

PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST
Form N-CSR
November 24, 2006

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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, 2006 through September 30, 2006

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

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

ITEM 1. REPORTS TO SHAREOWNERS.

PIONEER

MUNICIPAL
HIGH INCOME
ADVANTAGE
TRUST

Semiannual
Report

9/30/06

[LOGO] PIONEER
Investments (R)

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President's

Dear Shareowner,

Mature and emerging market economies around the world showed moderate improvement after a flat second quarter. The U.S. saw some resurgence of growth, which we expect to continue through the fourth quarter of 2006 and into 2007, although this growth may be slow with housing sector measures down in recent months. While inflation pressures have risen slightly in recent months, we believe the United States may now be at the end of the Fed's monetary tightening cycle. Mature economies, led by Japan, remain firm, as do European economic prospects, with strong GDP data reflecting the broad-based strength seen in crucial indicators.

U.S. economic growth was back on track after lackluster market results prior to Labor Day. Consumer spending rose with receding gas prices, just in time for the back-to-school season, which retailers now consider the second most lucrative period after the Christmas season. U.S. economic growth is in line with our projections; we anticipate U.S. GDP finishing with a level of around 3.0% for 2006.

In our view, the pace of corporate earnings growth should slow amid pressure from high raw materials costs and moderating economic growth. However, modest U.S. dollar depreciation and improving growth overseas should offer some support to U.S. earnings.

The European economy continues to improve and appears to be at its healthiest in six years, with business confidence showing improvement across sectors and consumers becoming more optimistic. While business sentiment indicators have had a tendency to over-estimate growth in recent years, their broad-based improvement across countries since 2005 is a clear sign that European economic growth should continue through 2006.

The positive long-term drivers of emerging markets remain in place: improving domestic growth and inflation stability; structural reform; debt sustainability; and favorable demographics. Together, the emerging markets' current account surplus is at record highs while external debt as a percentage of GDP is at its lowest since 1991.

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Letter

In summary, we think that despite the existence of some inflation pressures seen by the Federal Reserve and its counterparts in developed economies, it seems as if interest rates will remain mostly unchanged. U.S. economic growth is expected to remain positive, as it should among the developed nations for the remainder of 2006. Any further geopolitical issues and rising energy prices could lead to deceleration, but not a derailment from the current healthy pace of economic growth, as investment is expected to remain robust, benefiting from sustained internal and international demand worldwide.

Our cautiously optimistic outlook reinforces the importance of Pioneer's message that investors should remain diversified, take a long-term view, and base investment decisions on economic and market fundamentals rather than on emotion. Our investment philosophy and approach continue to be based on the use of fundamental research to identify a range of opportunities that offer an attractive balance of risk and reward to help Trust shareowners work toward

their long-term goals.

Respectfully,

/s/ Osbert M. Hood

Osbert M. Hood, President
Pioneer Investment Management, 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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Pioneer Municipal High Income Advantage Trust

PORTFOLIO MANAGEMENT DISCUSSION 9/30/06

In an environment of moderating economic growth and lower interest rates, the Trust's portfolio of high-yield and investment-grade municipal bonds continued to provide shareholders with relatively strong returns. In the following interview, David Eurkus, a member of the management team for Pioneer Municipal High Income Advantage Trust, discusses some of the factors that had an impact on the municipal bond market and the Trust.

Q: How did the Trust perform over the past six months?

A: For the six-month period ended September 30, 2006, Pioneer Municipal High Income Advantage Trust produced a total return of 7.06% at net asset value and 3.02% at market price. As of September 30, 2006, the Trust was selling at a discount of market price to net asset value of 4.1%. The Lehman Brothers Municipal Bond Index returned 3.44%, while the Lehman Brothers Non-Investment Grade Municipal Bond Index returned 5.84% for the same period. At the end of the six months, the Trust held 137 issues in 35 states, territories and the District of Columbia. On September 30, 2006, the Trust's current yield was 5.60% and the 30-day SEC yield was 7.53%. When reviewing the Trust's relative performance, it is important to note that the Lehman Brothers Municipal Bond Index tracks the performance only of investment-grade bonds and does not include below investment-grade bonds, which are a significant part of the portfolio.

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.

The performance data quoted represents past performance, which is no guarantee of future results. Investment return and principal value will fluctuate, and shares, when redeemed, may be worth more or less than their original cost.

Q: What was the investment environment like during the period?

A: After boosting interest rates 17 times over the past two years, the Federal Reserve left rates unchanged in August and September, as the pace of

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economic growth slowed, and inflation appeared to be under control. At the end of the six-month period, the Federal funds rate, the rate banks charge for overnight loans, was 5.25%. In this environment, municipal bond yields declined across the yield spectrum and prices rose.

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Pioneer Municipal High Income Advantage Trust

Q: How did you manage the Trust against this backdrop?

A: The Trust was fully invested throughout the period in sectors that are important to the growth of the U.S. economy. The biggest positions were in health care, transportation and various revenue bonds in the public power, education, housing and water and sewer areas, among others. The Trust also had investments in tobacco bonds, which are backed by tobacco companies' payments to states. Over the six months, we created a new position in bonds issued by correctional institutions that have been privatized by the federal government and are now being built and managed by private corporations. The Trust had a mix of investment-grade securities, below investment-grade securities and cash equivalents (see page eight). At the end of the period, the average quality of the portfolio was BBB-, based on S&P ratings.

Q: What contributed to performance?

A: While high-yield bonds gave performance the biggest boost, nearly all of the Trust's investments benefited from the capital appreciation that occurred as yields declined and prices rose. The best performing positions in the portfolio included hospital/health care (+5.1%), airline/airports (+10.5%) and power and energy (+10.5%).

On September 30, 2006, 30% of the Trust was leveraged, which means that in the past we borrowed funds at low rates and invested those funds in high-yielding bonds. This leveraging strategy has aided return for several years. Over the six months, short-term rates stabilized and then started to decline toward the end of the period. Should rates continue to decline, the cost of borrowing would also go down, providing the Trust with a modest amount of additional income. A rise in short-term interest rates in the future would add to the Trust's borrowing costs, and the ability to sustain present dividend levels could be affected.

Q: What detracted from performance?

A: Because of the relatively strong economy, many issuers have a surplus of cash that they are using to pay down their bond debt earlier than expected. As some of our bonds have been called, or redeemed, before their maturity dates, we have invested the proceeds in new securities that have slightly lower yields than the redeemed bonds. Having bonds called sooner than expected is a

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Pioneer Municipal High Income Advantage Trust

normal part of the fixed-income investment process, and we continue to find attractive investment opportunities.

Q: What is your outlook?

A: In an environment of relatively strong, though moderating, economic growth, we have seen a substantial rise in general tax revenues in most states that has reduced the need for additional municipal financing. This situation has resulted in a contraction in the supply of municipal bonds at a time when demand for income on the part of investors has remained robust. As we move into 2007, this supply/demand dynamic has the potential to increase the value of the bonds in the Trust. As has been the case in the past, we intend to keep the portfolio fully invested and diversified among economic sectors and will continue to hold a combination of high-yield and below investment-grade bonds.

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

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

The Trust may use leverage through the issuance of preferred shares with an aggregate liquidation preference of up to 331/3% of the Trust's total assets after such issuance. 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.

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Pioneer Municipal High Income Advantage Trust

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Pioneer Municipal High Income Advantage Trust

 PORTFOLIO SUMMARY 9/30/06

Portfolio Diversification

 (As a percentage of total investment portfolio)

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

| | |
|---------------------------|-------|
| Health Revenue | 25.0% |
| Airport Revenue | 16.5% |
| Insured | 14.1% |
| Tobacco Revenue | 9.4% |
| Development Revenue | 9.3% |
| Transportation Revenue | 8.1% |
| Pollution Control Revenue | 5.7% |
| Facilities Revenue | 5.2% |
| Education Revenue | 2.1% |
| Housing Revenue | 1.1% |
| General Obligation | 1.1% |
| Water Revenue | 1.1% |
| Other | 0.8% |
| Power Revenue | 0.5% |

Portfolio Maturity

 (As a percentage of long-term holdings)

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

| | |
|------------|-------|
| 0-1 years | 10.1% |
| 1-3 years | 12.2% |
| 3-6 years | 41.7% |
| 6-8 years | 12.8% |
| 8-10 years | 4.7% |
| 10+ years | 18.5% |

Quality Distribution

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

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

| | |
|-----|------|
| AAA | 8.8% |
|-----|------|

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| | |
|------------------|-------|
| AA | 0.8% |
| A | 2.9% |
| BBB | 22.6% |
| BB | 7.1% |
| B | 13.9% |
| CCC | 6.6% |
| Not Rated | 37.0% |
| Cash Equivalents | 0.3% |

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Pioneer Municipal High Income Advantage Trust

 PRICES AND DISTRIBUTIONS 9/30/06

Share Prices and Distributions

| | | |
|----------------------------------|---------|---------|
| Market Value per Common Share | 9/30/06 | 3/31/06 |
| | \$14.99 | \$14.99 |

| | | |
|-------------------------------------|---------|---------|
| Net Asset Value per Common Share | 9/30/06 | 3/31/06 |
| | \$15.63 | \$15.04 |

| | | | |
|---|-----------------------------|-----------------------------|----------------------------|
| Distributions per Common Share (4/1/06 - 9/30/06) | Net Investment Income | Short-Term Capital Gains | Long-Term Capital Gains |
| | \$0.44 | \$ - | \$ - |

10 Largest Holdings

(As a percentage of long-term holdings)*

| | |
|---|-------|
| 1. Dallas-Fort Worth International Airport Revenue, 6.0%, 11/1/14 | 2.81% |
| 2. New Jersey Economic Development Authority Revenue, 6.25%, 9/15/29 | 2.72% |
| 3. Alliance Airport Authority Special Facilities Revenue, | |

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| | |
|---|------|
| 7.5%, 12/1/29 | 2.33 |
| 4. Charlotte North Carolina Special Facilities Revenue, 5.6%, 7/1/27 | 2.31 |
| 5. University of California, RIB, 7.651%, 5/15/38 (144A) | 2.22 |
| 6. Houston Texas Airport System Revenue, 6.75%, 7/1/29 | 2.16 |
| 7. Miami-Dade County Aviation Revenue, 5.0%, 10/1/37 | 2.12 |
| 8. Indiana State Development Finance Authority Revenue, 5.75%, 10/1/11 | 2.11 |
| 9. Port Seattle Washington Special Facilities Revenue, 5.0%, 4/1/31 | 2.09 |
| 10. Tobacco Settlement Financing Corp., 5.875%, 5/15/39 | 2.03 |

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

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Pioneer Municipal High Income Advantage Trust

 PERFORMANCE UPDATE 9/30/06

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 Non-Investment Grade Municipal Bond Index.

 Cumulative Total Returns
 (As of September 30, 2006)

| Period | Net Asset Value (NAV) | Market Price |
|-----------------------------|-----------------------|--------------|
| Life-of-Trust (10/20/03) | 34.35% | 23.09% |
| 1 Year | 13.47 | 8.60 |

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

| | Pioneer Municipal High Income Advantage Trust | Lehman Brothers Municipal Bond Index | Lehman Brothers Non-Investment Grade Municipal Bond Index |
|-------|---|---|---|
| 10/03 | 10040 | 10000 | 10000 |
| 9/04 | 9965 | 10513 | 10864 |
| 9/05 | 11335 | 10939 | 12031 |
| 9/06 | 12310 | 11425 | 13323 |

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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 market price.

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

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Pioneer Municipal High Income Advantage Trust

 SCHEDULE OF INVESTMENTS 9/30/06 (unaudited)

| Principal Amount | S&P/ Moody's Ratings (unaudited) | | |
|---------------------|---|--|---------|
| | | TAX-EXEMPT OBLIGATIONS - 138.3% of Net Assets | |
| | | Alaska - 1.3% | |
| \$ 3,875,000 (a) | NR/Aaa | Alaska State Housing Finance Corp., RIB, 10.574%, 6/1/49 (144A) | \$ 4,43 |
| | | Arizona - 4.2% | |

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| | | | |
|---------------|----------|--|----------|
| 5,000,000 | NR/NR | Casa Grande Industrial Development Authority, Hospital Revenue, 7.625%, 12/1/29 | \$ 5,53 |
| 3,140,000 (a) | NR/Aaa | Downtown Phoenix Hotel Corp., RIB, 7.284%, 7/1/40 (144A) | 3,53 |
| 1,000,000 | NR/Baa3 | Pima County Industrial Development Authority, 6.3%, 7/1/31 (144A) | 1,05 |
| 1,570,000 | NR/Baa3 | Pima County Industrial Development Authority, 6.75%, 7/1/31 | 1,66 |
| 1,000,000+ | NR/NR | Pima County Industrial Development Authority, 7.5%, 7/1/34 | 1,22 |
| 2,000,000 | NR/NR | San Luis Facility Development Corp., 7.25%, 5/1/27 | 2,03 |
| | | | ----- |
| | | | \$ 15,04 |
| | | | ----- |
| | | California - 6.6% | |
| 2,680,000 | BBB/Baa3 | Golden State Tobacco Securitization Corp., 6.75%, 6/1/39 | \$ 3,03 |
| 9,520,000 (a) | NR/Aaa | University of California, RIB, 7.651%, 5/15/38 (144A) | 10,89 |
| 9,455,000 | B+/NR | Valley Health System Hospital Revenue, 6.875%, 5/15/23 | 9,46 |
| | | | ----- |
| | | | \$ 23,39 |
| | | | ----- |
| | | Colorado - 1.9% | |
| 2,850,000 | BBB/Baa3 | Denver Health & Hospital Authority Healthcare Revenue, 6.0%, 12/1/31 | \$ 3,04 |
| 3,650,000 | CCC/B3 | Northwest Parkway Public Highway Authority, 7.125%, 6/15/41 | 3,62 |
| | | | ----- |
| | | | \$ 6,66 |
| | | | ----- |
| | | District of Columbia - 2.1% | |
| 2,700,000 | BBB/Baa3 | District of Columbia Tobacco Settlement Financing Corp., 6.5%, 5/15/33 | \$ 3,17 |
| 4,000,000 | BBB/Baa3 | District of Columbia Tobacco Settlement Financing Corp., 6.75%, 5/15/40 | 4,37 |
| | | | ----- |
| | | | \$ 7,54 |
| | | | ----- |

The accompanying notes are an integral part of these financial statements. 11

Pioneer Municipal High Income Advantage Trust

 SCHEDULE OF INVESTMENTS 9/30/06 (unaudited) (continued)

Principal
 Amount

S&P/
 Moody's
 Ratings
 (unaudited)

Florida - 5.7%

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| | | | |
|---------------|-----------|---|-----------------------------|
| \$ 1,000,000 | NR/NR | Greater Orlando Aviation Authority, 6.5%, 11/15/36 | \$ 1,039 |
| 4,500,000 | BBB-/Baa2 | Hillsborough County Florida Industrial Development Authority Pollution Control Revenue, 5.5%, 10/1/23 | 4,656 |
| 2,000,000 | NR/NR | Hillsborough County Florida Industrial Development Authority Pollution Control Revenue, 6.75%, 7/1/29 | 2,044 |
| 500,000 | BB+/NR | Miami Beach Health Facilities Authority, 5.375%, 11/15/28 | 507 |
| 1,500,000 | BB+/Ba1 | Miami Beach Health Facilities Authority, 6.7%, 11/15/19 | 1,663 |
| 10,000,000 | AAA/Aaa | Miami-Dade County Aviation Revenue, 5.0%, 10/1/37 | 10,438 |
| | | | ----- \$ 20,350 ----- |
| | | Georgia - 2.7% | |
| 4,000,000 (a) | NR/Aaa | Atlanta Georgia Water and Wastewater Revenue, RIB, 7.469%, 11/1/43 (144A) | \$ 4,539 |
| 2,250,000 | NR/NR | Brunswick & Glynn County Development Authority Revenue, 7.125%, 1/1/25 | 2,214 |
| 1,065,000 | NR/B2 | Effingham County Industrial Development Authority, 6.5%, 6/1/31 | 1,127 |
| 1,650,000 | NR/NR | Savannah Georgia Economic Development Authority Revenue, 7.4%, 1/1/34 | 1,740 |
| | | | ----- \$ 9,622 ----- |
| | | Guam - 1.6% | |
| 5,000,000 | B+/Ba3 | Northern Mariana Islands, 6.75%, 10/1/33 | \$ 5,602 |
| | | Idaho - 2.3% | |
| 2,000,000 | BBB-/Baa3 | Power County Industrial Development Corp., 6.45%, 8/1/32 | \$ 2,132 |
| 5,920,000 | BBB-/Baa3 | Power County Pollution Control Revenue, 5.625% 10/1/14 | 6,097 |
| | | | ----- \$ 8,230 ----- |

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

Pioneer Municipal High Income Advantage Trust

| Principal Amount | S&P/ Moody's Ratings (unaudited) | | Value |
|---------------------|---|---|-------|
| \$4,000,000 | NR/NR | Illinois - 4.6% Centerpoint Intermodal Center, 8.0%, | |

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| | | | |
|------------|----------|---|---------------|
| | | 6/15/23 (144A) | \$ 4,100,400 |
| 1,000,000 | NR/NR | Illinois Finance Authority Revenue, 5.1%, 8/15/31 | 1,012,170 |
| 1,000,000 | NR/NR | Illinois Finance Authority Revenue, 6.0%, 11/15/27 | 1,046,260 |
| 3,000,000 | NR/NR | Illinois Finance Authority Revenue, 6.0%, 11/15/39 | 3,117,420 |
| 1,645,000 | NR/NR | Illinois Health Facilities Authority Revenue, 5.5%, 11/15/19 | 1,658,390 |
| 1,400,000 | NR/B2 | Illinois Health Facilities Authority Revenue, 6.7%, 3/1/14 | 1,400,224 |
| 2,400,000 | NR/B2 | Illinois Health Facilities Authority Revenue, 6.75%, 3/1/24 | 2,399,856 |
| 1,500,000 | NR/NR | Illinois Health Facilities Authority Revenue, 6.9%, 11/15/33 | 1,645,530 |
| | | | ----- |
| | | | \$ 16,380,250 |
| | | | ----- |
| | | Indiana - 5.0% | |
| 10,000,000 | BBB-/Ba1 | Indiana State Development Finance Authority Revenue, 5.75%, 10/1/11 | \$ 10,380,000 |
| 5,000,000 | NR/B2 | Jasper County Industrial Economic Development Revenue, 5.6%, 4/1/29 | 5,039,500 |
| 2,315,000 | NR/NR | Vincennes Industrial Economic Development Revenue, 6.25%, 1/1/24 | 2,330,071 |
| | | | ----- |
| | | | \$ 17,749,571 |
| | | | ----- |
| | | Kentucky - 1.4% | |
| 500,000 | BB-/NR | Kentucky Economic Development Finance Authority Hospital System Revenue, 5.7%, 10/1/10 | \$ 508,955 |
| 4,400,000 | BB-/NR | Kentucky Economic Development Finance Authority Hospital System Revenue, 5.875%, 10/1/22 | 4,468,024 |
| | | | ----- |
| | | | \$ 4,976,979 |
| | | | ----- |
| | | Louisiana - 3.0% | |
| 750,000 | BBB+/NR | Opelousas Louisiana General Hospital Authority Revenue, 5.75%, 10/1/23 | \$ 797,918 |
| 9,415,000 | BBB/Baa3 | Tobacco Settlement Financing Corp., 5.875%, 5/15/39 | 9,973,874 |
| | | | ----- |
| | | | \$ 10,771,792 |
| | | | ----- |
| | | Maryland - 0.4% | |
| 1,500,000 | A/A2 | Maryland Health & Higher Educational Facilities Authority, 5.125%, 10/1/45 | \$ 1,563,930 |
| | | | ----- |

The accompanying notes are an integral part of these financial statements. 13

Pioneer Municipal High Income Advantage Trust

 SCHEDULE OF INVESTMENTS 9/30/06 (unaudited) (continued)

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| Principal Amount | S&P/ Moody's Ratings (unaudited) | | Value |
|------------------|----------------------------------|--|---------------------------------|
| \$ 1,000,000 | AAA/Aaa | Massachusetts - 9.3% Lynn Massachusetts Water & Sewer Commission General Revenue, 5.0%, 12/1/32 | \$ 1,045,890 |
| 5,000,000 | AAA/Aa2 | Massachusetts Bay Transportation Authority Revenue, 5.0%, 7/1/31 | 5,620,000 |
| 5,000,000 | AAA/Aa1 | Massachusetts Bay Transportation Authority Revenue, 5.25%, 7/1/31 | 5,811,450 |
| 2,195,000 | BBB-/Baa3 | Massachusetts Health & Educational Facilities Authority Revenue, 5.375%, 7/15/28 | 2,214,272 |
| 1,000,000 | BBB-/Baa3 | Massachusetts Health & Educational Facilities Authority Revenue, 6.35%, 7/15/32 | 1,070,340 |
| 3,520,000 (a) | NR/Aaa | Massachusetts State College Building Authority Project Revenue, RIB, 7.654%, 5/1/41 (144A) | 4,115,267 |
| 1,740,000 | BB/NR | Massachusetts State Development Finance Agency, 5.25%, 10/1/18 | 1,622,393 |
| 2,920,000 | NR/Ba2 | Massachusetts State Development Finance Agency, 6.0%, 11/1/28 | 2,974,779 |
| 4,710,000 | NR/NR | Massachusetts State Development Finance Agency, 7.1%, 7/1/32 | 4,915,686 |
| 3,475,000 (a) | NR/Aa3 | Massachusetts State Housing Finance Agency, RIB, 8.254%, 12/1/45 (144A) | 3,693,299 |
| | | | ----- \$ 33,083,376 ----- |
| 3,000,000+ | AAA/Baa3 | Michigan - 4.4% Delta County Michigan Economic Development Corp., 6.25%, 4/15/27 | \$ 3,395,970 |
| 3,000,000 | BB/NR | Macomb County Hospital Finance Authority Revenue, 5.875%, 11/15/34 | 3,170,310 |
| 4,130,000 | BB-/Ba3 | Michigan State Hospital Finance Authority Revenue, 5.5%, 8/15/23 | 4,054,091 |
| 1,000,000 | NR/NR | Michigan State Strategic Fund Solid Waste Disposal Revenue, 7.375%, 1/15/22 | 1,021,800 |
| 3,000,000 (b) | NR/NR | Wayne Charter County Michigan Special Airport Facilities Revenue, 6.0%, 12/1/29 | 1,813,380 |
| 3,405,000 (b) | NR/NR | Wayne Charter County Michigan Special Airport Facilities Revenue, 6.75%, 12/1/15 | 2,125,163 |
| | | | ----- \$ 15,580,714 ----- |

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

Pioneer Municipal High Income Advantage Trust

S&P/

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| Principal Amount | Moody's Ratings (unaudited) | | Val |
|------------------|-----------------------------|--|-----------|
| \$ 4,800,000 (b) | NR/NR | Minnesota - 0.9% Minneapolis/St. Paul Metropolitan Airports, 7.0%, 4/1/25 | \$ 3,246, |
| 1,500,000 | NR/Caa2 | Missouri - 0.9% St. Louis Industrial Development Authority Revenue, 7.2%, 12/15/28 | \$ 1,392, |
| 2,000,000 | NR/Caa2 | St. Louis Industrial Development Authority Revenue, 7.25%, 12/15/35 | 1,880, |
| | | | \$ 3,272, |
| 2,660,000 (c) | NR/NR | Montana - 0.7% Hardin Increment Industrial Infrastructure Development Revenue, 0.0%, 9/1/31 | \$ 1,592, |
| 1,000,000 | NR/NR | Two Rivers Authority, Inc., Project Revenue, 7.375%, 11/1/27 | 984, |
| | | | \$ 2,577, |
| 2,425,000 | B/NR | Nevada - 2.3% Clark County Industrial Development Revenue, 5.5%, 10/1/30 | \$ 2,424, |
| 2,500,000 | B/NR | Clark County Industrial Development Revenue, 5.9%, 11/1/32 | 2,500, |
| 1,600,000 | NR/NR | Nevada State Department of Business & Industry, 7.25%, 1/1/23 | 1,669, |
| 1,000,000 | NR/NR | Nevada State Department of Business & Industry, 7.375%, 1/1/30 | 1,046, |
| 500,000 | NR/NR | Nevada State Department of Business & Industry, 7.375%, 1/1/40 | 522, |
| | | | \$ 8,164, |
| 1,000,000 | A/NR | New Hampshire - 1.5% New Hampshire Health & Educational Facilities Authority Revenue, 5.375%, 1/1/34 | \$ 1,049, |
| 1,125,000 | NR/NR | New Hampshire Health & Educational Facilities Authority Revenue, 5.875%, 7/1/34 | 1,182, |
| 3,000,000+ | NR/NR | New Hampshire Higher Educational & Health Facilities Authority Revenue, 6.25%, 1/1/18 | 3,141, |
| | | | \$ 5,373, |

The accompanying notes are an integral part of these financial statements. 15

Pioneer Municipal High Income Advantage Trust

SCHEDULE OF INVESTMENTS 9/30/06 (unaudited) (continued)

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| Principal Amount | S&P/ Moody's Ratings (unaudited) | | Value |
|------------------|---|--|---------------|
| \$ 13,000,000 | B/Caa1 | New Jersey - 9.0% New Jersey Economic Development Authority Revenue, 6.25%, 9/15/29 | \$ 13,377,000 |
| 2,500,000 | BBB/Baa1 | New Jersey Health Care Facilities Financing Authority Revenue, 5.375%, 7/1/33 | 2,603,850 |
| 1,420,000 | CCC/B3 | New Jersey Health Care Facilities Financing Authority Revenue, 7.5%, 7/1/21 | 1,422,102 |
| 2,495,000 (a) | NR/Aaa | New Jersey State Turnpike Authority, RIB, 9.412%, 1/1/28 (144A) | 4,085,288 |
| 1,000,000 | BBB/Baa3 | Tobacco Settlement Financing Corp., 6.25%, 6/1/43 | 1,092,600 |
| 3,250,000 | BBB/Baa3 | Tobacco Settlement Financing Corp., 6.75%, 6/1/39 | 3,657,225 |
| 5,000,000 | BBB/Baa3 | Tobacco Settlement Financing Corp., 7.0%, 6/1/41 | 5,738,000 |
| | | | ----- |
| | | | \$ 31,976,065 |
| | | | ----- |
| 3,000,000 | NR/NR | New York - 10.8% Dutchess County Industrial Development Agency Revenue, 7.5%, 3/1/29 | \$ 3,305,010 |
| 5,000,000 | A/A3 | Nassau County New York Industrial Development Agency Revenue, 5.25%, 6/1/27 | 5,193,300 |
| 6,980,000 | BB-/Ba2 | New York City Industrial Development Agency, 5.25%, 12/1/32 | 6,718,250 |
| 2,000,000 | A/NR | New York City Industrial Development Agency, 5.375%, 6/1/23 | 2,095,460 |
| 2,000,000 | CCC+/Caa2 | New York City Industrial Development Agency, 6.9%, 8/1/24 | 2,000,320 |
| 3,950,000 | BB-/Ba2 | New York City Industrial Development Agency, 7.625%, 12/1/32 | 4,421,986 |
| 2,700,000 | NR/NR | New York City Industrial Development Agency, 7.8%, 1/1/16 | 2,761,209 |
| 5,000,000 | AAA/Aaa | New York State Environmental Facilities Corp., 5.0%, 6/15/33 | 5,222,600 |
| 4,500,000 | A/NR | Suffolk County New York Industrial Development Agency, 5.0%, 6/1/36 | 4,624,830 |
| 2,000,000 | NR/NR | Yonkers Industrial Development Agency Civic Facilities Revenue, 6.15%, 3/1/15 | 2,005,720 |
| | | | ----- |
| | | | \$ 38,348,685 |
| | | | ----- |

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

Pioneer Municipal High Income Advantage Trust

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| Principal Amount | S&P/ Moody's Ratings (unaudited) | | Value |
|------------------|----------------------------------|--|---------------|
| \$11,350,000 | NR/NR | North Carolina - 6.5% Charlotte North Carolina Special Facilities Revenue, 5.6%, 7/1/27 | \$ 11,352,724 |
| 7,140,000 | NR/NR | Charlotte North Carolina Special Facilities Revenue, 7.75%, 2/1/28 | 7,649,582 |
| 4,000,000 | AA+/Aa1 | North Carolina Capital Facilities Finance Agency Revenue 5.0%, 10/1/41 | 4,192,000 |
| | | | ----- |
| | | | \$ 23,194,306 |
| | | | ----- |
| | | Ohio - 2.7% | |
| 3,900,000 | B/NR | Belmont County Health System Revenue, 5.7%, 1/1/13 | \$ 3,833,349 |
| 1,000,000 | B/NR | Belmont County Health System Revenue, 5.8%, 1/1/18 | 973,340 |
| 5,000,000 | B-/Caa1 | Cleveland Airport Special Revenue, 5.375%, 9/15/27 | 4,850,100 |
| | | | ----- |
| | | | \$ 9,656,789 |
| | | | ----- |
| | | Oklahoma - 1.0% | |
| 2,180,000 | BB/NR | Jackson County Memorial Hospital Authority Revenue, 7.3%, 8/1/15 | \$ 2,191,401 |
| 1,500,000 | B/Caa2 | Tulsa Municipal Airport Transportation Revenue, 7.35%, 12/1/11 | 1,507,470 |
| | | | ----- |
| | | | \$ 3,698,871 |
| | | | ----- |
| | | Oregon - 0.7% | |
| 2,500,000 | NR/NR | Western Generation Agency Cogeneration Project Revenue, 7.125%, 1/1/21 | \$ 2,508,925 |
| | | | ----- |
| | | Pennsylvania - 6.5% | |
| 3,000,000 | B+/Ba3 | Allegheny County Hospital Development Authority Revenue, 9.25%, 11/15/22 | \$ 3,555,750 |
| 500,000 | B+/Ba3 | Allegheny County Hospital Development Authority Revenue, 9.25%, 11/15/30 | 591,630 |
| 1,000,000 | BBB-/NR | Clarion County Hospital Authority Revenue, 5.625%, 7/1/21 | 1,016,070 |
| 3,735,000 | B/NR | Columbia County Hospital Authority Revenue, 5.85%, 6/1/24 | 3,439,039 |
| 1,250,000 | BBB/Ba2 | Hazleton Health Services Authority Hospital Revenue, 6.125%, 7/1/16 | 1,250,325 |
| 3,360,000 | NR/Baa3 | Montgomery County Higher Education & Health Authority Hospital Revenue, 6.6%, 7/1/10 | 3,430,829 |
| 1,430,000 | BB+/NR | Pennsylvania Economic Development Financing Authority Revenue, 5.125%, 6/1/18 | 1,399,798 |

The accompanying notes are an integral part of these financial statements. 17

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SCHEDULE OF INVESTMENTS 9/30/06 (unaudited) (continued)

| Principal Amount | S&P/ Moody's Ratings (unaudited) | | Val |
|----------------------------|---|---|-------------|
| Pennsylvania - (continued) | | | |
| \$ 1,805,000 | BB+/NR | Pennsylvania Economic Development Financing Authority Revenue, 5.3%, 6/1/10 | \$ 1,809,4 |
| 2,330,000 | BB+/NR | Pennsylvania Economic Development Financing Authority Revenue, 5.35%, 6/1/11 | 2,336,4 |
| 2,005,000 | B-/NR | Scranton-Lackawanna Health & Welfare Authority Revenue, 6.1%, 7/1/11 | 2,009,7 |
| 2,245,000 | B-/NR | Scranton-Lackawanna Health & Welfare Authority Revenue, 6.15%, 7/1/12 | 2,251,4 |
| | | | ----- |
| | | | \$ 23,090,6 |
| Rhode Island - 3.9% | | | |
| 4,485,000 | NR/NR | Central Falls Rhode Island Detention Facilities Revenue, 7.25%, 7/15/35 | \$ 5,040,4 |
| 8,285,000 | BBB/Baa3 | Tobacco Settlement Financing Corp., 6.25%, 6/1/42 | 8,821,8 |
| | | | ----- |
| | | | \$ 13,862,3 |
| South Carolina - 5.9% | | | |
| 1,500,000 | B-/NR | Connector 2000 Association, Inc., Toll Road Revenue, 5.375%, 1/1/38 | \$ 1,341,5 |
| 1,600,000 | BBB/NR | Loris Community Hospital District, 5.625%, 1/1/29 | 1,653,8 |
| 7,140,000+ | BBB+/Baa1 | South Carolina Jobs Economic Development Authority Revenue, 6.375%, 8/1/34 | 8,268,9 |
| 860,000 | BBB+/Baa1 | South Carolina Jobs Economic Development Authority Revenue, 6.375%, 8/1/34 | 970,6 |
| 3,000,000 | NR/NR | South Carolina Jobs Economic Development Authority Revenue, 8.0%, 10/1/31 | 3,485,2 |
| 4,400,000 | BBB/Baa3 | Tobacco Settlement Revenue Management, 6.375%, 5/15/30 | 5,049,0 |
| | | | ----- |
| | | | \$ 20,769,2 |
| Tennessee - 2.5% | | | |
| 1,000,000 | BBB+/Baa2 | Johnson City Health & Educational Facilities Board Hospital Revenue, 7.5%, 7/1/33 | \$ 1,170,4 |
| 7,000,000 | NR/Baa3 | Knox County Health Educational & Housing Facilities Board Hospital Revenue, 6.5%, 4/15/31 | 7,716,6 |
| | | | ----- |
| | | | \$ 8,887,0 |

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

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Pioneer Municipal High Income Advantage Trust

| Principal Amount | S&P/ Moody's Ratings (unaudited) | | |
|------------------|----------------------------------|---|------------|
| | | Texas - 18.3% | |
| \$ 11,300,000 | CCC+/Caa2 | Alliance Airport Authority Special Facilities Revenue, 7.5%, 12/1/29 | \$ 11,463, |
| 8,650,000 | BBB-/NR | Brazos River Authority Pollution Control Revenue, 6.75%, 10/1/38 | 9,750, |
| 13,885,000 | CCC+/Caa2 | Dallas-Fort Worth International Airport Revenue, 6.0%, 11/1/14 | 13,830, |
| 10,000,000 | B-/Caa1 | Houston Texas Airport System Revenue, 6.75%, 7/1/29 | 10,642, |
| 845,000 | NR/NR | Lubbock Health Facilities Development Corp., 6.5%, 7/1/26 | 873, |
| 2,000,000 | NR/NR | Lubbock Health Facilities Development Corp., 6.625%, 7/1/36 | 2,064, |
| 7,750,000 | BBB-/Ba1 | Matagorda County Navigation District Number 1 Revenue, 5.95%, 5/1/30 | 7,993, |
| 1,885,000 (b) | NR/Ca | Panhandle Texas Regional Housing Finance, 8.125%, 3/1/31 | 1,608, |
| 5,000,000 | NR/Baa3 | Tomball Hospital Authority, 6.0%, 7/1/25 | 5,213, |
| 1,500,000 | NR/NR | Willacy County Local Government Corp., 6.0%, 3/1/09 | 1,533, |
| | | | ----- |
| | | | \$ 64,974, |
| | | | ----- |
| | | Virginia - 0.5% | |
| 1,555,000+ | AAA/NR | Pocahontas Parkway Association of Virginia Toll Road Revenue, 5.25%, 8/15/09 | \$ 1,632, |
| | | | ----- |
| | | Washington - 6.6% | |
| 10,000,000 | AAA/Aaa | Port Seattle Washington Special Facilities Revenue, 5.0%, 4/1/31 | \$ 10,285, |
| 5,500,000 (b) | NR/NR | Port Seattle Washington Special Facilities Revenue, 7.25%, 4/1/30 | 3,544, |
| 1,390,000 | BBB/Baa3 | Tobacco Settlement Authority Revenue, 6.5%, 6/1/26 | 1,526, |
| 6,960,000 (a) | NR/Aaa | Washington State Economic Development Finance Authority, RIB, 7.278%, 6/1/38 (144A) | 8,151, |
| | | | ----- |
| | | | \$ 23,507, |
| | | | ----- |

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Pioneer Municipal High Income Advantage Trust

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 SCHEDULE OF INVESTMENTS 9/30/06 (unaudited) (continued)

| Principal Amount | S&P/ Moody's Ratings (unaudited) | | Valu |
|---------------------|---|---|---------------------------------|
| \$ 1,000,000 | NR/NR | Wisconsin - 0.6% Wisconsin State Health & Educational Facilities Authority Revenue, 6.125%, 4/1/24 | \$ 1,031,81 |
| 1,000,000 | NR/NR | Wisconsin State Health & Educational Facilities Authority Revenue, 6.25%, 4/1/34 | 1,027,25 |
| | | | ----- \$ 2,059,06 |
| | | TOTAL TAX-EXEMPT OBLIGATIONS (Cost \$442,254,752) | ----- \$ 491,801,22 |
| Shares | | | |
| 1,650,911 | | TAX-EXEMPT MONEY MARKET MUTUAL FUND - 0.5% of Net Assets BlackRock Provident Institutional Municipal Fund | \$ 1,650,91 |
| | | TOTAL TAX-EXEMPT MONEY MARKET MUTUAL FUND (Cost \$1,650,911) | ----- \$ 1,650,91 |
| | | TOTAL INVESTMENTS IN SECURITIES - 138.8% (Cost \$443,905,663) (d) (e) | ----- \$ 493,452,13 |
| | | OTHER ASSETS AND LIABILITIES - 3.4% | ----- \$ 12,034,27 |
| | | PREFERRED SHARES AT REDEMPTION VALUE, INCLUDING DIVIDENDS PAYABLE - (42.2)% | ----- \$ (150,079,20 |
| | | NET ASSETS APPLICABLE TO COMMON SHAREOWNERS - 100.0% | ----- \$ 355,407,20 ===== |

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

Pioneer Municipal High Income Advantage Trust

(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, 2006, the value of these securities amounted to \$48,602,762, or 13.7% of total net assets applicable to common shareowners.

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- RIB Residual Interest Bonds.
- NR Security not rated by S&P or Moody's.
- + Prerefunded bonds have been collateralized by U.S. Treasury 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 interest rate shown is the rate at September 30, 2006.
- (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 rate at September 30, 2006.
- (d) The concentration of investments by type of obligation/market sector is as follows:

| | |
|---------------------------|--------|
| Insured | 14.1% |
| General Obligation | 1.1 |
| Revenue Bonds: | |
| Health Revenue | 25.0 |
| Airport Revenue | 16.5 |
| Tobacco Revenue | 9.4 |
| Development Revenue | 9.3 |
| Transportation Revenue | 8.1 |
| Pollution Control Revenue | 5.7 |
| Facilities Revenue | 5.2 |
| Education Revenue | 2.1 |
| Water Revenue | 1.1 |
| Housing Revenue | 1.1 |
| Other | 0.8 |
| Power Revenue | 0.5 |
| | ----- |
| | 100.0% |
| | ===== |

- (e) At September 30, 2006, the net unrealized gain on investments based on cost for federal income tax purposes of \$441,012,357 was as follows:

| | |
|--|--------------|
| Aggregate gross unrealized gain for all investments in which there is an excess of value over tax cost | \$58,405,826 |
| Aggregate gross unrealized loss for all investments in which there is an excess of tax cost over value | (5,966,045) |
| | ----- |
| Net unrealized gain | \$52,439,781 |
| | ===== |

For financial reporting purposes net unrealized gain on investments was \$49,546,475 and cost of investments aggregated \$443,905,663.

Purchases and sales of securities (excluding temporary cash investments) for

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the six months ended September 30, 2006, aggregated \$41,632,313 and \$32,275,912, respectively.

The accompanying notes are an integral part of these financial statements. 21

Pioneer Municipal High Income Advantage Trust

 STATEMENT OF ASSETS AND LIABILITIES 9/30/06 (unaudited)

| | |
|--|---------------|
| ASSETS: | |
| Investments in securities, at value (cost \$443,905,663) | \$493,452,138 |
| Cash | 79,783 |
| Receivables - | |
| Investment securities sold | 1,647,300 |
| Interest | 9,355,473 |
| Unrealized appreciation on interest rate swaps | 1,412,356 |
| Prepaid expenses | 36,662 |
| | ----- |
| Total assets | \$505,983,712 |
| | ----- |
| LIABILITIES: | |
| Payables - | |
| Investment securities purchased | \$ 120,488 |
| Due to affiliate | 250,755 |
| Administration fee | 28,954 |
| Accrued expenses | 97,105 |
| | ----- |
| Total liabilities | \$ 497,302 |
| | ----- |
| PREFERRED SHARES AT REDEMPTION VALUE: | |
| \$25,000 liquidation value per share applicable to 6,000 shares, including dividends payable of \$79,209 | \$150,079,209 |
| | ----- |
| NET ASSETS APPLICABLE TO COMMON SHAREOWNERS: | |
| Paid-in capital | \$323,671,003 |
| Undistributed net investment income | 1,512,594 |
| Accumulated net realized loss on investments and interest rate swaps | (20,735,227) |
| Net unrealized gain on investments | 49,546,475 |
| Net unrealized gain on interest rate swaps | 1,412,356 |
| | ----- |
| Net assets applicable to common shareowners | \$355,407,201 |
| | ===== |
| NET ASSET VALUE PER SHARE: | |
| No par value, (unlimited number of shares authorized) | |
| Based on \$355,407,201/22,740,627 common shares | \$ 15.63 |
| | ===== |

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

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Pioneer Municipal High Income Advantage Trust

 STATEMENT OF OPERATIONS (unaudited)

For the Six Months Ended 9/30/06

| | | |
|---|----------------|----------------|
| INVESTMENT INCOME: | | |
| Interest | | \$15,241,341 |
| | | ----- |
| EXPENSES: | | |
| Management fees | \$ 1,490,449 | |
| Administration fees and reimbursement | 236,072 | |
| Transfer agent fees and expenses | 22,273 | |
| Auction agent fees | 195,859 | |
| Custodian fees | 11,673 | |
| Registration fees | 12,079 | |
| Professional fees | 36,163 | |
| Printing expense | 9,415 | |
| Trustees' fees | 6,360 | |
| Pricing fees | 9,776 | |
| Insurance fees | 7,715 | |
| Miscellaneous | 7,181 | |
| | ----- | |
| Total expenses | | \$ 2,045,015 |
| Less management fees waived and expenses reimbursed by Pioneer Investment Management, Inc. | | (45,275) |
| | | ----- |
| Net expenses | | \$ 1,999,740 |
| | | ----- |
| Net investment income | | \$13,241,601 |
| | | ----- |
| REALIZED AND UNREALIZED GAIN (LOSS) ON INVESTMENTS AND INTEREST RATE SWAPS: | | |
| Net realized gain (loss) from: | | |
| Investments | \$ (2,005,947) | |
| Interest rate swaps | 318,246 | \$ (1,687,701) |
| | ----- | ----- |
| Change in net unrealized gain from: | | |
| Investments | \$15,045,602 | |
| Interest rate swaps | (625,004) | \$14,420,598 |
| | ----- | ----- |
| Net gain on investments and interest rate swaps | | \$12,732,897 |
| | | ----- |
| DISTRIBUTIONS TO PREFERRED SHAREOWNERS FROM NET INVESTMENT INCOME | | |
| | | \$ (2,573,203) |
| | | ----- |
| Net increase in net assets applicable to common shareowners resulting from operations | | \$23,401,295 |
| | | ===== |

The accompanying notes are an integral part of these financial statements. 23

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Pioneer Municipal High Income Advantage Trust

STATEMENTS OF CHANGES IN NET ASSETS

For the Six Months Ended 9/30/06 and the Year Ended from 3/31/06

| | Six Months Ended 9/30/06 (unaudited) | Year Ended 3/31/06 |
|---|---|--------------------------|
| FROM OPERATIONS: | | |
| Net investment income | \$ 13,241,601 | \$ 26,621,808 |
| Net realized loss on investments and interest rate swaps | (1,687,701) | (13,577,265) |
| Change in net unrealized gain on investments and interest rate swaps | 14,420,598 | 22,405,597 |
| Distributions to preferred shareowners from net investment income | (2,573,203) | (3,961,976) |
| | ----- | ----- |
| Net increase in net assets applicable to common shareowners | \$ 23,401,295 | \$ 31,488,164 |
| | ----- | ----- |
| DISTRIBUTIONS TO COMMON SHAREOWNERS FROM: | | |
| Net investment income (\$0.44 and \$0.99 per share, respectively) | \$ (10,005,875) | \$ (22,481,571) |
| | ----- | ----- |
| Total distributions to common shareowners | \$ (10,005,875) | \$ (22,481,571) |
| | ----- | ----- |
| FROM TRUST SHARE TRANSACTIONS: | | |
| Reinvestment of distributions | \$ - | \$ 630,886 |
| | ----- | ----- |
| Net increase in net assets applicable to common shareowners resulting from Trust share transactions | \$ - | \$ 630,886 |
| | ----- | ----- |
| Net increase in net assets applicable to common shareowners | \$ 13,395,420 | \$ 9,637,479 |
| NET ASSETS APPLICABLE TO COMMON SHAREOWNERS: | | |
| Beginning of period | 342,011,781 | 332,374,302 |
| | ----- | ----- |
| End of period | \$ 355,407,201 | \$ 342,011,781 |
| | ===== | ===== |
| Undistributed net investment income | \$ 1,512,594 | \$ 850,071 |
| | ----- | ----- |

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

Pioneer Municipal High Income Advantage Trust

FINANCIAL HIGHLIGHTS

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| | Six Months Ended 9/30/06 (unaudited) | Year Ended 3/31/06 | Year Ended 3/31/05 |
|---|---|--------------------------|--------------------------|
| Per Common Share Operating Performance | | | |
| Net asset value, beginning of period | \$ 15.04 | \$ 14.64 | \$ 14.51 |
| Increase (decrease) from investment operations:(a) | | | |
| Net investment income | \$ 0.58 | \$ 1.17 | \$ 1.26 |
| Net realized and unrealized gain on investments and interest rate swaps | 0.56 | 0.39 | 0.18 |
| Dividends and distributions to preferred shareowners from: | | | |
| Net investment income | (0.11) | (0.17) | (0.09) |
| Net realized gains | - | - | (0.01) |
| Net increase from investment operations | \$ 1.03 | \$ 1.39 | \$ 1.34 |
| Dividends and distributions to common shareowners from: | | | |
| Net investment income | (0.44) | (0.99) | (1.13) |
| Net realized gains | - | - | (0.09) |
| Capital charge with respect to issuance of: | | | |
| Common shares | - | - | 0.01 |
| Preferred shares | - | - | - |
| Net increase in net asset value | \$ 0.59 | \$ 0.40 | \$ 0.13 |
| Net asset value, end of period(d) | \$ 15.63 | \$ 15.04 | \$ 14.64 |
| Market value, end of period(d) | \$ 14.99 | \$ 14.99 | \$ 14.37 |
| Total return(e) | 3.02% | 11.55% | 4.07% |
| Ratios to average net assets of common shareowners | | | |
| Net expenses(f) | 1.15% (g) | 1.16% | 1.18% |
| Net investment income before preferred share dividends | 7.65% (g) | 7.88% | 8.94% |
| Preferred share dividends | 1.49% (g) | 1.17% | 0.64% |
| Net investment income available to common shareowners | 6.16% (g) | 6.71% | 8.30% |
| Portfolio turnover | 7% | 19% | 39% |
| Net assets of common shareowners, end of period (in thousands) | \$355,407 | \$342,012 | \$332,374 |
| Preferred shares outstanding (in thousands) | \$150,000 | \$150,000 | \$150,000 |
| Asset coverage per preferred share, end of period | \$ 84,248 | \$ 82,011 | \$ 80,396 |
| Average market value per preferred share | \$ 25,000 | \$ 25,000 | \$ 25,000 |
| Liquidation value, including dividends payable, per preferred share | \$ 25,013 | \$ 25,009 | \$ 25,000 |
| Ratios to average net assets of common shareowners before waivers and reimbursement of expenses | | | |
| Net expenses(f) | 1.18% (g) | 1.16% | 1.19% |
| Net investment income before preferred share dividends | 7.62% (g) | 7.88% | 8.93% |
| Preferred share dividends | 1.49% (g) | 1.17% | 0.64% |

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Net investment income available to
common shareowners

6.13%(g)

6.71%

8.29%

The accompanying notes are an integral part of these financial statements. 25

Pioneer Municipal High Income Advantage Trust

FINANCIAL HIGHLIGHTS (continued)

- (a) The per share data presented above is based upon the average common shares outstanding for the periods presented.
- (b) Trust 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) Ratios do not reflect the effect of dividend payments to preferred shareowners.
- (g) Annualized.

The information above represents the operating performance data for a share of common stock outstanding, total investment return, ratios to average net assets of common shareowners 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.

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

Pioneer Municipal High Income Advantage Trust

NOTES TO FINANCIAL STATEMENTS 9/30/06 (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 Trust may invest in municipal securities with a broad range of maturities

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and credit ratings, including both investment grade and below investment grade municipal securities.

The Trust invests in below investment grade (high-yield) municipal securities. 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.

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 period. Actual results could differ from those estimates.

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

A. Security Valuation

Security transactions are recorded as of trade date. Securities are valued at prices supplied by independent pricing services, which consider such factors as Treasury spreads, yields, maturities and ratings. Valuations may be supplemented by 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 at their fair values as determined by, or under the direction of, the Board of Trustees.

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Pioneer Municipal High Income Advantage Trust

NOTES TO FINANCIAL STATEMENTS 9/30/06 (unaudited) (continued)

At September 30, 2006, there were no securities fair valued. Temporary cash investments are valued at amortized cost.

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.

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.

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B. Federal Income Taxes

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

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

At March 31, 2006, the Trust had a capital loss carryforward of \$15,917,330, which is comprised of \$360,350, which will expire in 2013 and \$15,556,980, which will expire in 2014, if not utilized.

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Pioneer Municipal High Income Advantage Trust

 The tax character of distribution paid to common and preferred shareowners will be determined at the end of the fiscal year. Distributions during the year ended March 31, 2006 were as follows:

| | 2006 |
|--------------------------|--------------|
| Distributions paid from: | |
| Tax exempt income | \$26,443,547 |
| | ----- |
| Total | \$26,443,547 |
| | ===== |

 The following shows components of distributable earnings on a federal income tax basis at March 31, 2006.

| | 2006 |
|---------------------------------|--------------|
| Undistributed tax-exempt income | \$ 626,796 |
| Undistributed ordinary income | 224,795 |
| Capital loss carry forward | (15,917,330) |
| Dividend payable | (1,874,116) |

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| | |
|----------------------------|--------------|
| Unrealized appreciation | 38,410,829 |
| Post October loss deferred | (3,130,196) |
| | ----- |
| Total | \$18,340,778 |
| | ===== |

The difference between book basis and tax basis unrealized appreciation is primarily attributable to the difference between book and tax amortization methods for premiums and discounts on fixed income securities and accrual of income on defaulted bond interest.

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

Pioneer Municipal High Income Advantage Trust

NOTES TO FINANCIAL STATEMENTS 9/30/06 (unaudited) (continued)

"Plan Agent"), in writing prior to any dividend record date; otherwise such termination or resumption will be effective with respect to any subsequently declared dividend or other distribution. Whenever the Trust declares a dividend on common shares payable in cash, participants in the Plan will receive the equivalent in common shares acquired by the Plan Agent either (i) through receipt of additional unissued but authorized common shares from the Trust or (ii) by purchase of outstanding common shares on the New York Stock Exchange or elsewhere. If, on the payment date for any dividend, the net asset value per common share is equal to or less than the market price per share plus estimated brokerage trading fees ("market premium"), the Plan Agent will invest the dividend amount in newly issued common shares. The number of newly issued common shares to be credited to each account will be determined by dividing the dollar amount of the dividend by the net asset value per common share on the date the shares are issued, provided that the maximum discount from 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 Unicredito Italiano S.p.A. ("Unicredito Italiano"), manages the Trust's portfolio. Management fees 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. At

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Pioneer Municipal High Income Advantage Trust

September 30, 2006, \$243,516 was payable to PIM related to management fees.

In addition, under PIM's management and administration agreements, certain other services and costs are paid by PIM and reimbursed by the Trust. For the six months ended September 30, 2006, the Trust recorded \$62,186 in reimbursement and is included in "Administration fees and reimbursement" on the Statement of Operations.

The Trust has retained Princeton Administrators, LLC ("Princeton") to provide certain administrative services to the Trust on its behalf. The Trust pays Princeton a monthly fee at an annual rate of 0.07% of the average daily value of the Trust's managed assets, subject to a minimum monthly fee of \$10,000.

Also, PIM has agreed for the first three years of the Trust's investment operations to limit the Trust's total annual expenses (excluding offering costs for common and preferred shares, interest expense, the cost of defending or prosecuting any claim or litigation to which the Trust is a party (together with any amount in judgment or settlement), indemnification expense or taxes incurred due to the failure of the Trust to qualify as a regulated investment company under the Code or any other non-recurring or non-operating expenses) to 0.80% of the Trusts average daily managed assets. The dividend on any preferred shares is not an expense for this purpose. For the six months ended September 30, 2006, the expense reduction under such arrangements was \$45,275.

3. Transfer Agents

Pioneer Investment Management Shareholder Services, Inc. ("PIMSS"), a wholly owned indirect subsidiary of UniCredito Italiano, 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 is the transfer agent, registrar, dividend paying agent and redemption agent with respect to the Trust's Auction Preferred Shares ("APS"). The Trust pays Deutsche Bank Trust Company Americas an annual fee, as is agreed to from time to time by the Trust and Deutsche Bank Trust Company Americas, for providing such services.

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Pioneer Municipal High Income Advantage Trust

NOTES TO FINANCIAL STATEMENTS 9/30/06 (unaudited) (continued)

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 a 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 market 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, 2006 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.

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, 2006 were as follows:

| Counterparty | Termination Date | Notional Amount (000) | Fixed Rate | Floating Rate | Unrealized Appreciation |
|--------------|------------------|-----------------------|------------|---------------|-------------------------|
| UBS AG | April 5, 2009 | \$75,000 | 2.665% | 1 month BMA | \$1,412,356 |

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Pioneer Municipal High Income Advantage Trust

5. Trust Shares

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There are an unlimited number of common shares of beneficial interest authorized. Of the 22,740,627 common shares of beneficial interest outstanding at September 30, 2006, PIM owned 6,981 shares.

Transactions in common shares of beneficial interest for the six months ended September 30, 2006 and the year ended March 31, 2006 were as follows:

| | 9/2006 | 3/2006 |
|---|------------|------------|
| Shares outstanding at beginning of period | 22,740,627 | 22,698,047 |
| Reinvestment of distributions | - | 42,580 |
| Shares outstanding at end of period | 22,740,627 | 22,740,627 |

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, 2006, 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. Dividend rates ranged from 2.99% to 4.05% during the six months ended September 30, 2006.

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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Pioneer Municipal High Income Advantage Trust

NOTES TO FINANCIAL STATEMENTS 9/30/06 (unaudited) (continued)

The holders of APS have voting rights equal to the holders of the Trust's common shares (one vote per share) and will vote together with holders of the common shares as a single class. However, holders of APS are also entitled to elect two of the Trust's Trustees. In addition, the Investment Company Act of 1940, as amended, requires that along with approval by shareowners that might otherwise be required, the approval of the holders of a majority of any

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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

On July 13, 2006, the Financial Accounting Standards Board ("FASB") released FASB Interpretation No. 48 "Accounting for Uncertainty in Income Taxes" ("FIN 48"). FIN 48 provides guidance for how uncertain tax positions should be recognized, measured, presented and disclosed in the financial statements. FIN 48 requires the evaluation of tax positions taken or expected to be taken in the course of preparing the Trust's tax returns to determine whether the tax positions will "more-likely-than-not" be sustained by the applicable tax authority. Tax positions not deemed to meet the more-likely-than-not threshold would be recorded as a tax benefit or expense in the reporting period. Adoption of FIN 48 is required for fiscal years beginning after December 15, 2006 and is to be applied to all open tax years as of the effective date. At this time, management is evaluating the implications of FIN 48 and any impact in the financial statements has not yet been determined.

In addition, in September 2006, Statement of Financial Accounting Standards No. 157, Fair Value Measurements ("SFAS 157"), was issued and is effective for fiscal years beginning after November 15, 2007. SFAS 157 defines fair value, establishes a framework for measuring fair value and expands disclosures about fair value measurements. Management is currently evaluating the impact the adoption of SFAS 157 will have on the Trust's financial statement disclosures.

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Pioneer Municipal High Income Advantage Trust

7. Subsequent Events

Subsequent to September 30, 2006, the Board of Trustees of the Trust declared a dividend from undistributed net investment income of \$0.07 per common share payable October 31, 2006, to shareowners of record on October 17, 2006.

For the period October 1, 2006 to October 31, 2006, dividends declared on preferred shares totaled \$448,650 in aggregate for the two outstanding preferred share series.

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Pioneer Municipal High Income Advantage Trust

NOTES TO FINANCIAL STATEMENTS 9/30/06 (unaudited) (continued)

ADDITIONAL INFORMATION (unaudited)

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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 have not been approved by the shareowners. There have been no changes in the principal risk factors associated with investment in the Trust. There have been no changes in the persons who are primarily responsible for the day-to-day management of the Trust's portfolio.

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

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Pioneer Municipal High Income Advantage Trust

RESULTS OF SHAREHOLDER MEETING (unaudited)

On September 21, 2006, Pioneer Municipal High Income Advantage Trust held its annual meeting of shareowners to elect Class III trustees. All Class III Trustees were elected. Here are the detailed results of the votes.

Proposal 1 - To elect Class III Trustees.

| Nominee | Affirmative | Withheld |
|----------------------|-------------|----------|
| Mary K. Bush | 21,679,438 | 352,341 |
| Thomas J. Perna | 21,693,730 | 338,049 |
| Marguerite A. Piret+ | 5,269 | 37 |

+ Elected by Preferred Shares only

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Pioneer Municipal High Income Advantage Trust

TRUSTEES, OFFICERS AND SERVICE PROVIDERS

Trustees

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

Officers

John F. Cogan, Jr., President
Osbert M. Hood, Executive
Vice President
Vincent Nave, Treasurer
Dorothy E. Bourassa, Secretary

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John Winthrop

Investment Adviser
Pioneer Investment Management, Inc.

Custodian
Brown Brothers Harriman & Co.

Independent Registered Public Accounting Firm
Ernst & Young LLP

Legal Counsel
Wilmer Cutler Pickering Hale and Dorr LLP

Transfer Agent
Pioneer Investment Management Shareholder Services, Inc.

Shareowner Services and Sub-Transfer Agent
American Stock Transfer & Trust Company

Preferred Share Auction/Transfer Agent and Registrar
Deutsche Bank Trust Company Americas

Sub-Administrator
Princeton Administrators, LLC

Proxy Voting Policies and Procedures of the Trust are available without charge, upon request, by calling our toll free number (1-800-225-6292). Information regarding how the Trust voted proxies relating to portfolio securities during the most recent 12 months ended June 30, is publicly available to shareowners at www.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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This page for your notes.

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This page for your notes.

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This page for your notes.

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This page for your notes.

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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:

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For

General inquiries, lost dividend checks,
change of address, lost stock certifi-
cates, 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.

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

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(5) Accountability for adherence to the code.

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

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

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

Not applicable.

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

Not applicable.

(f) The registrant must:

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

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

(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.

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

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

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

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

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

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

Not applicable.

ITEM 4. PRINCIPAL ACCOUNTANT FEES AND SERVICES.

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

N/A

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

N/A

(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

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

N/A

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

PIONEER FUNDS

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

SECTION I - POLICY PURPOSE AND APPLICABILITY

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

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

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

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

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

SECTION II - POLICY

| SERVICE CATEGORY | SERVICE CATEGORY DESCRIPTION | SPECIFIC PRE-APPROVED SERVICE SUBCATEGORIES |
|-------------------|---|--|
| I. AUDIT SERVICES | Services that are directly related to performing the independent audit of the Funds | <ul style="list-style-type: none"> o Accounting research assistance o SEC consultation, registration statements, and reporting o Tax accrual related matters o Implementation of new accounting standards o Compliance letters (e.g. rating agency) |

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- letters)
- o Regulatory reviews and assistance regarding financial matters
- o Semi-annual reviews (if requested)
- o Comfort letters for closed end offerings

II.
AUDIT-RELATED
SERVICES

Services which are not prohibited under Rule 210.2-01(C)(4) (the "Rule") and are related extensions of the audit services support the audit, or use the knowledge/expertise gained from the audit procedures as a foundation to complete the project. In most cases, if the Audit-Related Services are not performed by the Audit firm, the scope of the Audit Services would likely increase. The Services are typically well-defined and governed by accounting professional standards (AICPA, SEC, etc.)

- o AICPA attest and agreed-upon procedures
- o Technology control assessments
- o Financial reporting control assessments
- o Enterprise security architecture assessment

AUDIT COMMITTEE APPROVAL POLICY

AUDIT COMMITTEE
REPORTING POLICY

- o "One-time" pre-approval for the audit period for all pre-approved specific service subcategories. Approval of the independent auditors as auditors for a Fund shall constitute pre approval for these services.

- o A summary of all such services and related fees reported at each regularly scheduled Audit Committee meeting.

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

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

- o Specific approval is needed to exceed the pre-approved dollar limit for these services (see general Audit Committee approval policy below for details on obtaining specific approvals)

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

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to add a specific service
subcategory as "pre-approved"

SECTION III - POLICY DETAIL, CONTINUED

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

| AUDIT COMMITTEE APPROVAL POLICY | AUDIT COMMITTEE REPORTING POLICY |
|--|---|
| <ul style="list-style-type: none"> o "One-time" pre-approval for the fund fiscal year within a specified dollar limit 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

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

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

SECTION III - POLICY DETAIL, CONTINUED

| SERVICE CATEGORY | SERVICE CATEGORY | SPECIFIC PROHIBITED SERVICE SUBCATEGORIES |
|------------------|------------------|---|
|------------------|------------------|---|

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DESCRIPTION

| | | |
|---------------------|--|---|
| 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 reports4. Actuarial services (i.e., setting actuarial reserves versus actuarial audit work)*5. Internal audit outsourcing services*6. Management functions or human resources7. Broker or dealer, investment advisor, or investment banking services8. Legal services and expert services unrelated to the audit9. Any other service that the Public Company Accounting Oversight Board determines, by regulation, is impermissible |
|---------------------|--|---|

AUDIT COMMITTEE APPROVAL POLICY

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

AUDIT COMMITTEE REPORTING POLICY

- 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.

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

N/A

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

N/A

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

N/A

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

N/A

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

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Item 6. Schedule of Investments.

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

Included in Item 1

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

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

N/A

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

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

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

Information not required in semi annual reports on form NCSR.

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

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

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report. Provide disclosures covering repurchases made on a monthly basis. For example, if the reporting period began on January 16 and ended on July 15, the chart would show repurchases for the months from January 16 through February 15, February 16 through March 15, March 16 through April 15, April 16 through May 15, May 16 through June 15, and June 16 through July 15.

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

Item 10. Submission of Matters to a Vote of Security Holders.

Describe any material changes to the procedures by which shareholders may recommend nominees to the registrants board of directors, where those changes were implemented after the registrant last provided disclosure in response to the requirements of Item 7(d) (2) (ii) (G) of Schedule 14A (17 CFR 240.14a-101), or this Item.

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

ITEM 11. CONTROLS AND PROCEDURES.

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

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

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

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reporting.

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

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

ITEM 12. EXHIBITS.

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

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

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

Filed herewith.

SIGNATURES

[See General Instruction F]

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

(Registrant) Pioneer Municipal High Income Advantage Trust

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

Date November 29, 2006

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

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following persons on behalf of the registrant and in the capacities and on the dates indicated.

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

Date November 29, 2006

By (Signature and Title)* /s/ Vincent Nave
Vincent Nave, Treasurer

Date November 29, 2006

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