust was selling at a 10.1% discount of market price to net asset value. The Lehman Brothers Municipal Bond Index, which tracks the performance of investment-grade bonds, returned -2.59% for the same period. The Lehman Brothers High Yield Municipal Bond Index, which tracks the performance of below investment-grade bonds, returned -4.64%, also for the same period. At the end of the six months, the Trust held 142 issues in 33 states, territories and the District of Columbia. On September 30, 2008, the Trust's 30-day SEC yield was 12.34%, and its current dividend yield, based on market close, was 8.70%.

Q What was the investment environment like during the period?

A The credit crisis, triggered by subprime mortgage defaults, continued to have an impact on municipal bonds during the six-month period ended September 30, 2008. In the second half of the period (July through September), the municipal bond market declined more than 10%. It declined about 9% on a year-to-date basis (January through September 2008).

Several factors contributed to this decline, including:

- o The sale of hundreds of millions of dollars of long-term bonds held by hedge funds. After several weeks of falling municipal bond prices, rising Treasury bond prices and sharply rising money market borrowing rates, some hedge funds were rapidly approaching insolvency. To protect themselves from default, some lenders forced the hedge funds to sell their long-term municipal bonds to raise cash.
- o Concerns over the downgrades of "monoline" insurers. Three of the largest bond insurers -- Financial Guarantee Insurance Company (FGIC), Municipal Bond Insurance Association (MBIA) and Ambac Financial Group (AMBAC) -- lost their AAA ratings because they had insured structured mortgage products that were tied to defaulting subprime mortgages. (A monoline insurer writes a single line of insurance contracts, such as credit insurance, which is similar to a financial guarantee.)

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- o A crisis in the auction-rate securities market. As investment banks refused to support auctions for these securities, which are long-term bonds tied to short-term interest rates that are set at weekly or monthly auctions, investors saw the auction market and their cash freeze up.
- o Weak demand, as investors shied way from new bonds.
- o Lack of new issuance. Because of the winnowing of firms and rising debt cost, tax-exempt issuers have postponed several billion dollars in planned borrowing. Also, five of the largest 12 arrangers of municipal bond sales in 2007 were taken over or left the business

during 2008.

In the face of all this, investors sold assets that had even the slightest bit of risk and moved to the Treasury market. As municipal bonds sold off, their prices declined and their yields rose substantially above Treasury yields. Rarely in history has the ratio of municipal bond yields to Treasury yields been so high. At one point, yields on top-rated 30-year municipal bonds as a percentage of 30-year U.S. Treasury yields reached 142 basis points. (A basis point equals 1/100 of 1%.) The typical rate of municipal yields to Treasury yields is closer to 85%.

Q Can you comment on the issues surrounding auction-rate preferred securities?

A The Trust has issued auction-rate preferred shares as a low-cost way of borrowing to provide leverage for the Trust. These auction-rate preferred shares typically have been purchased at regularly scheduled auctions, giving investors in the preferred shares a source of financial liquidity while keeping the Trust's borrowing costs low. However, the aggravated problems in the credit markets have led to failed auctions for the preferred shares of many closed-end funds, including Pioneer Municipal High Income Advantage Trust. Investors holding the preferred shares have been adversely affected because they have not had the ability to sell their shares at auctions. When an auction fails, the Trust must pay higher interest rates to the holders of the preferred shares, consistent with the terms of documents authorizing issuance of preferred shares.

The Trust continues to pay all distributions in compliance with the terms of the auction-rate preferred share agreements. The distributions are at levels still sufficient to be an effective strategy in pursuit of the Trust's goals. The income from municipal bond investing has exceeded, and continues to exceed, the cost of borrowing money through auction-rate preferreds.

Q How did you manage the Trust in this environment?

A At the end of the six months, 35.2% of the Trust's total investments were in investment-grade bonds, 63.3% were in below investment-grade bonds, and 1.5% was in cash. On September 30, 2008, the average credit quality of the

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Trust was BBB. As has been the case in the past, we emphasized sectors that are fundamental to the U.S. economy. The largest allocations were to health care (27.4% of total investments) and transportation (5.9% of total investments). The Trust also had investments in education, housing, public power, water and sewer, and pollution control bonds. About 10% of the portfolio was in tobacco bonds, which are backed by tobacco companies' payments to states as part of the Master Settlement Agreement of 1998. A large percentage of the Trust's assets were invested in revenue bonds on which the payment of interest and principal is derived from the revenues generated by the particular asset the bond was issued to finance. Because revenue bonds do not depend on the taxing power of the state, they tend to hold their value when the economy is weak and revenues going into state coffers may decline.

Q What portfolio positions had the biggest impact on performance for the period?

A The Trust had indirect exposure to Lehman Brothers through a municipal bond

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issued in April 2008 by Main Street Natural Gas in Georgia. The issuer was established by the Municipal Gas Authority of Georgia to finance the cost of acquiring approximately a 30-year supply of gas with the object of reselling gas to Georgia municipalities, as well as the city of Tallahassee (Florida). The guarantor in the case was Lehman Brothers Holdings, and proceeds from the bonds were paid to Lehman Brothers Commodities Services ("LBCS"), which was obliged to make payments to Main Street to cover the prepayment amount. With the bankruptcy of Lehman Brothers Holdings, LBCS was unable to fulfill its obligation to deliver gas. As a result, Main Street terminated its contract with Lehman and demanded repayment of the bond proceeds. Bondholders have become senior unsecured creditors of Lehman Brothers Holdings. As of September 30, the price of the bonds was approximately 13 cents on the dollar, reflecting the current clearing price of the bonds, while bondholders and their lawyers determine the underlying recovery value on the bonds and the unsecured creditors' pool. Given the complex nature of the bankruptcy, this determination will take at least several months. Pioneer is participating in a creditors' committee in efforts to increase client recoveries.

The Trust's performance was also held back by exposure to airline bonds, which were hit hard by higher jet fuel costs resulting from rising oil prices. Tobacco bonds also did poorly in reaction to Standard & Poor's announcement that it was putting newer-issued tobacco bonds on credit watch because of concerns that in a weak economy some states may not have the money to retire their bonds. The Trust's high-yield bonds were also disappointing. As mentioned above, at September 30, 2008, about 63.3% of the Trust was invested in below investment-grade, or high yield bonds.

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Q What is your outlook over the next six months?

A The problems that the municipal bond market experienced over the past several months were triggered largely by a lack of liquidity. As we look ahead, we expect liquidity to increase and the municipal market to return to more normal conditions. We believe there is exceptional value in the municipal market. Longer-term municipal bonds offer higher tax-free yields than investment-grade corporate bonds, and municipal bonds have had the lowest default rate of any bond category, except U.S. Treasuries. Over the next several months, we hope to take advantage of the higher yields and lower prices that municipal bonds provide.

Please refer to the Schedule of Investments on pages 11-21 for a full listing of Trust securities.

Investments in high-yield or lower-rated securities are subject to greater-than-average risk. The Trust may invest in securities of issuers that are in default or that are in bankruptcy.

A portion of income may be subject to state, federal, and/or alternative minimum tax. Capital gains, if any, are subject to a capital gains tax. When interest rates rise, the prices of fixed-income securities in the Trust will generally fall. Conversely, when interest rates fall, the prices of fixed-income securities in the Trust will generally rise. By concentrating in municipal securities, the portfolio is more susceptible to adverse economic, political or regulatory developments than is a portfolio that invests more broadly. Investments in the Trust are subject to possible loss due to the financial failure of underlying securities and their inability to meet their debt obligations.

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

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

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

Any information in this shareowner report regarding market or economic trends or the factors influencing the Trust's historical or future performance are statements of the opinion of Trust management as of the date of this report. These statements should not be relied upon for any other purposes.

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Portfolio Summary | 9/30/08

Portfolio Diversification

(As a percentage of total investment portfolio)

[The following data is represented by a pie chart in the printed material.]

Health Revenue	27.4%
Development Revenue	11.7%
Other Revenue	10.5%
Tobacco Revenue	9.9%
Airport Revenue	8.8%
Pollution Control Revenue	7.8%
Facilities Revenue	7.7%
Transportation Revenue	5.9%
Insured	5.9%
Housing Revenue	1.6%
Water Revenue	1.2%
Education Revenue	1.0%
Utilities Revenue	0.4%
Airlines Revenue	0.2%

Portfolio Maturity

(As a percentage of long-term holdings)

[The following data is represented by a pie chart in the printed material.]

0-1 year	3.5%
1-3 years	9.4%
3-6 years	18.4%
6-8 years	4.1%
8-10 years	30.2%
10+ years	34.4%

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Quality Distribution

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

[The following data is represented by a pie chart in the printed material.]

AAA	11.4%
AA	0.5%
BBB	23.3%
BB	7.5%
B	8.7%
CCC	2.9%
CC	0.2%
C	1.4%
D	0.4%
Not Rated	42.2%
Cash Equivalents	1.5%

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

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Prices and Distributions | 9/30/08

Share Prices and Distributions

Market Value per Common Share

9/30/08	3/31/08
\$ 10.34	\$ 13.74

Net Asset Value per Common Share

9/30/08	3/31/08
\$ 11.50	\$ 13.54

Distributions per Common Share

	Net Investment Income	Short-Term Capital Gains	Long-Term Capital Gains
4/1/08-9/30/08	\$ 0.4500	\$ --	\$ --

10 Largest Holdings

(As a percentage of long-term holdings)*

1.	Non-Profit Preferred Funding Trust I, Series E, 12.0%, 9/15/37 (144A)	3.13%
2.	Indiana State Development Finance Authority Revenue, 5.75%, 10/1/11	2.49
3.	New Jersey Economic Development Authority Revenue, 6.25%, 9/15/29	2.47
4.	North Texas Tollway Authority Revenue, 5.75%, 1/1/33	2.28
5.	Houston Texas Airport System Special Facilities Revenue, 6.75%, 7/1/29	2.03
6.	South Carolina Jobs Economic Development Authority Revenue, 6.375%, 8/1/34	2.01
7.	Tobacco Settlement Financing Corp., 5.875%, 5/15/39	1.96
8.	Charlotte North Carolina Special Facilities Revenue, 5.6%, 7/1/27	1.91
9.	Tobacco Settlement Financing Corp., 6.25%, 6/1/42	1.76
10.	Knox County Health Educational & Housing Facilities Board Hospital Revenue, 6.5%, 4/15/31	1.75

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

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Performance Update | 9/30/08

Investment Returns

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

Cumulative Total Returns
(As of September 30, 2008)

Period	Net Asset Value ("NAV")	Market Price
Life-of-Trust (10/20/03)	11.70%	-4.06%
1 Year	-19.48	-28.36

[The following data is represented by a mountain chart in the printed material.]

Value of \$10,000 Investment

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

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

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

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

Closed-end funds, unlike open-end funds, are not continuously offered. There is a one-time public offering and, once issued, shares of closed-end funds are sold in the open market through a stock exchange and frequently trade at prices lower than their NAV. NAV is total assets less total liabilities which includes preferred shares divided by the number of common shares outstanding.

When NAV is lower than market price, dividends are assumed to be reinvested at the greater of NAV or 95% of the market price. When NAV is higher, dividends are assumed to be reinvested at prices obtained under the Trust's dividend reinvestment plan.

The performance table and graph do not reflect the deduction of fees and taxes that a shareowner would pay on Trust distributions or the sale of Trust shares.

Index comparison begins October 31, 2003. The Lehman Brothers Municipal Bond Index is a broad measure of the municipal bond market. Lehman Brothers Non-Investment Grade Municipal Bond Index 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. You cannot invest directly in the Indices.

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Schedule of Investments | 9/30/08 (unaudited)

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

TAX-EXEMPT OBLIGATIONS -- 146.6% of Net Assets

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\$ 5,000,000	NR/NR	Arizona -- 4.3% Casa Grande Industrial Development Authority, Hospital Revenue, 7.625%, 12/1/29	\$
1,551,000	NR/Baa3	Pima County Industrial Development Authority, 6.75%, 7/1/31	
2,640,000	NR/NR	Pima County Industrial Development Authority, 7.0%, 1/1/38	
1,000,000+	NR/NR	Pima County Industrial Development Authority, 7.5%, 7/1/34	
2,000,000	NR/NR	San Luis Facility Development Corp., 7.25%, 5/1/27	---
			\$ 1

3,140,000 (a)	AAA/Aaa	California -- 11.5% California State University Revenue, RIB, 0.0%, 11/1/39 (144A)	\$
8,170,000 (a)	AAA/NR	California State Variable Purpose, RIB, 0.0%, 6/1/37 (144A)	
6,000,000	NR/NR	California Statewide Communities Development Authority, 9.0%, 12/1/38	
2,680,000+	AAA/Aaa	Golden State Tobacco Securitization Corp., 6.75%, 6/1/39	
2,500,000	AA/Aa3	San Jose California Airport Revenue, 5.0%, 3/1/37	
7,500,000 (a)	AAA/NR	University of California, RIB, 1.113%, 5/15/38 (144A)	
7,670,000	C/NR	Valley Health System Hospital Revenue, 6.875%, 5/15/23	---
			\$ 3

2,850,000+	BBB/NR	Colorado -- 2.7% Denver Health & Hospital Authority Healthcare Revenue, 6.0%, 12/1/31	\$
3,520,000+	NR/NR	Northwest Parkway Public Highway Authority, 7.125%, 6/15/41	

			\$

2,700,000	BBB/Baa3	District of Columbia -- 2.3% District of Columbia Tobacco Settlement Financing Corp., 6.5%, 5/15/33	\$
4,000,000	BBB/Baa3	District of Columbia Tobacco Settlement Financing Corp., 6.75%, 5/15/40	

			\$

6,890,000 (a)	NR/Aa1	Florida -- 4.6% Florida State Department of Transportation, RIB, 0.0%, 7/1/37 (144A)	\$
4,500,000	BBB-/Baa2	Hillsborough County Florida Industrial Development Authority Pollution Control Revenue, 5.5%, 10/1/23	

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

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Schedule of Investments | 9/30/08 (unaudited) (continued)

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Principal Amount	S&P/Moody's Ratings (unaudited)		Value
Florida -- (continued)			
\$ 1,980,000	NR/NR	Hillsborough County Florida Industrial Development Authority Pollution Control Revenue, 6.75%, 7/1/29	\$ 1
500,000	BB+/NR	Miami Beach Health Facilities Authority, 5.375%, 11/15/28	\$ 12

Georgia -- 3.6%			
4,000,000 (a)	NR/Aaa	Atlanta Georgia Water and Wastewater Revenue, RIB, 0.0%, 11/1/43 (144A)	\$ 2
1,065,000	NR/B2	Effingham County Industrial Development Authority, 6.5%, 6/1/31	2
3,360,000	NR/NR	Fulton County Residential Care Facilities, 7.0%, 7/1/29	2
7,500,000 (b)	D/Caa3	Main Street Natural Gas, Inc., Gas Project Revenue Bonds, 6.25%, 7/15/33	
4,500,000 (b)	D/Caa3	Main Street Natural Gas, Inc., Gas Project Revenue Bonds, 6.375%, 7/15/38	
1,650,000	NR/NR	Savannah Georgia Economic Development Authority Revenue, 7.4%, 1/1/34	1

Guam -- 3.0%			
3,000,000	NR/NR	Northern Mariana Islands, 5.0%, 6/1/30	\$ 2
4,600,000+	AAA/Ba3	Northern Mariana Islands, 6.75%, 10/1/33	5
400,000	B+/Ba3	Northern Mariana Islands, 6.75%, 10/1/33	7

Idaho -- 2.9%			
2,000,000	BBB/Baa2	Power County Industrial Development Corp., 6.45%, 8/1/32	\$ 1
5,920,000	BBB/Baa2	Power County Pollution Control Revenue, 5.625%, 10/1/14	5

Illinois -- 5.3%			
4,000,000	NR/NR	Centerpoint Intermodal Center, 8.0%, 6/15/23 (144A)	\$ 3
1,000,000	NR/NR	Illinois Finance Authority Revenue, 6.0%, 11/15/27	2
3,000,000	NR/NR	Illinois Finance Authority Revenue, 6.0%, 11/15/39	2
2,500,000	NR/NR	Illinois Finance Authority Revenue, 6.125%, 11/15/25	2
1,645,000	NR/NR	Illinois Health Facilities Authority Revenue, 5.5%, 11/15/19	1
1,500,000	NR/NR	Illinois Health Facilities Authority Revenue, 6.9%, 11/15/33	1
2,700,000	NR/NR	Southwestern Illinois Development Authority Revenue, 5.625%, 11/1/26	2

\$ 13			

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Principal Amount	S&P/Moody's Ratings (unaudited)		Va
\$ 10,000,000	BBB+/NR	Indiana -- 5.8% Indiana State Development Finance Authority Revenue, 5.75%, 10/1/11	\$
5,000,000	NR/B2	Jasper County Industrial Economic Development Revenue, 5.6%, 4/1/29	
2,170,000	NR/NR	Vincennes Industrial Economic Development Revenue, 6.25%, 1/1/24	

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

2,500,000	BB+/Ba3	Louisiana -- 4.1% Louisiana Local Government Environmental Facilities Development Authority Revenue, 6.75%, 11/1/32	\$
750,000	BBB+/NR	Opelousas Louisiana General Hospital Authority Revenue, 5.75%, 10/1/23	
9,415,000	BBB/Baa3	Tobacco Settlement Financing Corp., 5.875%, 5/15/39	

710,000	NR/NR	Maryland -- 0.6% Maryland Health & Higher Educational Facilities Authority Revenue, 5.25%, 1/1/27	\$
1,250,000	NR/NR	Maryland Health & Higher Educational Facilities Authority Revenue, 5.3%, 1/1/37	

2,195,000	BBB-/Baa3	Massachusetts -- 4.9% Massachusetts Health & Educational Facilities Authority Revenue, 5.375%, 7/15/28	\$
1,000,000+	BBB-/Baa3	Massachusetts Health & Educational Facilities Authority Revenue, 6.35%, 7/15/32	
900,000	BB/NR	Massachusetts State Development Finance Agency, 5.25%, 10/1/18	
2,920,000	NR/Ba1	Massachusetts State Development Finance Agency, 6.0%, 11/1/28	
4,440,000	NR/NR	Massachusetts State Development Finance Agency, 7.1%, 7/1/32	
3,335,000 (a)	NR/Aa3	Massachusetts State Housing Finance Agency, RIB, 0.0%, 12/1/45 (144A)	

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Schedule of Investments | 9/30/08 (unaudited) (continued)

Principal Amount	S&P/Moody's Ratings (unaudited)	
		Michigan -- 4.3%
\$ 1,500,000+	AAA/A3	Delta County Michigan Economic Development Corp., 6.25%, 4/15/27
3,000,000+	BB+/NR	Macomb County Hospital Finance Authority Revenue, 5.875%, 11/15/34
745,000	NR/NR	Michigan Public Educational Facilities Authority Revenue, 7.0%, 10/1/36
4,130,000	BB-/Ba3	Michigan State Hospital Finance Authority Revenue, 5.5%, 8/15/23
1,000,000	NR/NR	Michigan State Strategic Fund Solid Waste Disposal Revenue, 7.375%, 1/15/22
1,470,000	BB+/NR	Star International Academy Certificates of Participation, 6.125%, 3/1/37

		Missouri -- 3.2%
1,850,000	NR/NR	Kansas City Industrial Development Authority Revenue, 5.875%, 1/1/37 (144A)
1,500,000	NR/Caa2	St. Louis Industrial Development Authority Revenue, 7.2%, 12/15/28
6,640,000	NR/Caa2	St. Louis Industrial Development Authority Revenue, 7.25%, 12/15/35

		Montana -- 0.8%
2,445,000 (c)	NR/NR	Hardin Increment Industrial Infrastructure Development Revenue, 0.0%, 9/1/31
1,000,000	NR/NR	Two Rivers Authority, Inc., Project Revenue, 7.375%, 11/1/27

		Nevada -- 1.1%
2,425,000	BB+/NR	Clark County Industrial Development Revenue, 5.5%, 10/1/30
1,600,000	NR/NR	Nevada State Department of Business & Industry, 7.25%, 1/1/23
1,000,000	NR/NR	Nevada State Department of Business & Industry, 7.375%, 1/1/30
1,320,000	NR/NR	Nevada State Department of Business & Industry, 7.375%, 1/1/40

		New Hampshire -- 0.7%
1,000,000	BBB-/NR	New Hampshire Health & Educational Facilities Authority Revenue, 5.375%, 1/1/34
1,125,000	NR/NR	New Hampshire Health & Educational Facilities Authority Revenue, 5.875%, 7/1/34

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

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Principal Amount	S&P/Moody's Ratings (unaudited)		Value
		New Jersey -- 10.1%	
\$ 2,500,000	NR/NR	Burlington County New Jersey Bridge Commission Revenue, 5.625%, 1/1/38	\$ 2,0
13,000,000	B/B3	New Jersey Economic Development Authority Revenue, 6.25%, 9/15/29	9,8
2,500,000	BBB/Baa1	New Jersey Health Care Facilities Financing Authority Revenue, 5.375%, 7/1/33	2,1
2,495,000 (a)	NR/Aaa	New Jersey State Turnpike Authority, RIB, 0.0%, 1/1/28 (144A)	2,1
1,000,000+	AAA/Aaa	Tobacco Settlement Financing Corp., 6.25%, 6/1/43	1,1
3,250,000+	AAA/Aaa	Tobacco Settlement Financing Corp., 6.75%, 6/1/39	3,6
5,000,000+	AAA/Aaa	Tobacco Settlement Financing Corp., 7.0%, 6/1/41	5,7
			\$ 26,6
		New York -- 9.8%	
3,000,000	NR/NR	Dutchess County Industrial Development Agency Revenue, 7.5%, 3/1/29	\$ 3,1
1,000,000	NR/NR	Nassau County New York Industrial Development Agency Revenue, 6.7%, 1/1/43	9
5,000,000	BB+/Ba1	New York City Industrial Development Agency, 5.25%, 12/1/32	3,0
2,000,000	NR/NR	New York City Industrial Development Agency, 5.375%, 6/1/23	1,7
2,000,000	CCC+/Caa2	New York City Industrial Development Agency, 6.9%, 8/1/24	1,0
3,950,000	BB+/Ba1	New York City Industrial Development Agency, 7.625%, 12/1/32	3,3
2,300,000	NR/NR	New York City Industrial Development Agency, 7.8%, 1/1/16	2,3
5,000,000	AAA/Aaa	New York State Environmental Facilities Corp., 5.0%, 6/15/33	4,7
4,500,000	NR/NR	Suffolk County New York Industrial Development Agency, 5.0%, 6/1/36	3,2
500,000	NR/NR	Ulster County New York Industrial Development Agency, 6.0%, 9/15/37	4
2,000,000	NR/NR	Yonkers Industrial Development Agency Civic Facilities Revenue, 6.15%, 3/1/15	1,9
			\$ 25,7
		North Carolina -- 5.2%	
11,350,000	NR/NR	Charlotte North Carolina Special Facilities Revenue, 5.6%, 7/1/27	\$ 7,6
7,140,000	NR/NR	Charlotte North Carolina Special Facilities Revenue, 7.75%, 2/1/28	6,1

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\$ 13,7

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Schedule of Investments | 9/30/08 (unaudited) (continued)

Principal Amount	S&P/Moody's Ratings (unaudited)		Value
		Ohio -- 2.5%	
\$ 3,800,000	B-/NR	Belmont County Health System Revenue, 5.7%, 1/1/13	\$ 3,6
1,000,000	B-/NR	Belmont County Health System Revenue, 5.8%, 1/1/18	8
3,000,000	B-/B3	Cleveland Airport Special Revenue, 5.375%, 9/15/27	2,1
			----- \$ 6,6
		Oklahoma -- 1.8%	
1,695,000	BB/NR	Jackson County Memorial Hospital Authority Revenue, 7.3%, 8/1/15	\$ 1,7
2,220,000	B-/Caa2	Tulsa Municipal Airport Transportation Revenue, 6.25%, 6/1/20	1,7
1,500,000	B-/Caa2	Tulsa Municipal Airport Transportation Revenue, 7.35%, 12/1/11	1,4
			----- \$ 4,8
		Pennsylvania -- 10.1%	
3,000,000+	AAA/Baa3	Allegheny County Hospital Development Authority Revenue, 9.25%, 11/15/22	\$ 3,4
500,000+	AAA/Baa3	Allegheny County Hospital Development Authority Revenue, 9.25%, 11/15/30	5
1,000,000	BBB-/NR	Clarion County Hospital Authority Revenue, 5.625%, 7/1/21	1,0
3,600,000	B-/NR	Columbia County Hospital Authority Revenue, 5.85%, 6/1/24	2,8
3,110,000 (b)	NR/NR	Delaware County Industrial Development Authority Revenue, 9.0%, 8/1/31	2,3
1,050,000	BBB/Baa2	Hazleton Health Services Authority Hospital Revenue, 6.125%, 7/1/16	1,0
2,415,000	NR/Baa3	Montgomery County Higher Education & Health Authority Hospital Revenue, 6.6%, 7/1/10	2,4
1,430,000	BB+/NR	Pennsylvania Economic Development Financing Authority Revenue, 5.125%, 6/1/18	1,2
1,805,000	BB+/NR	Pennsylvania Economic Development Financing Authority Revenue, 5.3%, 6/1/10	1,7
2,330,000	BB+/NR	Pennsylvania Economic Development Financing Authority Revenue, 5.35%, 6/1/11	2,2
5,000,000	BBB/Baa3	Philadelphia Hospitals & Higher Education Facilities Authority Revenue, 5.0%, 7/1/34	3,5
2,005,000	B-/NR	Scranton-Lackawanna Health & Welfare Authority Revenue, 6.1%, 7/1/11	1,9
2,245,000	B-/NR	Scranton-Lackawanna Health & Welfare Authority Revenue, 6.15%, 7/1/12	2,1

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\$ 26,5

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Principal Amount	S&P/Moody's Ratings (unaudited)		Val
\$ 4,485,000	NR/NR	Rhode Island -- 4.3% Central Falls Rhode Island Detention Facilities Revenue, 7.25%, 7/15/35	\$
8,285,000	BBB/Baa3	Tobacco Settlement Financing Corp., 6.25%, 6/1/42	----- \$ 1
1,500,000	CC/NR	South Carolina -- 7.3% Connector 2000 Association, Inc., Toll Road Revenue, 5.375%, 1/1/38	\$
1,600,000	BBB/NR	Loris Community Hospital District, 5.625%, 1/1/29	
7,140,000+	BBB+/Baa1	South Carolina Jobs Economic Development Authority Revenue, 6.375%, 8/1/34	
860,000+	BBB+/Baa1	South Carolina Jobs Economic Development Authority Revenue, 6.375%, 8/1/34	
3,000,000+	AAA/NR	South Carolina Jobs Economic Development Authority Revenue, 8.0%, 10/1/31	
4,400,000 (d)	BBB/Baa3	Tobacco Settlement Revenue Management, 6.375%, 5/15/30	----- \$ 1
1,000,000+	BBB+/A2	Tennessee -- 3.1% Johnson City Health & Educational Facilities Board Hospital Revenue, 7.5%, 7/1/33	\$
7,000,000	NR/Ba2	Knox County Health Educational & Housing Facilities Board Hospital Revenue, 6.5%, 4/15/31	----- \$
8,650,000	CCC/Caa1	Texas -- 18.9% Brazos River Authority Pollution Control Revenue, 6.75%, 10/1/38	\$
4,000,000	CCC/Caa1	Brazos River Authority Pollution Control Revenue, 7.7%, 4/1/33	
7,350,000	NR/NR	Gulf Coast Industrial Development Authority, 7.0%, 12/1/36	
10,000,000	B-/B3	Houston Texas Airport System Special Facilities Revenue, 6.75%, 7/1/29	
1,000,000	NR/NR	IAH Public Facility Corp., Project Revenue Bonds, Series 2006, 6.0%, 5/1/16	
1,000,000	NR/NR	IAH Public Facility Corp., Project Revenue Bonds, Series 2006, 6.0%, 5/1/21	
1,350,000	NR/NR	IAH Public Facility Corp., Project Revenue Bonds, Series 2006, 6.125%, 5/1/26	

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845,000	NR/NR	Lubbock Health Facilities Development Corp., 6.5%, 7/1/26
2,000,000	NR/NR	Lubbock Health Facilities Development Corp., 6.625%, 7/1/36
7,750,000	BBB-/Ba1	Matagorda County Navigation District Number 1 Revenue, 5.95%, 5/1/30

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Schedule of Investments | 9/30/08 (unaudited) (continued)

Principal Amount	S&P/Moody's Ratings (unaudited)	
		Texas -- (continued)
\$ 10,000,000	BBB+/A3	North Texas Tollway Authority Revenue, 5.75%, 1/1/33
5,000,000	NR/Baa3	Tomball Hospital Authority, 6.0%, 7/1/25

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

		Washington -- 4.1%
2,500,000	NR/NR	Port Seattle Washington Special Facilities Revenue, 7.25%, 4/1/30
1,290,000	BBB/Baa3	Tobacco Settlement Authority Revenue, 6.5%, 6/1/26
2,000,000	BBB/Baa2	Washington State Health Care Facilities Authority, 6.125%, 8/15/37
2,000,000	BBB/Baa2	Washington State Health Care Facilities Authority, 6.25%, 8/15/42
5,000,000	NR/NR	Washington State Housing Finance Commission Nonprofit Revenue Bonds, 5.625%, 1/1/27

		Wisconsin -- 1.6%
3,000,000	NR/NR	Aztalan Wisconsin Exempt Facilities Revenue, 7.50%, 5/1/18
1,000,000	NR/NR	Wisconsin State Health & Educational Facilities Authority Revenue, 6.125%, 4/1/24
1,000,000	NR/NR	Wisconsin State Health & Educational Facilities Authority Revenue, 6.25%, 4/1/34

		TOTAL TAX-EXEMPT OBLIGATIONS (Cost \$428,123,579)

13,000,000 (e) (f)	NR/NR	MUNICIPAL COLLATERALIZED DEBT OBLIGATION -- 4.7% of Net Non-Profit Preferred Funding Trust I, Series E, 12.0%, 9/15/37 (144A)

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

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

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Shares	S&P/Moody's Ratings (unaudited)		Value
85,903 (e) (g)		COMMON STOCK -- 0.3% of Net Assets Northwest Airlines Corp.	\$ 775,7
		TOTAL COMMON STOCK (Cost \$3,210,349)	\$ 775,7
6,000,000		TAX-EXEMPT MONEY MARKET MUTUAL FUND -- 2.3% of Net Assets BlackRock Liquidity Funds MuniFund Portfolio	\$ 6,000,0
		TOTAL TAX-EXEMPT MONEY MARKET MUTUAL FUND (Cost \$6,000,000)	\$ 6,000,0
		TOTAL INVESTMENTS IN SECURITIES -- 153.9% (Cost \$450,333,928) (h) (i)	\$ 404,520,0
		OTHER ASSETS AND LIABILITIES -- 3.2%	\$ 8,317,9
		PREFERRED SHARES AT REDEMPTION VALUE, INCLUDING DIVIDENDS PAYABLE -- (57.1)%	\$ (150,067,5
		NET ASSETS APPLICABLE TO COMMON SHAREOWNERS -- 100.0%	\$ 262,770,4

(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, 2008, the value of these securities amounted to \$45,364,232, or 17.3% of total net assets applicable to common shareowners.

RIB Residual Interest Bonds.

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

+ Prerefunded bonds have been collateralized by U.S. Treasury or U.S. Government Agency securities which are held in escrow to pay interest and principal on the tax exempt issue and to retire the bonds in full at the earliest refunding date.

(a) The interest rate is subject to change periodically and inversely based upon prevailing market rates. The rate shown is the coupon rate at September 30, 2008.

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- (b) Security is in default and is non-income producing.
- (c) Debt obligation initially issued at one coupon which converts to a higher coupon at a specific date. The rate shown is the coupon rate at September 30, 2008.
- (d) Escrow to maturity.
- (e) Indicates a security that has been deemed illiquid. The aggregate cost of illiquid securities is \$16,210,349. The aggregate value is \$13,246,084, or 5.0% of the net assets.
- (f) The interest rate is subject to change periodically. The interest rate shown is the rate at September 30, 2008.
- (g) Non-income producing.

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

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Schedule of Investments | 9/30/08 (unaudited) (continued)

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

Insured	
FSA	4.0%
ACA	1.4
AMBAC	0.6
Revenue Bonds:	
Health Revenue	27.4
Development Revenue	11.7
Other Revenue	10.5
Tobacco Revenue	9.9
Airport Revenue	8.8
Pollution Control Revenue	7.8
Facilities Revenue	7.8
Transportation Revenue	5.9
Housing Revenue	1.6
Water Revenue	1.2
Education Revenue	1.0
Utilities Revenue	0.4

	100.0%
	=====

- (i) At September 30, 2008, the net unrealized loss on investments based on cost for federal income tax purposes of \$446,140,558 was as follows:

Aggregate gross unrealized gain for all investments in which there is an excess of value over tax cost	\$ 13,657,076
Aggregate gross unrealized loss for all investments in which there is an excess of tax cost over value	(55,277,564)

Net unrealized loss	\$(41,620,488)

=====

For financial reporting purposes net unrealized loss on investments was \$45,813,858 and cost of investments aggregated \$450,333,928.

Purchases and sales of securities (excluding temporary cash investments) for the period ended September 30, 2008, aggregated \$39,965,780 and \$45,574,120, respectively.

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

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FAS 157 Footnote Disclosures

Various inputs are used in determining the value of the Trust's investments. These inputs are summarized in the three broad levels listed below. Highest priority is given to Level 1 inputs and lowest priority is given to Level 3.

- Level 1 - quoted prices in active markets for identical securities
- Level 2 - other significant observable inputs (including quoted prices for similar securities, interest rates, prepayment speeds, credit risk, etc.)
- Level 3 - significant unobservable inputs (including the Trust's own assumptions in determining fair value of investments)

The following is a summary of the inputs used as of September 30, 2008, in valuing the Trust's assets:

Valuation Inputs	Investments in Securities	Other Financial Instruments*
Level 1 - Quoted Prices	\$ 775,704	\$ --
Level 2 - Other Significant Observable Inputs	403,744,366	513,075
Level 3 - Significant Unobservable Inputs	--	--

Total	\$404,520,070	\$513,075

* Other financial instruments include, interest rate swaps.

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

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Statement of Assets and Liabilities | 9/30/08 (unaudited)

ASSETS:

Investments in securities, at value (cost \$450,333,928)	\$404,520,070
Receivables --	
Interest	9,360,733
Unrealized appreciation on interest rate swaps	513,075

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Prepaid expenses	40,470

Total assets	\$414,434,348

LIABILITIES:	
Due to custodian	\$ 1,242,615
Due to affiliates	223,559
Administration fee payable	25,343
Accrued expenses	104,840

Total liabilities	\$ 1,596,357

PREFERRED SHARES AT REDEMPTION VALUE:	
\$25,000 liquidation value per share applicable to 6,000 shares, including dividends payable of \$67,504	\$150,067,504

NET ASSETS APPLICABLE TO COMMON SHAREOWNERS:	
Paid-in capital	\$325,088,359
Undistributed net investment income	8,191,665
Accumulated net realized loss on investments and interest rate swaps	(25,208,754)
Net unrealized loss on investments	(45,813,858)
Net unrealized gain on interest rate swaps	513,075

Net assets applicable to common shareowners	\$262,770,487
=====	
NET ASSET VALUE PER SHARE:	
No par value, (unlimited number of shares authorized)	
Based on \$262,770,487/22,844,055 common shares	\$ 11.50
=====	

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

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Statement of Operations (unaudited)

For the Six Months Ended 9/30/08

INVESTMENT INCOME:	
Interest	\$ 16,088,196

EXPENSES:	
Management fees	\$ 1,362,115
Administration fees	198,642
Transfer agent fees and expenses	17,833
Auction agent fees	195,087
Custodian fees	16,174
Registration fees	10,629
Professional fees	33,958
Printing expense	14,074
Trustees' fees	6,874
Pricing fees	10,024
Miscellaneous	13,945

Total expenses	\$ 1,879,355

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Net investment income		\$ 14,208,841

REALIZED AND UNREALIZED GAIN (LOSS) ON INVESTMENTS AND INTEREST RATE SWAPS:		
Net realized loss from:		
Investments	\$ (6,021,087)	
Interest rate swaps	(261,587)	\$ (6,282,674)

Change in net unrealized gain (loss) from:		
Investments	\$ (42,407,477)	
Interest rate swaps	1,032,210	\$ (41,375,267)

Net loss on investments and interest rate swaps		\$ (47,657,941)

DISTRIBUTIONS TO PREFERRED SHAREOWNERS FROM NET INVESTMENT INCOME		\$ (2,775,626)

Net decrease in net assets applicable to common shareowners resulting from operations		\$ (36,224,726)
=====		

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

Pioneer Municipal High Income Advantage Trust | Semiannual Report | 9/30/08 23

Statement of Changes in Net Assets

For the Six Months Ended 9/30/08 and the Year Ended 3/31/08, respectively

	Six Months Ended 9/30/08 (unaudited)	Year Ended 3/31/08
FROM OPERATIONS:		
Net investment income	\$ 14,208,841	\$ 29,331,433
Net realized loss on investments and interest rate swaps	(6,282,674)	(4,089,389)
Change in net unrealized gain (loss) on investments and interest rate swaps	(41,375,267)	(53,215,821)
Distributions to preferred shareowners from net investment income	(2,775,626)	(5,823,201)

Net decrease in net assets applicable to common shareowners resulting from operations	\$ (36,224,726)	\$ (33,796,978)

DISTRIBUTIONS TO COMMON SHAREOWNERS:		
Net investment income (\$0.45 and \$0.89 per share, respectively)	\$ (10,266,823)	\$ (20,246,811)

Total distributions to common shareowners	\$ (10,266,823)	\$ (20,246,811)

FROM TRUST SHARE TRANSACTIONS:		
Reinvestment of distributions	\$ 761,766	\$ 655,590

Net increase in net assets applicable to common shareowners resulting from Trust share transactions	\$ 761,766	\$ 655,590

Net decrease in net assets applicable to common shareowners	\$ (45,729,783)	\$ (53,388,199)

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NET ASSETS APPLICABLE TO COMMON SHAREOWNERS:		
Beginning of period	308,500,270	361,888,469
End of period	\$ 262,770,487	\$308,500,270
Undistributed net investment income	\$ 8,191,665	\$ 7,025,273

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

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Financial Highlights

	Six Months Ended 9/30/08 (unaudited)	Year Ended 3/31/08
Per Common Share Operating Performance		
Net asset value, beginning of period	\$ 13.54	\$ 15.00
Increase (decrease) from investment operations:(a)		
Net investment income	\$ 0.62	\$ 1.00
Net realized and unrealized gain (loss) on investments and interest rate swaps	(2.09)	(2.00)
Dividends and distributions to preferred shareowners from:		
Net investment income	(0.12)	(0.00)
Net realized gains	--	--
Net increase (decrease) from investment operations		
	\$ (1.59)	\$ (1.00)
Dividends and distributions to common shareowners from:		
Net investment income	(0.45)	(0.00)
Net realized gains	--	--
Capital charge with respect to issuance of:		
Common shares	--	--
Preferred shares	--	--
Net increase (decrease) in net asset value		
	\$ (2.04)	\$ (2.00)
Net asset value, end of period(d)	\$ 11.50	\$ 13.00
Market value, end of period(d)	\$ 10.34	\$ 13.00
Total return at market value(e)	(22.07)%	(6.00)%
Ratios to average net assets of common shareowners		
Net expenses(f)	1.24% (g)	1.00%
Net investment income before preferred share dividends	9.36% (g)	8.00%
Preferred share dividends	1.83% (g)	1.00%
Net investment income available to common shareowners	7.53% (g)	6.00%
Portfolio turnover	9%	

	Year Ended 3/31/06	Year Ended 3/31/05
Per Common Share Operating Performance		

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Net asset value, beginning of period	\$ 14.64	\$ 14.51

Increase (decrease) from investment operations:(a)		
Net investment income	\$ 1.17	\$ 1.26
Net realized and unrealized gain (loss) on investments and interest rate swaps	0.39	0.18
Dividends and distributions to preferred shareowners from:		
Net investment income	(0.17)	(0.09)
Net realized gains	--	(0.01)

Net increase (decrease) from investment operations	\$ 1.39	\$ 1.34
Dividends and distributions to common shareowners from:		
Net investment income	(0.99)	(1.13)
Net realized gains	--	(0.09)
Capital charge with respect to issuance of:		
Common shares	--	0.01
Preferred shares	--	--

Net increase (decrease) in net asset value	\$ 0.40	\$ 0.13

Net asset value, end of period(d)	\$ 15.04	\$ 14.64
=====		
Market value, end of period(d)	\$ 14.99	\$ 14.37

Total return at market value(e)	11.55%	4.07%
Ratios to average net assets of common shareowners		
Net expenses(f)	1.16%	1.18%
Net investment income before preferred share dividends	7.88%	8.94%
Preferred share dividends	1.17%	0.64%
Net investment income available to common shareowners	6.71%	8.30%
Portfolio turnover	19%	39%

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

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Financial Highlights (continued)

	Six Months Ended 9/30/08 (unaudited)	Year Ended 3/31/08
Net assets of common shareowners, end of period (in thousands)	\$262,770	\$ 262,770
Preferred shares outstanding (in thousands)	\$150,000	\$ 150,000
Asset coverage per preferred share, end of period	\$ 68,806	\$ 68,806
Average market value per preferred share(h)	\$ 25,000	\$ 25,000
Liquidation value, including dividends payable, per preferred share	\$ 25,011	\$ 25,011
Ratios to average net assets of common shareowners before waivers and reimbursement of expenses		
Net expenses(f)	1.24% (g)	1.18% (g)
Net investment income before preferred share dividends	9.36% (g)	8.94% (g)
Preferred share dividends	1.83% (g)	0.64% (g)
Net investment income available to common shareowners	7.53% (g)	8.30% (g)

	Year Ended	Year Ended
--	---------------	---------------

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	3/31/06	3/31/05
Net assets of common shareowners, end of period (in thousands)	\$ 342,012	\$ 332,3
Preferred shares outstanding (in thousands)	\$ 150,000	\$ 150,0
Asset coverage per preferred share, end of period	\$ 82,011	\$ 80,3
Average market value per preferred share(h)	\$ 25,000	\$ 25,0
Liquidation value, including dividends payable, per preferred share	\$ 25,009	\$ 25,0
Ratios to average net assets of common shareowners before waivers and reimbursement of expenses		
Net expenses(f)	1.16%	1.
Net investment income before preferred share dividends	7.88%	8.
Preferred share dividends	1.17%	0.
Net investment income available to common shareowners	6.71%	8.

- (a) The per common share data presented above is based upon the average common shares outstanding for the periods presented.
- (b) The Trust's common shares were first publicly offered on October 15, 2003.
- (c) Net asset value immediately after the closing of the first public offering was \$14.30.
- (d) 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.
- (e) Total investment return is calculated assuming a purchase of common shares at the current market value on the first day and a sale at the current market value on the last day of the periods reported. Dividends and distributions, if any, are assumed for purposes of this calculation to be reinvested at prices obtained under the Trust's dividend reinvestment plan. Total investment return does not reflect brokerage commissions. Total investment return less than a full period is not annualized. Past performance is not a guarantee of future results.
- (f) Expense ratios do not reflect the effect of dividend payments to preferred shareowners.
- (g) Annualized.
- (h) Market value is redemption value without an active market.

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

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

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Notes to Financial Statements | 9/30/08 (unaudited)

1. Organization and Significant Accounting Policies

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

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

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

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

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

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A. Security Valuation

Security transactions are recorded as of trade date. Securities are valued at prices supplied by independent pricing services, which consider such factors as Treasury spreads, yields, maturities and ratings. Valuations may be supplemented by values obtained from dealers and other sources, as required. The values of interest rate swaps are determined by obtaining dealer quotations. Securities for which market quotations are not readily available are valued using fair value methods pursuant to procedures adopted by the Board of Trustees. At September 30, 2008, there were no securities that were valued using fair value methods. Temporary cash investments are valued at net asset value.

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

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

B. Federal Income Taxes

It is the Trust's policy to comply with the requirements of the Internal Revenue Code applicable to regulated investment companies and to distribute all of its taxable income and net realized capital gains, if any, to its shareowners. Therefore, no federal income tax provision is required. All

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tax returns filed thus far are subject to examination by tax authorities.

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

At March 31, 2008, the Trust had a capital loss carryforward of \$14,467,453 which is comprised of \$14,156,085 which will expire in 2014 and \$311,368 which will expire in 2016, if not utilized.

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The tax character of distributions paid to common and preferred shareowners will be determined at the end of the fiscal year. Distributions during the year ended March 31, 2008 were as follows:

	2008
Distributions paid from:	
Tax exempt income	\$25,232,182
Ordinary income	837,830

Total	\$26,070,012

The following shows components of distributable earnings on a federal income tax basis at March 31, 2008:

	2008
Distributable earnings:	
Undistributed tax-exempt income	\$ 3,324,986
Undistributed ordinary income	110,632
Capital loss carryforward	(14,467,453)
Dividends payable	(60,819)
Unrealized depreciation	(4,733,669)

Total	\$ (15,826,323)

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

C. Automatic Dividend Reinvestment Plan

All common shareowners automatically participate in the Automatic Dividend Reinvestment Plan (the "Plan"), under which participants receive all

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

Whenever the Trust declares a dividend on common shares payable in cash, participants in the Plan will receive the equivalent in common shares acquired by the Plan Agent either (i) through receipt of additional unissued

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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.

2. Management Agreement

Pioneer Investment Management, Inc. ("PIM"), a wholly owned indirect subsidiary of UniCredit S.p.A. ("UniCredit"), manages the Trust's portfolio. Management fees payable under the Trust's Advisory Agreement with PIM are calculated daily at the annual rate of 0.60% of the Trust's average daily managed assets. "Managed assets" is the average daily value of the Trust's total assets minus the sum of the Trust's liabilities, which liabilities exclude debt related to leverage, short-term debt and the aggregate liquidation preference of any outstanding preferred shares. For the six months ended September 30, 2008, the net management fee was equivalent to 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. Included in "Due to affiliates" reflected on the Statement of Assets and Liabilities is \$223,559 in management costs, administrative costs and certain other fees payable to PIM at September 30, 2008.

The Trust has retained Princeton Administrators, LLC ("Princeton") to provide

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certain administrative and accounting services to the Trust on its behalf. The Trust pays Princeton a monthly fee equal to 0.07% of the Trust's average daily

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managed assets up to \$500 million and 0.03% for average daily managed assets in excess of \$500 million, subject to a minimum monthly fee of \$10,000.

3. Transfer Agents

Pioneer Investment Management Shareholder Services, Inc. ("PIMSS"), a wholly owned indirect subsidiary of UniCredit, through a sub-transfer agency agreement with American Stock Transfer & Trust Company provides substantially all transfer agent and shareowner services related to the Trust's common shares at negotiated rates. Deutsche Bank Trust Company Americas ("Deutsche Bank") is the transfer agent, registrar, dividend paying agent and auction agent with respect to the Trust's Auction Preferred Shares ("APS"). The Trust pays Deutsche Bank an annual fee, as is agreed to from time to time by the Trust and Deutsche Bank, for providing such services.

4. Interest Rate Swaps

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

An interest rate swap is an agreement between two parties, which involves exchanging floating rate and fixed rate interest payments for a specified period of time. Interest rate swaps involve the accrual of the net interest payments between the parties on a daily basis, with the net amount recorded within the unrealized appreciation/depreciation of interest rate swaps on the Statement of Assets and Liabilities. Once the interim payments are settled in cash, at the pre-determined dates specified in the agreement, the net amount is recorded as realized gain or loss from interest rate swaps on the Statement of Operations. During the term of the swap, changes in the value of the swap are recognized as unrealized gains and losses by "marking-to-market" the value of the swap based on values obtained from dealer quotations. When the swap is terminated, the Trust will record a realized gain or loss equal to the difference, if any, between the proceeds from (or cost of) closing the contract and the cost basis of the contract. The Trust is exposed to credit risk in the event of non-performance by the other party to the interest rate swap. However, at September 30, 2008 the Trust does not anticipate non-performance by any counterparty. 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.

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Under the terms of the agreement entered into by the Trust, the Trust receives a floating rate of interest and pays a fixed rate of interest for the term. Details of the swap agreement outstanding as of September 30, 2008 were as follows:

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Counterparty	Termination Date	Notional Amount (000)	Fixed Rate	Floating Rate	Unrealized Appreciation
UBS AG	April 5, 2009	\$75,000	2.665%	1 month BMA	\$513,075

5. Trust Shares

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

Transactions in common shares of beneficial interest for the six months ended September 30, 2008 and the year ended March 31, 2008 were as follows:

	9/2008	3/2008
Shares outstanding at beginning of period	22,786,930	22,740,627
Reinvestment of distributions	57,125	46,303
Shares outstanding at end of period	22,844,055	22,786,930

The Trust may classify or reclassify any unissued common shares of beneficial interest into one or more series of preferred shares of beneficial interest. As of September 30, 2008, there were 6,000 APS as follows: Series A -- 3,000 and Series B -- 3,000.

Dividends on Series A and Series B are cumulative at a rate, which is reset every seven days based on the results of an auction. An auction fails if there are more APS offered 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. You will not be able to sell your APS at an auction if the auction fails. Since February 13, 2008, the Trust's auctions related to the APS have failed. The maximum rate for the 7-Day Series is 125% of the 7 day commercial paper rate or Kenny rate. Dividend rates ranged from 2.781% to 12.894% during the six months ended September 30, 2008.

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, asset coverage with respect to the outstanding preferred shares would be less than 200%.

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

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The holders of APS have voting rights equal to the holders of the Trust's common shares (one vote per share) and will vote together with holders of the common shares as a single class. However, holders of APS are also entitled to elect two of the Trust's Trustees. In addition, the Investment Company Act of

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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.

6. New Pronouncements

In March 2008, Statement of Financial Accounting Standards No. 161, Disclosures about Derivative Instruments and Hedging Activities ("SFAS 161"), was issued and is effective for fiscal years beginning after November 15, 2008. SFAS 161 requires enhanced disclosures about an entity's derivative and hedging activities. Management is currently evaluating the impact the adoption of SFAS 161 will have on the Trust's financial statement disclosures.

7. Subsequent Events

Subsequent to September 30, 2008, the Board of Trustees of the Trust declared a dividend from undistributed net investment income of \$0.075 per common share payable October 31, 2008, to common shareowners of record on October 15, 2008.

Subsequent to September 30, 2008, dividends declared and paid on preferred shares totaled \$1,039,320 in aggregate for the two outstanding preferred share series through November 4, 2008.

ADDITIONAL INFORMATION (unaudited)

During the period, there have been no material changes in the Trust's investment objective or fundamental policies that have not been approved by the shareowners. There have been no changes in the Trust's charter or By-Laws that would delay or prevent a change in control of the Trust which has not been approved by the shareowners. There have been no changes in the principal risk factors associated with investment in the Trust. Day-to-day management of the Trust's portfolio is the responsibility of David Eurkus. Mr. Eurkus is supported by the fixed income team. Members of this team manage other Pioneer funds investing primarily in fixed income securities. The portfolio manager and the team also may draw upon the research and investment management expertise of Pioneer's affiliate, Pioneer Investment Management Limited. Mr. Eurkus joined Pioneer as a senior vice president in January 2000 and has been an investment professional since 1969.

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

CEO CERTIFICATION DISCLOSURE (unaudited)

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

Results of Shareholder Meeting (unaudited)

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On September 22, 2008, Pioneer Municipal High Income Advantage Trust held its annual meeting of shareowners to elect Class II Trustees. All Class II Trustees were elected. Here are the detailed results of the votes.

Proposal 1 - To elect Class II Trustees.

Nominee	For	Withheld
Daniel K. Kingsbury	20,901,339	417,705
Benjamin M. Friedman	20,892,223	426,821
Margaret B.W. Graham	20,896,922	422,122

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Trustees, Officers and Service Providers

Trustees

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

Officers

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

Investment Adviser

Pioneer Investment Management, Inc.

Custodian

Brown Brothers Harriman & Co.

Legal Counsel

Bingham McCutchen LLP

Transfer Agent

Pioneer Investment Management Shareholder Services, Inc.

Shareowner Services and Sub-Transfer Agent

American Stock Transfer & Trust Company

Preferred Share Auction/Transfer Agent and Registrar

Deutsche Bank Trust Company Americas

Sub-Administrator

Princeton Administrators, LLC

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

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This page for your notes.

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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 1-800-710-0935

Or write to AST:

For

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

Dividend reinvestment plan (DRIP)

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

Website

www.amstock.com

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

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

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

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[Logo]PIONEER
Investments (R)

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

Securities offered through Pioneer Funds Distributor, Inc.
60 State Street, Boston, MA 02109
Underwriter of Pioneer Mutual Funds, Member SIPC
(C) 2008 Pioneer Investments 19435-02-1108

ITEM 2. CODE OF ETHICS.

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

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

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

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

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

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

Not applicable.

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

Not applicable.

(f) The registrant must:

(1) File with the Commission, pursuant to Item 10(a), a copy of its code of ethics that applies to the registrant's principal executive officer, principal financial officer, principal accounting officer or controller, or persons performing similar functions, as an exhibit to its annual report on this Form N-CSR;

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

(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

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committee may not, other than in his or her capacity as a member of the audit committee, the board of trustees, or any other board committee:

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

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

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

Not applicable.

ITEM 4. PRINCIPAL ACCOUNTANT FEES AND SERVICES.

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

N/A

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

N/A

(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

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SECTION I - POLICY PURPOSE AND APPLICABILITY

The Pioneer Funds recognize the importance of maintaining the independence of their outside auditors. Maintaining independence is a shared responsibility involving Pioneer Investment Management, Inc ("PIM"), the audit committee and the independent auditors.

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

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

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

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

SECTION II - POLICY

SERVICE CATEGORY	SERVICE CATEGORY DESCRIPTION	SPECIFIC PRE-APPROVED SERVICE SUBCATEGORIES
I. AUDIT SERVICES	Services that are directly related to performing the independent audit of the Funds	<ul style="list-style-type: none"> o Accounting research assistance o SEC consultation, registration statements, and reporting o Tax accrual related matters o Implementation of new accounting standards o Compliance letters (e.g. rating agency letters) o Regulatory reviews and assistance regarding financial matters o Semi-annual reviews (if requested) o Comfort letters for closed end offerings
II. AUDIT-RELATED SERVICES	Services which are not prohibited under Rule 210.2-01(C)(4) (the "Rule") and are related extensions of the audit services support the audit, or use the knowledge/expertise gained	<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

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.)

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

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| <p>III. TAX SERVICES</p> | <p>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.</p> | <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

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| <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 tax services not denoted as pre-approved, or to add a specific service subcategory as "pre-approved" | <ul style="list-style-type: none"> o A summary of all such services and related fees (including comparison to specified dollar limits) reported quarterly. |
|--|---|

SECTION III - POLICY DETAIL, CONTINUED

SERVICE CATEGORY	SERVICE CATEGORY DESCRIPTION	SPECIFIC PRE-APPROVED SERVICE SUBCATEGORIES
<p>IV. OTHER SERVICES</p> <p>A. SYNERGISTIC, UNIQUE QUALIFICATIONS</p>	<p>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,</p>	<ul style="list-style-type: none"> o Business Risk Management support o Other control and regulatory compliance projects

the ability to maintain a desired level of confidentiality, or where the Fund's auditors possess unique or superior qualifications to provide these services, resulting in superior value and results for the Fund.

AUDIT COMMITTEE APPROVAL POLICY

AUDIT COMMITTEE REPORTING POLICY

- o "One-time" pre-approval for the fund fiscal year within a specified dollar limit
- o Specific approval is needed to exceed the pre-approved dollar limits for these services (see general Audit Committee approval policy below for details on obtaining specific approvals)
- o Specific approval is needed to use the Fund's auditors for "Synergistic" or "Unique Qualifications" Other Services not denoted as pre-approved to the left, or to add a specific service subcategory as "pre-approved"
- o A summary of all such services and related fees (including comparison to specified dollar limits) reported quarterly.

SECTION III - POLICY DETAIL, CONTINUED

SERVICE CATEGORY	SERVICE CATEGORY DESCRIPTION	SPECIFIC PROHIBITED SERVICE SUBCATEGORIES
PROHIBITED SERVICES	Services which result in the auditors losing independence status under the Rule.	<ol style="list-style-type: none"> 1. Bookkeeping or other services related to the accounting records or financial statements of the audit client* 2. Financial information systems design and implementation* 3. Appraisal or valuation services, fairness* opinions, or contribution-in-kind reports 4. Actuarial services (i.e., setting actuarial reserves versus actuarial

- audit work)*
- 5. Internal audit outsourcing services*
- 6. Management functions or human resources
- 7. Broker or dealer, investment advisor, or investment banking services
- 8. Legal services and expert services unrelated to the audit
- 9. Any other service that the Public Company Accounting Oversight Board determines, by regulation, is impermissible

AUDIT COMMITTEE APPROVAL POLICY

AUDIT COMMITTEE REPORTING POLICY

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- 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.

- o A summary of all services and related fees reported at each regularly scheduled Audit Committee meeting will serve as continual confirmation that has not provided any restricted services.

GENERAL AUDIT COMMITTEE APPROVAL POLICY:

- o For all projects, the officers of the Funds and the Fund's auditors will each make an assessment to determine that any proposed projects will not impair independence.
- o Potential services will be classified into the four non-restricted service categories and the "Approval of Audit, Audit-Related, Tax and Other Services" Policy above will be applied. Any services outside the specific pre-approved service subcategories set forth above must be specifically approved by the Audit Committee.
- o At least quarterly, the Audit Committee shall review a report summarizing the services by service category, including fees, provided by the Audit firm as set forth in the above policy.

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

N/A

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

N/A

(g) Disclose the aggregate non-audit fees billed by the registrant's accountant

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

N/A

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

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

Item 5. Audit Committee of Listed Registrants

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

N/A

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

N/A

Item 6. Schedule of Investments.

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

Included in Item 1

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

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

Information not required in semi annual reports on form NCSR.

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

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

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

Information not required in semi annual reports on form NCSR.

Item 9. Purchases of Equity Securities by Closed-End Management Investment Company and Affiliated Purchasers.

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

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

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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 7(d)(2)(ii)(G) of Schedule 14A (17 CFR 240.14a-101), or this Item.

There have been no material changes to the procedures by which the shareholders may recommend nominees to the registrant's board of directors since the registrant last provided disclosure in response to the requirements of Item 7(d)(2)(ii)(G) of Schedule 14(A) in its definitive proxy statement, or this Item.

ITEM 11. CONTROLS AND PROCEDURES.

(a) Disclose the conclusions of the registrant's principal executive officer or officers and principal financial officer or officers, or persons performing similar functions, about the effectiveness of the registrant's disclosure controls and procedures (as defined in Rule 30a-2(c) under the Act (17 CFR 270.30a-2(c))) based on their evaluation of these controls and procedures as of a date within 90 days of the filing date of the report that includes the disclosure required by this paragraph.

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

(b) Disclose whether or not there were significant changes in the registrant's internal controls or in other factors that could significantly affect these controls subsequent to the date of their evaluation, including any corrective actions with regard to significant deficiencies and material weaknesses.

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

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

In August of 2006 the registrant's investment adviser enhanced its internal procedures for reporting performance information required to be included in prospectuses. Those enhancements involved additional internal controls over the appropriateness of performance data generated for this purpose. Such enhancements were made following an internal review which identified prospectuses relating to certain classes of shares of a limited number of registrants where, inadvertently,

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performance information not reflecting the deduction of applicable sales charges was included. Those prospectuses were revised, and the revised prospectuses were distributed to shareholders.

ITEM 12. EXHIBITS.

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

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

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

Filed herewith.

SIGNATURES

[See General Instruction F]

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

(Registrant) Pioneer Municipal High Income Advantage Trust

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

Date November 28, 2008

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 28, 2008

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

Date November 28, 2008

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