

PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST
Form N-CSR
November 29, 2012

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

FORM N-CSR

CERTIFIED SHAREHOLDER REPORT OF REGISTERED
MANAGEMENT INVESTMENT COMPANIES

Investment Company Act file number 811-21409

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

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

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

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

Date of fiscal year end: March 31

Date of reporting period: April 1, 2012 through September 30, 2012

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

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

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ITEM 1. REPORTS TO SHAREOWNERS.

Pioneer Municipal High
Income Advantage Trust

Semiannual Report | September 30, 2012

Ticker Symbol: MAV

[LOGO] PIONEER
Investments (R)

visit us: us.pioneerinvestments.com

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Pioneer Municipal High Income Advantage Trust | Semiannual Report | 9/30/12 1

President's Letter

Dear Shareowner,

The U.S. stock market rallied sharply through the third quarter of 2012 amid a sluggish, but nonetheless growing, U.S. economy. We have been cautiously optimistic about the U.S. from the start of the year, and the economic data continue to be encouraging. The housing and auto sectors are benefitting from record-low interest rates. The climate for consumer and business credit has improved, and inflation appears to be subdued. While corporate profits slowed in the third quarter, many U.S. companies continue to have strong balance sheets and to pay attractive dividends* compared to fixed-income securities.

All of these factors contributed to gains for investors who owned riskier assets, including equities and higher-yielding corporate bonds. Year to date

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through September 30, 2012, the Standard & Poor's 500 Index returned 16.35%. In fixed income, the Bank of America Merrill Lynch High Yield Master II Index was up by 12.02% during the same period, while the Barclays Capital Aggregate Bond Index gained 3.99%. Treasury bonds, by contrast, generated a comparatively sluggish return of 1.70%, as measured by the Barclays Capital Intermediate Treasuries Index.

Despite this generally positive picture during the first nine months of 2012, investors face powerful macroeconomic challenges in the months ahead. These include the threat of a so-called "fiscal cliff" in the U.S. budget process after the November elections, the European sovereign-debt crisis, and slowing growth in both Europe and China. Investors can continue to count on market volatility tied to these factors, although we remain optimistic that the underlying economic trends are moving in the right direction.

At Pioneer, we have long advocated the benefits of staying diversified** and investing for the long term. And while diversification alone does not assure a profit or protect against loss in a declining market, we believe in actively seeking out opportunities in undervalued securities and sectors around the globe. Our advice, as always, is to work closely with a trusted financial advisor to discuss your goals and work together to develop an investment strategy that meets your individual needs. There is no single best strategy that works for every investor.

* Dividends are not guaranteed.

** Diversification does not assure a profit or protect against loss in a declining market.

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Pioneer's investment professionals focus on finding good opportunities in both equity and bond markets using the same disciplined investment approach we have used since 1928. Our strategy is to identify undervalued individual securities with the greatest potential for success, carefully weighing risk against reward. Our teams of investment professionals continually monitor and analyze the relative valuations of different sectors and securities globally to help build portfolios that we believe can help you achieve your investment goals.

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

Sincerely,

/s/ Daniel K. Kingsbury

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

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

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Portfolio Management Discussion | 9/30/12

Tax-advantaged municipal securities produced healthy returns during the six months ended September 30, 2012, as both traditional and non-traditional investors were drawn by attractive values in the municipal market when compared to the taxable market. In the following interview, David Eurkus discusses the factors that influenced the performance of Pioneer Municipal High Income Advantage Trust over the six-month period. Mr. Eurkus, senior vice president and portfolio manager at Pioneer, is responsible for the daily management of the Trust.

Q How did Pioneer Municipal High Income Advantage Trust perform during the six-month period ended September 30, 2012?

A Pioneer Municipal High Income Advantage Trust produced a total return of 9.77% at net asset value, and 12.69% at market price, during the six-month period ended September 30, 2012. During the same six-month period, the Trust's benchmarks, the Barclays Capital Municipal Bond Index and the Barclays Capital High Yield Municipal Bond Index, returned 4.24% and 8.06%, respectively. The Barclays Capital Municipal Bond Index is designed to track the performance of investment-grade municipal bonds, while the Barclays Capital High Yield Municipal Bond Index is designed to track the performance of lower-rated municipal bonds. During the same six-month period, the average return (at market price) of the 12 closed end funds in Lipper's High Yield Municipal Debt Closed End Funds category (which may or may not be leveraged) was 14.10%.

The shares of the Trust were selling at a 17.7% premium to net asset value at the end of the period.

Unlike the Trust, the two Barclays Capital municipal indices do not use leverage. While the use of leverage can increase investment opportunity, it also can increase investment risk.

On September 30, 2012, the standardized 30-day SEC yield on the Trust's shares was 3.84%.

Q How would you describe the investment environment during the six-month period ended September 30, 2012?

A The six-month period ended September 30, 2012, was a favorable one for municipal securities in general, with new money flowing into the municipal market. Inflows came from traditional investors seeking tax advantages as well as from institutional investors, such as banks and insurance companies, who were attracted by the competitive yields available from municipal

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securities compared with taxable investments. Both investment-grade and higher-yielding, below-investment-grade municipal securities produced more income, on an after-tax basis, than taxable securities of comparable quality and with similar maturities. As demand for municipal securities rose while supply remained limited, municipal bond prices increased and interest rates declined, delivering total returns that often were superior to those available in the taxable market during the six-month period. Moreover, municipal revenue bonds continued to be perceived as a relatively safe place for investors' money.

Q How was the Trust's portfolio positioned over the six-month period ended September 30, 2012, and how did the positioning affect the Trust's performance?

- A During the six-month period, we maintained our traditional emphasis on project revenue bonds within the Trust's portfolio. Project revenue bonds are secured by dedicated revenue streams from specific projects, such as hospitals or other health care institutions, or airport revenues. We focus the Trust's investments in these types of securities because of the reliability of their funding sources as compared with general obligation bonds, which do not require a dedicated revenue stream and can be more affected by credit rating downgrades or the general fiscal problems of a municipality or agency.

At the end of the period on September 30, 2012, health care continued to represent the largest allocation in the Trust's total investment portfolio, at 20.7% of invested assets, followed by insurance bonds (16.3% of invested assets) and tobacco revenue bonds (13.7% of invested assets). Other project revenue allocations in the Trust's portfolio included those in the airport and airport facilities, education, housing, pollution control, and water and sewer sectors.

As of September 30, 2012, 47.3% of the Trust's total investment portfolio was invested in securities with investment-grade credit ratings, while 52.7% of the Trust's total investment portfolio was held in high-yield securities.

We kept the Trust fully invested during the six-month period and maintained a duration positioning that was longer than that of the benchmarks. The longer-duration positioning helped the Trust to capture fully the benefits of the falling interest rates and the resulting increases in bond prices during the six-month period.

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- Q Did any particular types of investments have notable effects on the Trust's performance during the six-month period ended September 30, 2012?

- A In addition to benefiting from the portfolio's longer-duration positioning, the Trust's performance during the six-month period was aided by established positions with adequate call protection that had much higher yields than those currently available. Call protection limits the issuers' ability to call back their debt in order to refinance into lower-yielding substitutes.

The Trust's performance also benefited from strong security selection results from investments in both high-yield and investment-grade securities across a wide spectrum of sectors, with positions in the hospital and health care, transportation and education groups performing particularly well during the six-month period.

Our investment process for the Trust relies heavily on basic, fundamental research and the analysis of individual securities as well as the reliability of those securities' funding sources. We believe the success of the investment process can especially be seen in the Trust's performance results from the hospital and health care and industrial revenue groups. Notable examples of strong-performing individual securities in the Trust's portfolio during the period include: Temple University (Philadelphia) Hospital bonds; State of Pennsylvania Industrial Revenue bonds for U.S. Gypsum; and State of California general obligation bonds.

In transportation, a noteworthy contributor to the Trust's performance during the six-month period was an airport facility security backed by revenues from American Airlines. That particular investment had fallen in value prior to the start of the period after AMR, the parent company of the airline, filed for bankruptcy protection in November 2011. The bond price

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appreciated during the six-month period ended September 30, 2012, as investors recognized the secured nature of the revenue stream dedicated to the security.

Despite strong overall performance, the Trust did own a couple of underperforming securities during the period. Specifically, the Trust's holdings of St. Louis Industrial Development Authority (hotel-related revenue bonds), the performance of which suffered due to a restructuring of the debt, and Non-Profit Preferred Funding Trust (variable-rate municipal pool), whose underperformance was related to low distributions relative to other securities in the Trust's portfolio, generated negative returns during the six-month period.

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Q How did the level of leverage employed by the Trust change over the six-month period ended September 30, 2012?

A At the end of the six-month period ended September 30, 2012, 32.1% of the Trust's total managed assets were financed by leverage, compared with 33.4% of the Trust's total managed assets financed by leverage at the start of the period on April 1, 2012. The decrease was due to fluctuations in the values of securities in which the Trust had invested.

Q What is your investment outlook?

A While the capital markets face a number of issues, we think there continue to be good values and attractive opportunities available in the municipal market--both in high-yield and investment-grade securities. In the current environment, we think credit research will remain essential for investment success. That is especially true when selecting project revenue bonds, which we emphasize in the Trust's investment strategy. We believe we will see in the future the continued need for financing of essential projects, and that need should provide quality investment opportunities for those who focus on fundamental research of the strengths and financial reliability of each proposed project.

We certainly foresee many challenges ahead, including geopolitical issues in the Middle East, the continuing political debate in the U.S. over the country's national debt, levels of taxation, and discretionary spending policies, and litigation over public pension funds.

We plan to stay focused on intensive, independent research when selecting securities for the Trust's portfolio, looking at the different sectors involved in public finance and examining which areas we believe are most likely to have secure revenues, and which services are considered to be most essential. We are watching carefully for new areas of investment opportunity, which may include financing for charter schools, seaport facility expansions, toll road construction and maintenance, and energy production. We also will seek to identify which regional or national projects are unlikely to receive further support from the U.S. government.

Please refer to the Schedule of Investments on pages 13-24 for a full listing of Trust securities.

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Investments in high-yield or lower-rated securities are subject to greater-than-average risk.

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The Trust may invest in securities of issuers that are in default or that are in bankruptcy.

A portion of income may be subject to state, federal, and/or alternative minimum tax. Capital gains, if any, are subject to a capital gains tax.

When interest rates rise, the prices of fixed-income securities in the Trust will generally fall. Conversely, when interest rates fall, the prices of fixed-income securities in the Trust will generally rise.

By concentrating in municipal securities, the portfolio is more susceptible to adverse economic, political or regulatory developments than is a portfolio that invests more broadly.

Investments in the Trust are subject to possible loss due to the financial failure of the issuers of the underlying securities and the issuers' inability to meet their debt obligations.

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

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

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

These risks may increase share price volatility.

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

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

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Portfolio Summary | 9/30/12

Portfolio Diversification

(As a percentage of total investment portfolio)

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

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| | |
|---------------------------|-------|
| Health Revenue | 20.7% |
| Insured | 16.2% |
| Tobacco Revenue | 13.7% |
| Facilities Revenue | 12.6% |
| Development Revenue | 9.4% |
| Other Revenue | 8.6% |
| Airport Revenue | 6.1% |
| Education Revenue | 4.5% |
| Pollution Control Revenue | 3.8% |
| Transportation Revenue | 2.4% |
| Water Revenue | 1.9% |
| Utilities Revenue | 0.1% |

Portfolio Maturity

(As a percentage of long-term holdings)

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

| | |
|-------------|-------|
| 20+ years | 67.4% |
| 10-20 years | 28.9% |
| 7-10 years | 1.1% |
| 5-7 years | 0.8% |
| 2-5 years | 0.5% |
| 0-2 year | 1.3% |

Quality Distribution

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

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

| | |
|-----------|-------|
| AAA | 3.0% |
| AA | 17.8% |
| A | 8.0% |
| BBB | 18.5% |
| BB | 7.6% |
| B | 8.6% |
| CCC | 2.1% |
| D | 0.1% |
| Not Rated | 34.3% |

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

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

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Prices and Distributions | 9/30/12

Share Prices and Distributions

Market Value per Common Share

| | 9/30/12 | 3/31/12 |
|---------|---------|---------|
| | \$15.99 | \$14.72 |
| Premium | 17.7% | 14.4% |

Net Asset Value per Common Share

| | 9/30/12 | 3/31/12 |
|--|---------|---------|
| | \$13.59 | \$12.87 |

Distributions per Common Share

| | Net Investment Income | Short-Term Capital Gains | Long-Term Capital Gains |
|----------------|-----------------------|--------------------------|-------------------------|
| 4/1/12-9/30/12 | \$0.57 | \$-- | \$-- |

10 Largest Holdings

(As a percentage of long-term holdings)*

| | |
|---|-------|
| 1. University of California, RIB, 13.177%, 5/15/32 | 2.60% |
| 2. North Texas Tollway Authority Revenue, 5.75%, 1/1/33 | 2.41 |

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| | | |
|-----|--|------|
| 3. | Massachusetts Housing Finance Agency Revenue, 5.35%, 12/1/45 | 2.41 |
| 4. | Massachusetts Development Finance Agency Revenue, 5.75%, 1/1/42 | 2.35 |
| 5. | Lehman Municipal Trust Receipts General Obligations, 12.866%, 7/28/31 | 2.35 |
| 6. | Houston Texas Airport System Special Facilities Revenue, 6.75%, 7/1/29 | 2.23 |
| 7. | California County Tobacco Securitization Agency Revenue, 5.25%, 6/1/46 | 1.93 |
| 8. | New Jersey Transportation Trust Fund Authority Revenue, 0.0%, 12/15/27 | 1.87 |
| 9. | Tobacco Settlement Financing Corp., Revenue, 6.25%, 6/1/42 | 1.87 |
| 10. | Non-Profit Preferred Funding Trust I, 6.75%, 9/15/37 | 1.83 |

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

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Performance Update | 9/30/12

Investment Returns

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

Average Annual Total Returns
(As of March 31, 2012)

| Period | Net Asset Value (NAV) | Market Price |
|----------------------------|-----------------------|--------------|
| Life-of-Class (10/17/2003) | 7.33% | 8.74% |
| 5 Years | 6.31 | 9.59 |
| 1 Year | 16.77 | 18.00 |

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

Value of \$10,000 Investment

| | | |
|---|---------------------------------------|--|
| Pioneer Municipal High Income Advantage Trust | Barclays Capital Municipal Bond Index | Barclays Capital High Yield Municipal Bond Index |
|---|---------------------------------------|--|

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| | | | |
|------------|-----------|-----------|-----------|
| 10/31/2003 | \$ 10,000 | \$ 10,000 | \$ 10,000 |
| 9/30/2004 | \$ 9,965 | \$ 10,513 | \$ 11,043 |
| 9/30/2005 | \$ 11,335 | \$ 10,939 | \$ 12,231 |
| 9/30/2006 | \$ 12,310 | \$ 11,425 | \$ 13,544 |
| 9/30/2007 | \$ 13,392 | \$ 11,779 | \$ 13,932 |
| 9/30/2008 | \$ 9,595 | \$ 11,559 | \$ 12,533 |
| 9/30/2009 | \$ 12,443 | \$ 13,275 | \$ 13,104 |
| 9/30/2010 | \$ 15,558 | \$ 14,046 | \$ 14,694 |
| 9/30/2011 | \$ 16,720 | \$ 14,592 | \$ 15,308 |
| 9/30/2012 | \$ 21,180 | \$ 15,805 | \$ 17,571 |

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

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

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

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

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

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

Index comparison begins October 31, 2003. The Barclays Capital Municipal Bond Index is a broad measure of the municipal bond market. The Barclays Capital High Yield Municipal Bond Index totals over \$26 billion in market value and maintains over 1300 securities. Municipal bonds in this index have the following requirements: maturities of one year or greater, sub investment grade (below Baa or non-rated), fixed coupon rate, issue date later than 12/31/90, deal size over \$20 million, maturity size of at least \$3 million. Index returns are calculated monthly, assume reinvestment of dividends and, unlike Trust returns, do not reflect any fees, expenses or sales charges. The indices do not employ leverage. You cannot invest directly in the indices.

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Schedule of Investments | 9/30/12 (unaudited)

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

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| | | TAX EXEMPT OBLIGATIONS -- 139.2% of Net Assets | |
|---------------|---------|--|-------|
| 2,500,000 | B-/B2 | Alabama -- 1.6% | |
| | | Alabama Industrial Development Authority Solid Waste Disposal Revenue, 6.45%, 12/1/23 | \$ |
| 2,500,000 | NR/NR | Huntsville-Redstone Village Special Care Facilities Financing Authority, 5.5%, 1/1/43 | |
| | | | ----- |
| | | | \$ |
| ----- | | | |
| 5,000,000 | NR/NR | Arizona -- 3.3% | |
| | | Casa Grande Industrial Development Authority Hospital Revenue, 7.625%, 12/1/29 | \$ |
| 1,487,000 | NR/Baa3 | Pima County Industrial Development Authority, 6.75%, 7/1/31 | |
| 2,640,000 | NR/NR | Pima County Industrial Development Authority, 7.0%, 1/1/38 | |
| 1,000,000 | NR/NR | San Luis Facility Development Corp., 7.25%, 5/1/27 | |
| | | | ----- |
| | | | \$ |
| ----- | | | |
| 11,990,000 | CCC/NR | California -- 19.1% | |
| | | California County Tobacco Securitization Agency Revenue, 5.25%, 6/1/46 | \$ |
| 1,450,000 | NR/NR | California Enterprise Development Authority Recovery Zone Facility Revenue, 8.5%, 4/1/31 | |
| 2,425,000 | A-/A1 | California State General Obligation Various Purpose, 5.75%, 4/1/31 | |
| 4,000,000 | BB/NR | California Statewide Communities Development Authority, 7.25%, 10/1/38 (144A) | |
| 757,342 (a) | NR/NR | California Statewide Communities Development Authority Environmental Facilities Revenue, 9.0%, 12/1/38 | |
| 2,680,000 (b) | AA+/Aaa | Golden State Tobacco Securitization Corp., 6.75%, 6/1/39 | |
| 2,500,000 | NR/Ba1 | Hesperia Public Financing Authority Tax Allocation, 5.5%, 9/1/27 | |
| 8,575,000 (c) | AA-/NR | Lehman Municipal Trust Receipts General Obligation, 12.866%, 7/28/31 | |
| 3,140,000 | AA-/WR | Lehman Municipal Trust Receipts Revenue, RIB, 12.959%, 9/20/28 (144A) | |
| 1,500,000 | A-/NR | Madera Irrigation Financing Authority Water Revenue, 6.25%, 1/1/31 | |
| 1,500,000 | A-/NR | Madera Irrigation Financing Authority Water Revenue, 6.5%, 1/1/40 | |
| 2,500,000 | A-/A2 | San Jose California Airport Revenue, 5.0%, 3/1/37 | |
| 7,000,000 | B-/Caa1 | Tobacco Securitization Authority of Northern California Revenue, 5.375%, 6/1/38 | |
| 10,500,000 | AA-/NR | University of California, RIB, 13.177%, 5/15/32 | |
| | | | ----- |
| | | | \$ |
| ----- | | | |

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

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Schedule of Investments | 9/30/12 (unaudited) (continued)

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| Principal Amount USD (\$) | S&P/Moody's Ratings | | Value |
|---------------------------|---------------------|--|-------|
| \$ 1,000,000 | NR/NR | Colorado -- 0.3% Kremmling Memorial Hospital District Certificate of Participation, 7.125%, 12/1/45 | \$ |
| 7,750,000 | BBB/Baa1 | Connecticut -- 2.8% Connecticut State Development Authority Revenue, 5.75%, 11/1/37 | \$ |
| 1,000,000 | NR/NR | Hamden Connecticut Facility Revenue, 7.75%, 1/1/43 | \$ |
| 2,700,000 | BBB/Baa1 | District of Columbia -- 3.1% District of Columbia Tobacco Settlement Financing Corp., 6.5%, 5/15/33 | \$ |
| 6,825,000 | BBB/Baa1 | District of Columbia Tobacco Settlement Financing Corp., 6.75%, 5/15/40 | \$ |
| 1,500,000 | NR/NR | Florida -- 4.7% Alachua County Health Facilities Authority Revenue, 8.125%, 11/15/41 | \$ |
| 1,500,000 | NR/NR | Alachua County Health Facilities Authority Revenue, 8.125%, 11/15/46 | |
| 500,000 | NR/Ba3 | Capital Trust Agency Revenue Bonds, 7.75%, 1/1/41 | |
| 1,000,000 | NR/NR | Florida Development Finance Corp., Educational Facilities Revenue, 6.0%, 9/15/40 | |
| 2,000,000 | NR/NR | Florida Development Finance Corp., Educational Facilities Revenue, 7.625%, 6/15/41 | |
| 1,000,000 | NR/NR | Florida Development Finance Corp., Educational Facilities Revenue, 7.75%, 6/15/42 | |
| 1,980,000 | NR/NR | Hillsborough County Industrial Development Authority, 6.75%, 7/1/29 | |
| 1,000,000 (b) | NR/WR | Hillsborough County Industrial Development Authority Revenue, 8.0%, 8/15/32 | |
| 2,500,000 | A-/A2 | Miami-Dade County Florida Aviation Revenue, 5.5%, 10/1/41 | \$ |
| 5,210,000 | AA-/WR | Georgia -- 4.3% Atlanta Georgia Water and Wastewater Revenue, RIB, 12.959%, 1/30/13 (144A) | \$ |
| 1,000,000 | CCC+/NR | Clayton County Development Authority Revenue, 9.0%, 6/1/35 | |
| 900,000 | NR/NR | DeKalb County Georgia Hospital Authority Revenue, 6.0%, 9/1/30 | |
| 750,000 | NR/NR | DeKalb County Georgia Hospital Authority Revenue, 6.125%, 9/1/40 | |
| 3,360,000 | NR/NR | Fulton County Residential Care Facilities for the Elderly Authority, 7.0%, 7/1/29 | |

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

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| Principal Amount USD (\$) | S&P/Moody's Ratings | | Value |
|------------------------------|------------------------|---|-------|
| \$ 1,650,000 | NR/NR | Georgia -- (continued) Savannah Georgia Economic Development Authority Revenue, 7.4%, 1/1/34 | \$ |
| | | | \$ |
| 1,000,000 | B/NR | Guam -- 1.8% Guam Government of Department Education Certificates of Participation, 6.625%, 12/1/30 | \$ |
| 4,400,000 (b) | AA+/B2 | Northern Mariana Islands, 6.75%, 10/1/33 | \$ |
| | | | \$ |
| 2,000,000 | BBB+/Baa1 | Idaho -- 1.1% Power County Industrial Development Corp. Revenue, 6.45%, 8/1/32 | \$ |
| 1,500,000 | BBB+/Baa1 | Power County Pollution Control Revenue, 5.625%, 10/1/14 | \$ |
| | | | \$ |
| 1,000,000 | NR/Baa2 | Illinois -- 6.6% City of Country Club Hills General Obligation, 5.0%, 12/1/31 | \$ |
| 1,450,000 | A+/A1 | Illinois Finance Authority Revenue, 5.5%, 4/1/39 | |
| 1,605,000 | AA-/Aa3 | Illinois Finance Authority Revenue, 6.0%, 8/15/25 | |
| 1,000,000 (a) | NR/NR | Illinois Finance Authority Revenue, 6.0%, 11/15/27 | |
| 280,000 | BBB+/NR | Illinois Finance Authority Revenue, 6.0%, 8/15/38 | |
| 2,000,000 | AA+/Aa2 | Illinois Finance Authority Revenue, 6.0%, 8/15/39 | |
| 2,500,000 | NR/NR | Illinois Finance Authority Revenue, 6.125%, 11/15/25 | |
| 6,000,000 | NR/NR | Illinois Finance Authority Revenue, 8.25%, 5/15/45 | |
| 2,500,000 | NR/NR | Illinois Finance Authority Revenue, 8.25%, 2/15/46 | |
| 2,270,000 | NR/NR | Southwestern Illinois Development Authority Revenue, 5.625%, 11/1/26 | \$ |
| | | | \$ |
| 250,000 | NR/NR | Indiana -- 0.9% City of Carmel Indiana Nursing Home Revenue, 7.0%, 11/15/32 | \$ |
| 750,000 | NR/NR | City of Carmel Indiana Nursing Home Revenue, 7.125%, 11/15/42 | |
| 500,000 | NR/NR | City of Carmel Indiana Nursing Home Revenue, | |

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| | | |
|-----------|---------|---|
| 250,000 | NR/Baa3 | 7.125%, 11/15/47 East Chicago Indiana Exempt Facilities Revenue, 7.0%, 1/1/14 |
| 1,805,000 | NR/NR | Vincennes Industrial Economic Development Revenue, 6.25%, 1/1/24 |

\$

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

Pioneer Municipal High Income Advantage Trust | Semiannual Report | 9/30/12 15

Schedule of Investments | 9/30/12 (unaudited) (continued)

| Principal Amount USD (\$) | S&P/Moody's Ratings | | Value |
|---------------------------------|------------------------|---|-------|
| \$ 1,000,000 | NR/A2 | Kansas -- 0.3% Kansas Development Finance Authority Revenue, 5.0%, 5/15/35 | \$ |
| 4,390,000 | BB/NR | Kentucky -- 1.4% Kentucky Economic Development Finance Authority Hospital System Revenue, 5.875%, 10/1/22 | \$ |
| 5,000,000 | BBB-/Baa2 | Louisiana -- 5.9% Jefferson Parish Hospital Service Revenue, 6.375%, 7/1/41 | \$ |
| 2,500,000 | BBB-/Baa3 | Louisiana Local Government Environmental Facilities & Community Development Authority Revenue, 6.75%, 11/1/32 | |
| 6,000,000 | NR/Baa1 | Louisiana Public Facilities Authority Revenue, 5.5%, 5/15/47 | |
| 750,000 | BBB-/NR | Opelousas Louisiana General Hospital Authority Revenue, 5.75%, 10/1/23 | |
| 2,915,000 | A-/A3 | Tobacco Settlement Financing Corp. Revenue, 5.875%, 5/15/39 | \$ |
| 1,500,000 | NR/Baa3 | Maine -- 0.6% Maine Health & Higher Educational Facilities Authority Revenue, 7.5%, 7/1/32 | \$ |
| 460,000 | NR/NR | Maryland -- 1.7% Maryland Health & Higher Educational Facilities Authority Revenue, 5.25%, 1/1/27 | \$ |
| 1,250,000 | NR/NR | Maryland Health & Higher Educational Facilities Authority Revenue, 5.3%, 1/1/37 | |
| 1,250,000 | NR/Baa3 | Maryland Health & Higher Educational Facilities Authority Revenue, 5.75%, 7/1/38 | |
| 2,000,000 | NR/NR | Maryland Health & Higher Educational Facilities Authority Revenue, 6.25%, 1/1/45 | |

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| Amount | Ratings | Description | Value |
|-----------|-----------|--|-------|
| 675,000 | BB/NR | Massachusetts -- 9.5% Massachusetts Development Finance Agency Revenue, 5.25%, 10/1/18 | \$ |
| 8,000,000 | A/WR | Massachusetts Development Finance Agency Revenue, 5.75%, 1/1/42 | |
| 1,845,000 | NR/NR | Massachusetts Development Finance Agency Revenue, 7.1%, 7/1/32 | |
| 2,195,000 | BBB-/Baa3 | Massachusetts Health & Educational Facilities Authority Revenue, 5.375%, 7/15/28 | |
| 2,000,000 | AAA/Aaa | Massachusetts Health & Educational Facilities Authority Revenue, 5.5%, 7/1/32 | |
| 1,000,000 | NR/Baa2 | Massachusetts Health & Educational Facilities Authority Revenue, 6.0%, 10/1/23 | |

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

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| Principal Amount USD (\$) | S&P/Moody's Ratings | Description | Value |
|---------------------------|---------------------|---|-------|
| \$ 3,420,000 (a) | NR/NR | Massachusetts -- (continued) Massachusetts Health & Educational Facilities Authority Revenue, 6.5%, 1/15/38 | \$ |
| 10,760,000 | AA-/Aa3 | Massachusetts Housing Finance Agency Revenue, 5.35%, 12/1/45 | \$ |
| 2,000,000 | NR/Ba1 | Michigan -- 1.7% Flint Michigan Hospital Building Authority Revenue, 7.375%, 7/1/35 | \$ |
| 2,235,000 | BB+/NR | Kent Hospital Finance Authority Revenue, 6.25%, 7/1/40 | |
| 725,000 | NR/NR | Michigan Public Educational Facilities Authority Revenue, 7.0%, 10/1/36 | \$ |
| 1,000,000 | NR/NR | Minnesota -- 0.4% Port Authority of the City of Bloomington, Minnesota Recovery Zone Facility Revenue, 9.0%, 12/1/35 | \$ |
| 1,000,000 | NR/NR | Missouri -- 1.1% Kansas City Tax Increment Financing Commission Tax Increment Revenue, 6.5%, 6/1/25 | \$ |
| 1,500,000 (a) (d) | NR/Ca | St. Louis Industrial Development Authority Revenue, 7.2%, 12/15/28 | |
| 6,640,000 (a) (d) | NR/Ca | St. Louis Industrial Development Authority Revenue, 7.25%, 12/15/35 | |

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| Principal Amount USD (\$) | S&P/Moody's Ratings | Description | Value |
|---------------------------|---------------------|---|-------|
| 2,445,000 (e) | NR/NR | Montana -- 0.7% Hardin Increment Industrial Infrastructure Development Revenue, 0.0%, 9/1/31 | \$ |
| 1,000,000 (a) (d) | NR/NR | Two Rivers Authority Inc., Project Revenue, 7.375%, 11/1/27 | \$ |
| 1,600,000 (a) (d) | NR/NR | Nevada -- 1.5% Director of the State of Nevada Department of Business & Industry Transportation Revenue, 7.25%, 1/1/23 | \$ |
| 1,000,000 (a) | NR/NR | Director of the State of Nevada Department of Business & Industry Transportation Revenue, 7.375%, 1/1/30 | \$ |
| 1,320,000 (a) (d) | NR/NR | Director of the State of Nevada Department of Business & Industry Transportation Revenue, 7.375%, 1/1/40 | \$ |
| 4,500,000 | A-/A3 | Reno Nevada Hospital Revenue, 5.25%, 6/1/41 | \$ |

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

Pioneer Municipal High Income Advantage Trust | Semiannual Report | 9/30/12 17

Schedule of Investments | 9/30/12 (unaudited) (continued)

| Principal Amount USD (\$) | S&P/Moody's Ratings | Description | Value |
|---------------------------|---------------------|--|-------|
| \$ 1,125,000 | NR/NR | New Hampshire -- 0.4% New Hampshire Health & Education Facilities Authority Revenue, 5.875%, 7/1/34 | \$ |
| 2,500,000 | NR/NR | New Jersey -- 12.0% Burlington County New Jersey Bridge Commission Revenue, 5.625%, 1/1/38 | \$ |
| 1,500,000 | NR/NR | New Jersey Economic Development Authority Revenue, 10.5%, 6/1/32 (144A) | \$ |
| 7,500,000 | B-/B3 | New Jersey Economic Development Authority Revenue, 5.75%, 9/15/27 | \$ |
| 3,500,000 (d) | AA-/WR | New Jersey State Turnpike Authority Transportation Revenue, RIB, 13.555%, 7/1/23 (144A) | \$ |
| 15,375,000 (e) | AA+/Aa1 | New Jersey Transportation Trust Fund Authority Revenue, 0.0%, 12/15/27 | \$ |
| 2,000,000 | B-/B1 | Tobacco Settlement Financing Corp., Revenue, 4.625%, 6/1/26 | \$ |
| 1,000,000 (b) | AA+/Aaa | Tobacco Settlement Financing Corp., Revenue, 6.25%, 6/1/43 | \$ |
| 3,250,000 (b) | AA+/Aaa | Tobacco Settlement Financing Corp., Revenue, 6.75%, 6/1/39 | \$ |

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| | | | |
|---------------|---------|--|----|
| 5,000,000 (b) | AA+/Aaa | Tobacco Settlement Financing Corp., Revenue, 7.0%, 6/1/41 | \$ |
| 1,730,000 | NR/NR | New York -- 8.2% Dutchess County Industrial Development Agency Revenue, 7.5%, 3/1/29 | \$ |
| 7,000,000 | BB/B2 | New York City Industrial Development Agency Revenue, 5.25%, 12/1/32 | |
| 3,950,000 | BB/B2 | New York City Industrial Development Agency Revenue, 7.625%, 12/1/32 | |
| 5,000,000 | AAA/Aaa | New York State Dormitory Authority Revenue, 5.0%, 10/1/41 | |
| 2,000,000 | NR/Ba1 | New York State Dormitory Authority Revenue, 6.125%, 12/1/29 | |
| 5,000,000 | AAA/Aaa | New York State Environmental Facilities Corp. Water Revenue, 5.0%, 6/15/33 | \$ |
| 5,010,000 | NR/NR | North Carolina -- 1.6% Charlotte North Carolina Special Facilities Revenue, 7.75%, 2/1/28 | \$ |
| 1,500,000 | NR/NR | Ohio -- 1.8% Adams County Hospital Facilities Revenue, 6.5%, 9/1/36 | \$ |
| 5,000,000 | B-/B3 | Buckeye Tobacco Settlement Financing Authority Revenue, 6.5%, 6/1/47 | \$ |

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

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| Principal Amount USD (\$) | S&P/Moody's Ratings | | Value |
|---------------------------|---------------------|---|-------|
| \$ 2,220,000 (a) | NR/WR | Oklahoma -- 1.8% Tulsa Municipal Airport Trust Revenue, 6.25%, 6/1/20 | \$ |
| 3,000,000 (a) (c) | NR/WR | Tulsa Municipal Airport Trust Revenue, 7.75%, 6/1/35 | \$ |
| 2,000,000 | A-/NR | Oregon -- 0.7% Oregon State Facilities Authority Revenue, 5.25%, 10/1/40 | \$ |
| 2,000,000 | BBB-/Ba1 | Pennsylvania -- 4.1% Pennsylvania Economic Development Financing | |

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| | | | |
|---------------|-----------|---|-------------|
| 1,000,000 | BB/NR | Authority Revenue, 4.625%, 12/1/18 Pennsylvania Economic Development Financing Authority Revenue, 5.125%, 6/1/18 | \$ |
| 5,000,000 | B-/Caa2 | Pennsylvania Economic Development Financing Authority Solid Waste Disposal Revenue, 6.0%, 6/1/31 | |
| 5,000,000 | BBB-/Ba1 | Philadelphia Hospitals & Higher Education Facilities Authority Revenue, 5.0%, 7/1/34 | |
| | | | ----- \$ |
| ----- | | | |
| 1,385,000 (d) | NR/NR | Rhode Island -- 3.6% Central Falls Rhode Island Detention Facility Corp. Revenue, 7.25%, 7/15/35 | \$ |
| 1,500,000 | NR/NR | Rhode Island Health & Educational Building Corp., Revenue, 8.375%, 1/1/46 | |
| 8,285,000 | BB/Ba1 | Tobacco Settlement Financing Corp. Revenue, 6.25%, 6/1/42 | |
| | | | ----- \$ |
| ----- | | | |
| 8,000,000 (b) | BBB+/Baa1 | South Carolina -- 4.7% South Carolina Jobs Economic Development Authority Revenue, 6.375%, 8/1/34 | \$ |
| 4,400,000 (f) | BBB/WR | Tobacco Settlement Revenue Management Authority, 6.375%, 5/15/30 | |
| | | | ----- \$ |
| ----- | | | |
| 5,000,000 | BBB+/Baa1 | Tennessee -- 2.9% Johnson City Health & Educational Facilities Board Hospital Revenue, 6.5%, 7/1/38 | \$ |
| 3,000,000 | BBB+/NR | Sullivan County Health, Educational & Housing Facilities Board Revenue, 5.25%, 9/1/36 | |
| | | | ----- \$ |
| ----- | | | |
| 2,400,000 | BB+/Ba1 | Texas -- 15.0% Central Texas Regional Mobility Authority Revenue, 6.75%, 1/1/41 | \$ |

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

Pioneer Municipal High Income Advantage Trust | Semiannual Report | 9/30/12 19

Schedule of Investments | 9/30/12 (unaudited) (continued)

| Principal Amount USD (\$) | S&P/Moody's Ratings | | Value |
|------------------------------|------------------------|--|-------|
| ----- | | | |
| \$ 2,663,453 (a) (d) | NR/NR | Texas -- (continued) Gulf Coast Industrial Development Authority Revenue, 7.0%, 12/1/36 | \$ |
| 10,000,000 | B-/B3 | Houston Texas Airport System Special Facilities Revenue, 6.75%, 7/1/29 | |

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| | | |
|-------------------|---------|---|
| 595,000 | NR/NR | IAH Public Facility Corp., Facilities Revenue, Series 2006, 6.0%, 5/1/16 |
| 1,000,000 | NR/NR | IAH Public Facility Corp., Facilities Revenue, Series 2006, 6.0%, 5/1/21 |
| 1,350,000 | NR/NR | IAH Public Facility Corp., Facilities Revenue, Series 2006, 6.125%, 5/1/26 |
| 3,000,000 | NR/NR | Jefferson County Industrial Development Corp., Revenue, 8.25%, 7/1/32 |
| 2,240,000 | AA-/Aa3 | Lower Colorado River Authority Power Revenue, 5.0%, 5/15/31 |
| 845,000 | NR/NR | Lubbock Health Facilities Development Corp., Nursing Home Revenue, 6.5%, 7/1/26 |
| 2,000,000 | NR/NR | Lubbock Health Facilities Development Corp., Nursing Home Revenue, 6.625%, 7/1/36 |
| 9,750,000 | BBB+/A3 | North Texas Tollway Authority Revenue, 5.75%, 1/1/33 |
| 1,711,000 | NR/Aaa | Panhandle Regional Housing Finance Corp., Multifamily Housing Revenue, 6.6%, 7/20/31 |
| 1,500,000 | NR/NR | Red River Health Facilities Development Corp., Revenue, 8.0%, 11/15/41 |
| 1,000,000 | A+/A1 | Richardson Hospital Authority Revenue, 6.0%, 12/1/34 |
| 3,000,000 | NR/NR | Sanger Industrial Development Corp., Revenue, 8.0%, 7/1/38 |
| 1,000,000 | NR/NR | Tarrant County Cultural Education Facilities Finance Corp., Revenue, 8.125%, 11/15/39 |
| 1,500,000 | NR/NR | Tarrant County Cultural Education Facilities Finance Corp., Revenue, 8.25%, 11/15/44 |
| 1,000,000 (a) (d) | D/NR | Texas Midwest Public Facility Corp., Revenue, 9.0%, 10/1/30 |
| 2,500,000 | NR/NR | Travis County Health Facilities Development Corp. Revenue, 7.125%, 1/1/46 |

\$

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

\$

| | | |
|-----------|---------|--|
| 1,125,000 | BBB/A3 | Washington -- 3.8% Tobacco Settlement Authority Revenue, 6.5%, 6/1/26 |
| 1,500,000 | NR/Baa3 | Washington State Health Care Facilities Authority Revenue, 5.5%, 12/1/39 |

\$

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

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

| | | | |
|--------------|----------|---|----|
| \$ 2,000,000 | BBB/Baa2 | Washington -- (continued) Washington State Health Care Facilities Authority Revenue, 6.125%, 8/15/37 | \$ |
|--------------|----------|---|----|

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| | | | |
|--------------------|----------|---|----|
| 2,000,000 | BBB/Baa2 | Washington State Health Care Facilities Authority Revenue, 6.25%, 8/15/42 | |
| 5,000,000 | NR/NR | Washington State Housing Finance Committee Nonprofit Revenue, 5.625%, 1/1/27 | |
| | | | \$ |
| 750,000 | NR/NR | West Virginia -- 0.3% West Virginia Hospital Finance Authority Hospital Revenue Bonds, 9.125%, 10/1/41 | \$ |
| 2,900,000 (g) | NR/NR | Wisconsin -- 3.1% Aztalan Township, 7.5%, 5/1/18 | \$ |
| 2,500,000 | NR/NR | Wisconsin Public Finance Authority Continuing Care Retirement Community Revenue, 8.25%, 6/1/46 | |
| 1,000,000 (b) | NR/NR | Wisconsin State Health & Educational Facilities Authority Revenue, 6.125%, 4/1/24 | |
| 1,000,000 (b) | NR/NR | Wisconsin State Health & Educational Facilities Authority Revenue, 6.25%, 4/1/34 | |
| 1,500,000 | A+/A1 | Wisconsin State Health & Educational Facilities Authority Revenue, 6.625%, 2/15/39 | |
| 1,500,000 | NR/NR | Wisconsin State Public Finance Authority Revenue, 8.375%, 6/1/20 | |
| 1,500,000 | NR/NR | Wisconsin State Public Finance Authority Revenue, 8.625%, 6/1/47 | |
| | | | \$ |
| | | TOTAL TAX EXEMPT OBLIGATIONS (Cost \$397,566,309) | \$ |
| 13,000,000 (c) (d) | NR/NR | MUNICIPAL COLLATERALIZED DEBT OBLIGATION -- 2.6% of Net Assets Non-Profit Preferred Funding Trust I, 6.75%, 9/15/37 (144A) | \$ |
| | | TOTAL MUNICIPAL COLLATERALIZED DEBT OBLIGATION (Cost \$13,000,000) | \$ |
| 2,600,000 | NR/NR | TAX EXEMPT MONEY MARKET MUTUAL FUND -- 0.8% of Net Assets BlackRock Liquidity Funds MuniFund Portfolio | \$ |
| | | TOTAL TAX EXEMPT MONEY MARKET MUTUAL FUND (Cost \$2,600,000) | \$ |

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

Pioneer Municipal High Income Advantage Trust | Semiannual Report | 9/30/12 21

Schedule of Investments | 9/30/12 (unaudited) (continued)

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| Principal Amount USD (\$) | S&P/Moody's Ratings | | Value |
|------------------------------|------------------------|---|-------|
| | | TOTAL INVESTMENTS IN SECURITIES -- 142.6% (Cost \$413,166,309) (h) (i) | \$ |
| | | OTHER ASSETS AND LIABILITIES -- 4.7% | \$ |
| | | PREFERRED SHARES AT REDEMPTION VALUE, INCLUDING DIVIDENDS PAYABLE -- (47.3)% | \$ |
| | | NET ASSETS APPLICABLE TO COMMON SHAREOWNERS --100.0% | \$ |

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

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

(144A) Security is exempt from registration under Rule 144A of the Securities Act of 1933. Such securities may be resold normally to qualified institutional buyers in a transaction exempt from registration. At September 30, 2012, the value of these securities amounted to \$30,250,775, or 9.5% of total net assets applicable to common shareowners.

RIB Residual Interest Bonds. The interest rate is subject to change periodically and inversely based upon prevailing market rates. The interest rate shown is the rate September 30, 2012.

(a) Security is in default and is non-income producing.

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

(c) The interest rate is subject to change periodically. The interest is shown is the rate at September 30, 2012.

(d) Indicates a security that has been deemed as illiquid. The aggregate cost of illiquid securities is \$29,084,559. The aggregate fair value of \$12,425,114 represents 3.9% of total net assets applicable to common shareowners.

(e) Security issued with a zero coupon. Income is recognized through accretion of discount.

(f) Escrow to maturity.

(g) Security is valued using fair value methods.

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

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(h) The concentration of investments by type of obligation/ market sector

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is as follows:

| | |
|---------------------------|--------|
| Insured | |
| FSA | 6.1% |
| FSA-CR | 2.3 |
| AMBAC GO OF INSTN | 2.3 |
| BHAC-CR MBIA | 1.9 |
| AMBAC | 1.0 |
| GO OF INSTN | 0.6 |
| AGM | 0.5 |
| XLCA | 0.5 |
| GNMA COLL | 0.4 |
| ASSURED GTY | 0.4 |
| NATL-RE | 0.2 |
| Revenue Bonds: | |
| Health Revenue | 20.7 |
| Tobacco Revenue | 13.7 |
| Facilities Revenue | 12.6 |
| Development Revenue | 9.4 |
| Other Revenue | 8.6 |
| Airport Revenue | 6.1 |
| Education Revenue | 4.5 |
| Pollution Control Revenue | 3.8 |
| Transportation Revenue | 2.4 |
| Water Revenue | 1.9 |
| Utilities Revenue | 0.1 |
| | ----- |
| | 100.0% |
| | ===== |

- (i) At September 30, 2012, the net unrealized gain on investments based on cost for federal tax purposes of \$412,818,326 was as follows:

| | |
|--|-------------|
| Aggregate gross unrealized gain for all investments in which there is an excess of value over tax cost | \$ 60,685,7 |
| Aggregate gross unrealized loss for all investments in which there is an excess of tax cost over value | (21,267,1 |
| | ----- |
| Net unrealized gain | \$ 39,418,6 |
| | ===== |

For financial reporting purposes net unrealized gain on investments was \$39,150,672 and cost of investments aggregated \$413,166,309.

Purchases and sales of securities (excluding temporary cash investments) for the six months ended September 30, 2012 aggregated \$28,076,435 and \$12,280,594, respectively.

Principal amounts are denominated in U.S. dollars unless otherwise noted.

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

Pioneer Municipal High Income Advantage Trust | Semiannual Report | 9/30/12 23

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Schedule of Investments | 9/30/12 (unaudited) (continued)

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

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

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

The following is a summary of the inputs used as of September 30, 2012, in valuing the Trust's investments.

| | Level 1 | Level 2 | Level 3 | Total |
|--|---------------------|-----------------------|--------------|-----------------------|
| Tax exempt obligations | \$ -- | \$ 441,506,831 | \$ -- | \$ 441,506,831 |
| Municipal collateralized debt obligation | -- | 8,210,150 | -- | 8,210,150 |
| Tax exempt money market mutual fund | 2,600,000 | -- | -- | 2,600,000 |
| Total | \$ 2,600,000 | \$ 449,716,981 | \$ -- | \$ 452,316,981 |

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

| | Balance as of 3/31/12 | Realized gain (loss) | Change in Unrealized appreciation (depreciation) | Purchases | Sales | Accrued discounts/premiums | Transfers in to Level 3* |
|------------------------|-----------------------|----------------------|--|--------------|--------------|----------------------------|--------------------------|
| Tax exempt obligations | \$ -- | \$ -- | \$ -- | \$ -- | \$ -- | \$ -- | \$ -- |
| Total | \$ -- | \$ -- | \$ -- | \$ -- | \$ -- | \$ -- | \$ -- |

* Transfers are calculated on the end of period value.

** Azatlan Township is fair valued at \$0.

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

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Statement of Assets and Liabilities | 9/30/12 (unaudited)

ASSETS:

| | |
|--|------------|
| Investments in securities, at value (cost \$413,166,309) | \$ 452,316 |
| Cash | 2,243 |
| Receivables for -- | |
| Investment securities sold | 3,000 |
| Interest receivable | 8,437 |
| Reinvestment of distributions | 158 |
| Prepaid expenses | 22 |
| Other assets | 1,524 |

| | |
|--------------|------------|
| Total assets | \$ 467,702 |
|--------------|------------|

LIABILITIES:

| | |
|--------------------|--------|
| Due to affiliates | \$ 220 |
| Administration fee | 73 |
| Accrued expenses | 192 |
| Other liabilities | 4 |

| | |
|-------------------|--------|
| Total liabilities | \$ 492 |
|-------------------|--------|

PREFERRED SHARES AT REDEMPTION VALUE:

| | |
|--|------------|
| \$25,000 liquidation value per share applicable to 6,000 shares, including dividends payable of \$8,301 | \$ 150,008 |
|--|------------|

NET ASSETS APPLICABLE TO COMMON SHAREOWNERS:

| | |
|--|------------|
| Paid-in capital | \$ 331,728 |
| Undistributed net investment income | 6,526 |
| Accumulated net realized loss on investments | (60,203) |
| Net unrealized gain on investments | 39,150 |

| | |
|---|------------|
| Net assets applicable to common shareowners | \$ 317,202 |
|---|------------|

NET ASSET VALUE PER COMMON SHARE:

| | |
|--|------|
| No par value (unlimited number of shares authorized) | |
| Based on \$317,202,037/23,345,818 common shares | \$ 1 |

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

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Statement of Operations (unaudited)

For the Six Months Ended 9/30/12

INVESTMENT INCOME:

| | |
|----------|-----------|
| Interest | \$ 12,944 |
|----------|-----------|

EXPENSES:

| | |
|----------------------------------|--------------|
| Management fees | \$ 1,382,372 |
| Administration fees | 100,227 |
| Transfer agent fees and expenses | 9,174 |

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| | | |
|--|---------------|-----------|
| Shareowner communication expenses | 7,236 | |
| Auction agent fees | 186,536 | |
| Custodian fees | 4,147 | |
| Registration fees | 12,180 | |
| Professional fees | 167,996 | |
| Printing expenses | 14,219 | |
| Trustees' fees | 8,464 | |
| Pricing fees | 15,105 | |
| Miscellaneous | 39,142 | |
| <hr/> | | |
| Total expenses | | \$ 1,946 |
| <hr/> | | |
| Net investment income | | \$ 10,997 |
| <hr/> | | |
| REALIZED AND UNREALIZED GAIN (LOSS) ON INVESTMENTS: | | |
| Net realized gain from investments | \$ 572,608 | |
| Change in net unrealized gain from investments | \$ 18,240,160 | |
| <hr/> | | |
| Net gain on investments | | \$ 18,812 |
| <hr/> | | |
| DISTRIBUTIONS TO PREFERRED SHAREOWNERS FROM NET INVESTMENT INCOME: | | |
| | | \$ (242) |
| <hr/> | | |
| Net increase in net assets applicable to common shareowners resulting from operations | | \$ 29,567 |
| <hr/> | | |

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

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Statements of Changes in Net Assets

| | Six Months Ended 9/30/12 (unaudited) | Year Ended 3/31/12 |
|--|---|-----------------------|
| <hr/> | | |
| FROM OPERATIONS: | | |
| Net investment income | \$ 10,997,891 | \$ 25,127 |
| Net realized gain (loss) on investments | 572,608 | (5,391) |
| Change in net unrealized gain (loss) on investments | 18,240,160 | 41,794 |
| Distributions to preferred shareowners from net investment income | (242,936) | (417) |
| <hr/> | | |
| Net increase in net assets applicable to common shareowners resulting from operations | \$ 29,567,723 | \$ 61,114 |
| <hr/> | | |
| DISTRIBUTIONS TO COMMON SHAREOWNERS: | | |
| Net investment income (\$0.57 and \$1.31 per share, respectively) | \$ (13,285,744) | \$ (30,307) |
| <hr/> | | |
| Total distributions to common shareowners | \$ (13,285,744) | \$ (30,307) |
| <hr/> | | |
| FROM TRUST SHARE TRANSACTIONS: | | |
| Conversion | \$ 351,771 | \$ |
| Reinvestment of distributions | \$ 931,061 | \$ 1,961 |

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| | | |
|---|----------------|------------|
| Net increase in net assets applicable to common shareowners from Trust share transactions | \$ 1,282,832 | \$ 1,961 |
| Net increase in net assets applicable to common shareowners | \$ 17,564,811 | \$ 32,767 |
| NET ASSETS APPLICABLE TO COMMON SHAREOWNERS: | | |
| Beginning of period | 299,637,226 | 266,869 |
| End of period | \$ 317,202,037 | \$ 299,637 |
| Undistributed net investment income | \$ 6,526,374 | \$ 9,057 |

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

Pioneer Municipal High Income Advantage Trust | Semiannual Report | 9/30/12 27

Financial Highlights

| | Six Months Ended 9/30/12 (unaudited) | Year Ended 3/31/12 | Year Ended 3/31/11 | Year Ended 3/31/10 |
|---|---|--------------------------|--------------------------|--------------------------|
| Per Share Operating Performance | | | | |
| Net asset value, beginning of period | \$12.87 | \$11.54 | \$ 12.24 | \$ 9.00 |
| Increase (decrease) from investment operations:(a) | | | | |
| Net investment income | \$ 0.47 | \$ 1.08 | \$ 1.18 | \$ 1.00 |
| Net realized and unrealized gain (loss) on investments and interests rate swaps | 0.83 | 1.58 | (0.79) | 2.00 |
| Distributions to preferred shareowners from: | | | | |
| Net investment income | (0.01) | (0.02) | (0.03) | (0.00) |
| Net increase (decrease) from investment operations | \$ 1.29 | \$ 2.64 | \$ 0.36 | \$ 3.00 |
| Distributions to common shareowners from: | | | | |
| Net investment income | (0.57) | (1.31) | (1.06) | (0.00) |
| Net increase (decrease) in net asset value | \$ 0.72 | \$ 1.33 | \$ (0.70) | \$ 3.00 |
| Net asset value, end of period(b) | \$13.59 | \$12.87 | \$ 11.54 | \$12.00 |
| Market value, end of period(b) | \$15.99 | \$14.72 | \$ 12.64 | \$13.00 |
| Total return at market value(c) | 12.69% | 28.48% | 4.97% | 57.00% |
| Ratios to average net assets of common shareowners: | | | | |
| Net expenses (d) | 1.25%(e) | 1.36% | 1.35% | 1.00% |
| Net investment income before preferred share distributions | 7.09%(e) | 8.73% | 9.54% | 10.00% |
| Preferred share distributions | 0.16%(e) | 0.15% | 0.25% | 0.00% |
| Net investment income available to common shareowners | 6.93%(e) | 8.58% | 9.29% | 10.00% |
| Portfolio turnover | 3% | 15% | 10% | |

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

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| | Six Months Ended 9/30/12 (unaudited) | Year Ended 3/31/12 | Year Ended 3/31/11 |
|---|---|--------------------------|--------------------------|
| Net assets of common shareowners, end of period (in thousands) | \$317,202 | \$299,637 | \$266,870 |
| Preferred shares outstanding (in thousands) | \$150,008 | \$150,000 | \$150,000 |
| Asset coverage per preferred share, end of period | \$ 77,870 | \$ 74,941 | \$ 69,479 |
| Average market value per preferred share (f) | \$ 25,001 | \$ 25,000 | \$ 25,000 |
| Liquidation value, including dividends payable, per preferred share | \$ 25,003 | \$ 25,001 | \$ 25,001 |
| Ratios to average net assets of common shareowners before waivers and reimbursement of expenses | | | |
| Net expenses (d) | 1.25% (e) | 1.36% | 1.35% |
| Net investment income before preferred share distributions | 7.09% (e) | 8.73% | 9.54% |
| Preferred share distributions | 0.16% (e) | 0.15% | 0.25% |
| Net investment income available to common shareowners | 6.93% (e) | 8.58% | 9.29% |

- (a) The per common share data presented above is based upon the average common shares outstanding for the periods presented.
- (b) Net asset value and market value are published in Barron's on Saturday, The Wall Street Journal on Monday and The New York Times on Monday and Saturday.
- (c) Total investment return is calculated assuming a purchase of common shares at the current market value on the first day and a sale at the current market value on the last day of the periods reported. Dividends and distributions, if any, are assumed for purposes of this calculation to be reinvested at prices obtained under the Trust's dividend reinvestment plan. Total investment return does not reflect brokerage commissions. Past performance is not a guarantee of future results.
- (d) Expense ratios do not reflect the effect of distribution payments to preferred shareowners.
- (e) Annualized.
- (f) Market value is redemption value without an active market.

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

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

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Notes to Financial Statements | 9/30/12 (unaudited)

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1. Organization and Significant Accounting Policies

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

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

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Securities for which independent pricing services are unable to supply prices or for which market prices and/or quotations are not readily available or are considered to be unreliable are valued using fair value methods pursuant to procedures adopted by the Board of Trustees. The Trust may use fair value methods if it is determined that a significant event has occurred after the close of the exchange or market on which the security trades and prior to the determination of the Trust's net asset value. Examples of a significant event might include political or economic news, corporate restructurings, natural disasters, terrorist activity or trading halts. Thus, the valuation of the Trust's securities may differ from exchange prices.

At September 30, 2012, one security was valued using fair value methods (in addition to securities valued using prices supplied by independent pricing services) representing 0.0% of net assets. Inputs used when applying fair value methods to value a security may include credit ratings, the financial condition of the company, current market conditions and comparable securities.

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

Dividend income is recorded on the ex-dividend date, except that certain dividends from foreign securities where the ex-dividend date may have passed are recorded as soon as the Trust becomes aware of the ex-dividend data in the exercise of reasonable diligence.

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

B. Federal Income Taxes

It is the Trust's policy to comply with the requirements of the Internal Revenue Code applicable to regulated investment companies and to distribute all of its taxable income and net realized capital gains, if any, to its shareowners. Therefore, no federal income tax provision is required. Tax years for the prior three fiscal years remain subject to examination by federal and state tax authorities.

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

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The tax character of current year distributions payable to common and preferred shareowners will be determined at the end of the current taxable year. The tax character of distributions paid during the year ended March 31, 2012 was as follows:

| | | |
|----------------------------|----|------------|
| ----- | | 2012 |
| ----- | | |
| Distribution paid from: | | |
| Tax exempt income | \$ | 26,664,988 |
| Ordinary income | | 4,060,404 |
| ----- | | |
| Total taxable distribution | \$ | 30,725,392 |
| ===== | | |

The following shows the components of distributable earnings (losses) on a federal income tax basis at March 31, 2012:

| | | |
|-------|--|------|
| ----- | | 2012 |
| ----- | | |

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| | |
|---------------------------------|-----------------|
| Distributable earnings: | |
| Undistributed tax-exempt income | \$ 9,047,860 |
| Undistributed ordinary income | 960,017 |
| Capital loss carryforward | (55,783,255) |
| Post-October loss deferred | (6,203,339) |
| Dividends payable | (7,736) |
| Unrealized appreciation | 21,178,495 |
| ----- | |
| Total | \$ (30,807,958) |
| ===== | |

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

C. Automatic Dividend Reinvestment Plan

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

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

Whenever the Trust declares a dividend on common shares payable in cash, participants in the Plan will receive the equivalent in common shares acquired by the Plan Agent either (i) through receipt of additional unissued but authorized common shares from the Trust or (ii) by purchase of outstanding common shares on the New York Stock Exchange or elsewhere. If, on the payment date for any dividend, the net asset value per common share is equal to or less than the market price per share plus estimated brokerage trading fees (market premium), the Plan Agent will invest the dividend amount in newly issued common shares. The number of newly issued common shares to be credited to each account will be determined by dividing the dollar amount of the dividend by the net asset value per common share on the date the shares are issued, provided that the maximum discount from the then current market price per share on the date of issuance does not exceed 5%. If, on the payment date for any dividend, the net asset value per common share is greater than the market value (market discount), the Plan Agent will invest the dividend amount in common shares acquired in open-market

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purchases. There are no brokerage charges with respect to newly issued common shares. However, each participant will pay a pro rata share of brokerage trading fees incurred with respect to the Plan Agent's open-market purchases. Participating in the Plan does not relieve shareowners from any federal, state or local taxes which may be due on dividends paid in any taxable year. Shareowners holding Plan shares in a brokerage account may not be able to transfer the shares to another broker and continue to participate in the Plan.

D. Risks

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

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

2. Management Agreement

Pioneer Investment Management, Inc. (PIM), the Trust's investment adviser, a wholly owned indirect subsidiary of UniCredit S.p.A. (UniCredit), manages the Trust's portfolio. Management fees payable under the Trust's Advisory Agreement with PIM are calculated daily at the annual rate of 0.60% of the Trust's average daily managed assets. "Managed assets" means (a) the total assets of the Trust, including any form of investment leverage, minus (b) all accrued liabilities incurred in the normal course of operations, which shall not include any liabilities or obligations attributable to investment leverage obtained through (i) indebtedness of any type (including, without limitation, borrowing through a credit facility of the issuance of debt securities), (ii) the issuance of preferred stock or other similar preference securities, and/or (iii) any other means. For the period ended September 30, 2012, the net management fee was 0.60% of the Trust's average daily managed assets, which was equivalent to 0.91% of the Trust's average daily net assets attributable to the common shareowners.

In addition, under PIM's management and administration agreements, certain other services and costs are paid by PIM and reimbursed by the Trust. At September 30, 2012, \$294,349 was payable to PIM related to management costs, administrative costs and certain other reimbursements and is included in "Due to affiliates" and "Administration fee" on the Statement of Assets and Liabilities.

Effective April 1, 2012, PIM has retained Brown Brothers Harriman & Co. (BBH) to provide certain administrative and accounting services to the Trust on its behalf. For such services, PIM pays BBH a monthly fee at an annual rate of 0.025% of the Trust's average daily managed assets subject to a minimum monthly fee of \$6,250. Previously, PIM had retained State Street Bank and Trust Company (State Street) to provide such services. PIM paid State Street a monthly fee at an annual rate of 0.07% of the Trust's average daily managed assets in excess up to \$500 million, subject to a minimum monthly fee of \$10,000. Neither BBH nor

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State Street received compensation directly from the Trust for providing such services.

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3. Transfer Agents

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

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

4. Expense Offset Agreements

The Trust has entered into an arrangement with its custodian whereby credits realized as a result of uninvested cash balances are used to reduce a portion of the Trust's custodian expenses. For the six months ended September 30, 2012, the Trust expenses were not reduced under such arrangement.

5. Interest Rate Swaps

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

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

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the other party to the interest rate swap. Risks may also arise with regard to market movements in the value of the swap arrangement that do not exactly offset the changes in the related dividend requirement or interest expense on the Trust's leverage.

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There were no interest rate swap contracts open during the six months ended September 30, 2012 or outstanding at September 30, 2012.

6. Trust Shares

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

Transactions in common shares of beneficial interest for the periods ended September 30, 2012 and March 31, 2012 were as follows:

| | 9/30/12 | 3/31/12 |
|---|------------|------------|
| Shares outstanding at beginning of period | 23,282,302 | 23,133,791 |
| Reinvestment of distributions | 63,516 | 148,511 |
| Shares outstanding at end of period | 23,345,818 | 23,282,302 |

The Trust may classify or reclassify any unissued shares of beneficial interest into one or more series of preferred shares of beneficial interest. As of September 30, 2012, there were 6,000 APS as follows: Series A -- 3,000 and Series B -- 3,000.

Dividends on Series A and Series B are cumulative at a rate which is to be reset every seven days based on the results of an auction. An auction fails if there are more APS offered for sale than there are buyers. When an auction fails, the dividend rate for the period will be the maximum rate on the auction dates described in the prospectus for the APS. Preferred shareowners are not able to sell their APS at an auction if the auction fails. Since February 2008, the Trust's auctions related to the APS have failed. The maximum rate for each series is 125% of the 7 day commercial paper rate or adjusted Kenny rate. Dividend rates on APS ranged from 0.26% to 0.45% during the period ended September 30, 2012.

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

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

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

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required, the approval of the holders of a majority of any outstanding preferred shares, voting separately as a class, would be required to (a) adopt any plan of reorganization that would adversely affect the preferred shares and (b) take any action requiring a vote of security holders, including, among other things, changes in the Trust's subclassification as a closed-end management investment company or changes in its fundamental investment restrictions.

7. Subsequent Events

The Board of Trustees of the Trust declared on October 4, 2012 a dividend from undistributed net investment income of \$0.095 per common share payable October 31, 2012, to common shareowners of record on October 16, 2012.

Subsequent to September 30, 2012, dividends declared and paid on preferred shares totaled \$45,503 in aggregate for the two outstanding preferred share series through November 7, 2012.

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ADDITIONAL INFORMATION (unaudited)

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

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

Results of Shareholder Meeting (unaudited)

At the annual meeting of shareowners held on September 18, 2012, shareowners of Pioneer Municipal High Income Advantage were asked to consider the proposal described below. A report of the total votes cast by the Trust's shareholders follows:

Proposal 1 -- To elect Class III Trustee.

| Nominee | For | Withheld |
|----------------------|----------------|-------------|
| Thomas J. Perna | 20,967,863.608 | 589,715.000 |
| Marguerite A. Piret* | 3,635.000 | 53.000 |

* Elected by preferred shares only

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Trustees, Officers and Service Providers

Trustees

Officers

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

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

Investment Adviser and Administrator
Pioneer Investment Management, Inc.

Custodian and Sub-Administrator
Brown Brothers Harriman & Co.

Principal Underwriter
Pioneer Funds Distributor, Inc.

Legal Counsel
Bingham McCutchen LLP

Shareowner Services and Transfer Agent
Pioneer Investment Management Shareholder Services, Inc.

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

* Chief Executive Officer of the Trust

** Chief Financial and Accounting Officer of the Trust

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How to Contact Pioneer

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

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

Account Information 1-800-225-6292

Or write to AST:

For Write to

| | |
|---|---|
| General inquiries, lost dividend checks, change of address, lost stock certificates, stock transfer | American Stock Transfer & Trust Operations Center 6201 15th Ave. Brooklyn, NY 11219 |
| Dividend reinvestment plan (DRIP) | American Stock Transfer & Trust Wall Street Station P.O. Box 922 New York, NY 10269-0560 |
| Website | www.amstock.com |

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

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

[LOGO] PIONEER
Investments(R)

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

us.pioneerinvestments.com

Securities offered through Pioneer Funds Distributor, Inc.
60 State Street, Boston, MA 02109
Underwriter of Pioneer Mutual Funds, Member SIPC
(C) 2012 Pioneer Investments 19435-06-1112

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

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done so.

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

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

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

(2) Full, fair, accurate, timely, and understandable disclosure in reports and documents that a registrant files with, or submits to, the Commission and in other public communications made by the registrant;

(3) Compliance with applicable governmental laws, rules, and regulations;

(4) The prompt internal reporting of violations of the code to an appropriate person or persons identified in the code; and

(5) Accountability for adherence to the code.

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

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.

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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 (see attachment);

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

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

ITEM 3. AUDIT COMMITTEE FINANCIAL EXPERT.

(a) (1) Disclose that the registrant's board of trustees has determined that the registrant either:

(i) Has at least one audit committee financial expert serving on its audit committee; or

(ii) Does not have an audit committee financial expert serving on its audit committee.

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

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

(i) Accept directly or indirectly any consulting, advisory, or other compensatory fee from the issuer; or

(ii) Be an "interested person" of the investment company as defined in Section 2(a)(19) of the Act (15 U.S.C. 80a-2(a)(19)).

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

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

Not applicable.

ITEM 4. PRINCIPAL ACCOUNTANT FEES AND SERVICES.

(a) Disclose, under the caption AUDIT FEES, the aggregate fees billed for each of the last two fiscal years for professional services rendered by the principal accountant for the audit of the registrant's annual financial statements or

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services that are normally provided by the accountant in connection with statutory and regulatory filings or engagements for those fiscal years.

N/A

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

N/A

(c) Disclose, under the caption TAX FEES, the aggregate fees billed in each of the last two fiscal years for professional services rendered by the principal accountant for tax compliance, tax advice, and tax planning. Registrants shall describe the nature of the services comprising the fees disclosed under this category.

N/A

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

N/A

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

PIONEER FUNDS

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

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

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Audit Committee itself and any pre-approval that may be waived in accordance with Rule 210.2-01(c) (7) (i) (C) is hereby waived.

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

SECTION II - POLICY

| SERVICE CATEGORY | SERVICE CATEGORY DESCRIPTION | SPECIFIC PRE-APPROVED SERVICE SUBCATEGORIES |
|----------------------------|--|---|
| I. AUDIT SERVICES | Services that are directly related to performing the independent audit of the Funds | <ul style="list-style-type: none"> o Accounting research assistance o SEC consultation, registration statements, and reporting o Tax accrual related matters o Implementation of new accounting standards o Compliance letters (e.g. rating agency letters) o Regulatory reviews and assistance regarding financial matters o Semi-annual reviews (if requested) o Comfort letters for closed end offerings |
| II. AUDIT-RELATED SERVICES | Services which are not prohibited under Rule 210.2-01(C) (4) (the "Rule") and are related extensions of the audit services support the audit, or use the knowledge/expertise gained from the audit procedures as a foundation to complete the project. In most cases, if the Audit-Related Services are not performed by the Audit firm, the scope of the Audit Services would likely increase. The Services are typically well-defined and governed by accounting professional standards (AICPA, SEC, etc.) | <ul style="list-style-type: none"> o AICPA attest and agreed-upon procedures o Technology control assessments o Financial reporting control assessments o Enterprise security architecture assessment |

AUDIT COMMITTEE APPROVAL POLICY

AUDIT COMMITTEE REPORTING POLICY

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

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

constitute pre approval for these services.

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

SECTION III - POLICY DETAIL, CONTINUED

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

| AUDIT COMMITTEE APPROVAL POLICY | AUDIT COMMITTEE REPORTING POLICY |
|--|---|
| o "One-time" pre-approval for the fund fiscal year within a specified dollar limit | o A summary of all such services and related fees (including comparison to specified dollar limits) reported quarterly. |

- o Specific approval is needed to exceed the pre-approved dollar limits for these services (see general Audit Committee approval policy below for details on obtaining specific approvals)
- o Specific approval is needed to use the Fund's auditors for tax services not denoted as pre-approved, or to add a specific service subcategory as "pre-approved"

SECTION III - POLICY DETAIL, CONTINUED

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

| AUDIT COMMITTEE APPROVAL POLICY | AUDIT COMMITTEE REPORTING POLICY |
|--|---|
| <ul style="list-style-type: none"> o "One-time" pre-approval for the fund fiscal year within a specified dollar limit o Specific approval is needed to exceed the pre-approved dollar limits for | <ul style="list-style-type: none"> o A summary of all such services and related fees (including comparison to specified dollar limits) reported quarterly. |

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these services (see general Audit Committee approval policy below for details on obtaining specific approvals)

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

SECTION III - POLICY DETAIL, CONTINUED

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

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

restricted services.

GENERAL AUDIT COMMITTEE APPROVAL POLICY:

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

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

N/A

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

N/A

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

N/A

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

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

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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.

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)).

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

N/A

Item 6. Schedule of Investments.

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

Included in Item 1

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

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

Information not required in semi annual reports on form NCSR.

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

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

(1) State the name, title, and length of service of the person or persons employed by or associated with the registrant or an investment adviser of the registrant who are primarily responsible for the day-to-day management

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of the registrants portfolio (Portfolio Manager). Also state each Portfolio Managers business experience during the past 5 years.

Information not required in semi annual reports on form NCSR.

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

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

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

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

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

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

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

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

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

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[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, 2012

Pursuant to the requirements of the Securities Exchange Act of 1934 and the Investment Company Act of 1940, this report has been signed below by the following persons on behalf of the registrant and in the capacities and on the dates indicated.

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

Date November 29, 2012

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

Date November 29, 2012

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