

PIONEER MUNICIPAL HIGH INCOME TRUST
Form N-CSR
December 29, 2009

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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 811-21321

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

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

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

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

Date of fiscal year end: April 30

Date of reporting period: May 1, 2009 through October 31, 2009

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

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

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ITEM 1. REPORTS TO SHAREOWNERS.

Pioneer Municipal High
Income Trust

Semiannual Report | October 31, 2009

Ticker Symbol: MHI

[LOGO] PIONEER
Investments (R)

visit us: pioneerinvestments.com

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President's Letter

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Dear Shareowner,

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

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

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

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

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

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

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Portfolio Management Discussion | 10/31/09

Municipal bond investors were rewarded over the six months ended October 31, 2009, with relatively solid performance, as the municipal bond market recovered from one of the most turbulent periods in history. In the following interview, David Eurkus, who is responsible for the daily management of Pioneer Municipal High Income Trust, discusses some of the factors that had an impact on the municipal bond market and the Trust's performance over the six-month period ended October 31, 2009.

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

A For the six-month period ended October 31, 2009, Pioneer Municipal High Income Trust produced a total return of 22.36% at net asset value and 31.93% at market price. As of October 31, 2009, the Trust was selling at a premium of market price to net asset value of 0.3%. Over the same six-month period, the Trust's benchmarks, the Barclays Capital (formerly Lehman Brothers) Municipal Bond Index, which tracks the performance of investment-grade bonds, returned 4.99%, and the Barclays Capital High Yield Municipal Bond Index returned 19.55%. While the Trust invested in municipal securities with a broad range of maturities and credit ratings, it maintained a dollar-weighted average portfolio credit quality of A- as of October 31, 2009. At the end of the six-month period, the Trust held 116 issues in 34 states and the District of Columbia.

During the period, investors also earned a relatively high level of dividend income. As of October 31, 2009, the Trust's 30-day SEC yield was 8.68%, and its current dividend yield, based on market close, was 7.27%. This translates into a taxable equivalent yield of 11.18%, based on the maximum Federal income tax rate of 35%. Approximately 12% of the Trust's investments were subject to the Federal Alternative Minimum Tax (AMT).

Q What was the investment environment like during the six months ended October 31, 2009?

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

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Q How did you manage the Trust during the six months ended October 31, 2009?

A We did not make any material changes to the portfolio during the period. As has been the case in the past, the Trust was invested primarily in sectors that support the U.S. economy. As of October 31, 2009, health care was the Trust's biggest sector position, 29.7% of the total investment portfolio. Airport revenue also was a relatively large position, at 12.6% of the total investment portfolio, and tobacco bonds accounted for approximately 12.5% of the total investment portfolio. The Trust also had investments in education, housing, and pollution control bonds. Below-investment-grade securities accounted for 53.3% of the Trust's total investment portfolio, and investment-grade securities accounted for 45.1% of the total investment portfolio. The Trust's cash position was 1.6%.

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Q What factors most affected the Trust's performance during the six months ended October 31, 2009?

A The performance of high-yield bonds, as measured by the Barclays Capital High Yield Municipal Bond Index, outpaced that of investment-grade bonds during the period. As a result, the Trust benefited from its position in high-yield securities. Although the airline industry has been one of the hardest-hit areas of the economy, and prices of airline bonds had experienced sharp declines, airline bonds did well. By cutting costs, reducing the number of flights and raising ticket prices, some airlines are now on a more stable footing, and as a result investors bid up the prices of their bonds.

Investment-grade bonds, as measured by the Barclays Capital Municipal Bond Index, were positive during the six months ended October 31, 2009; and the Trust's holdings of these higher-quality securities aided performance. A substantial weight in health care bonds was a key contributor to the Trust's relative outperformance during the six-month period ended October 31, 2009. In addition, the performance of tobacco bonds, whose prices had declined substantially in the first quarter of 2009, was particularly noteworthy. As bond prices rose, the Trust's relatively long duration (or sensitivity to changes in interest rates) also helped boost returns.

The Trust's high-quality pre-refunded escrow bonds were a slight disappointment during the period. While they generated a positive return, they underperformed the Barclays Capital Municipal Bond Index. (When interest rates decline, bond issuers often pre-refund, or "call" their bonds before they mature in order to reduce their interest costs. The proceeds from the sales of the pre-refunded bonds are invested in Treasury obligations, which are the highest-quality securities.)

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Q What is your outlook?

A The tax-exempt municipal market has had a substantial run-up, and while we believe conditions may moderate, we continue to be constructive in our outlook for municipal bonds and the Trust. The investment environment for the securities remains positive. We believe the economy is improving modestly, while inflation has remained benign and the Federal Reserve Board appears to be holding interest rates within the 0.00% to 0.25% range. As we look ahead, we believe that municipal bonds may continue to have the potential to provide capital appreciation and a relatively high level of tax-free income.

Please refer to the Schedule of Investments on pages 11-20 for a full listing of Trust securities.

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

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

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The Trust uses leverage through the issuance of preferred shares with an aggregate liquidation preference of up to 25% of the Trust's total assets after such issuance. Leverage creates significant risks, including the risk that the Trust's income or capital appreciation will not be sufficient to cover the cost of leverage, which may adversely affect the return for the holders of common shares.

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 prospectus relating to its common shares and in shareholder reports issued from time to time.

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

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

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Portfolio Summary | 10/31/09

Portfolio Diversification

(As a percentage of total investment portfolio)

[The following data was represented as a pie chart in the printed material]

| | |
|---------------------------|-------|
| Health Revenue | 29.7% |
| Airport Revenue | 12.6% |
| Tobacco Revenue | 12.5% |
| Other Revenue | 12.0% |
| Insured | 11.9% |
| Pollution Control Revenue | 4.4% |
| Facilities Revenue | 4.1% |
| Education Revenue | 3.8% |
| Development Revenue | 3.7% |
| Transportation Revenue | 2.7% |
| Gaming Revenue | 1.0% |
| Utilities Revenue | 0.9% |
| Airline Revenue | 0.4% |
| Housing Revenue | 0.3% |

Portfolio Quality

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

[The following data was represented as a pie chart in the printed material]

| | |
|------------------|-------|
| AAA | 16.9% |
| AA | 3.2% |
| A | 5.0% |
| BBB | 20.0% |
| BB | 3.6% |
| B | 8.8% |
| CCC | 1.3% |
| C | 0.1% |
| Not Rated | 39.5% |
| Cash Equivalents | 1.6% |

10 Largest Holdings

(As a percentage of long-term holdings)*

1. Allegheny County Hospital Development Authority Revenue, 9.25%, 11/15/30
2. Metropolitan Pier & Exposition Authority Dedicated State Tax Revenue, 0.0%, 6/15/22
3. Tobacco Settlement Financing Corp., 6.75%, 6/1/39
4. Connecticut Health & Educational Facilities Authority Revenue, RIB, 11.289%, 7/1/42 (144A)
5. New Jersey Economic Development Authority Revenue, 6.25%, 9/15/29
6. North Texas Tollway Authority Revenue, 5.75%, 1/1/33
7. New York State Dormitory Authority Revenue, RIB, 12.79%, 7/1/26 (144A)
8. Golden State Tobacco Securitization Corp., 7.875%, 6/1/42
9. Washington State General Obligation, 0.0%, 6/1/22
10. Johnson City Health & Educational Facilities Board Hospital Revenue, 7.5%, 7/1/33

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

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Prices and Distributions | 10/31/09

Market Value per Common Share

| 10/31/09 | 4/30/09 |
|----------|----------|
| \$ 13.21 | \$ 10.40 |

Net Asset Value per Common Share

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| | |
|----------|----------|
| 10/31/09 | 4/30/09 |
| \$ 13.17 | \$ 11.18 |

Distributions per Common Share: 5/1/09-10/31/09

| Net Investment Income | Short-Term Capital Gains | Long-Term Capital Gains |
|-----------------------------|-----------------------------|----------------------------|
| \$ 0.4600 | \$ -- | \$ -- |

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Performance Update | 10/31/09

Investment Returns

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

Cumulative Total Returns
(As of October 31, 2009)

| Period | Net Asset Value | Market Price |
|------------------------------|--------------------|-----------------|
| Life-of-Class (7/17/2003) | 39.80% | 33.95% |
| 5 Years | 22.73 | 27.53 |
| 1 Year | 32.51 | 51.10 |

[The following data was represented as a mountain chart in the printed material]

Value of \$10,000 Investment

| | | |
|----------------------|-----------------------------------|---------------------|
| Pioneer Municipal | Barclays Capital High Yield | Barclays Capital |
|----------------------|-----------------------------------|---------------------|

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| | High Income Trust | Municipal Bond Index | Municipal Bond Index |
|-------|----------------------|-------------------------|-------------------------|
| 7/03 | \$10,000 | \$10,000 | \$10,000 |
| 10/03 | 10,363 | 10,319 | 10,166 |
| 10/04 | 11,390 | 10,941 | 10,112 |
| 10/05 | 12,148 | 11,219 | 9,990 |
| 10/06 | 13,858 | 11,863 | 10,092 |
| 10/07 | 14,046 | 12,209 | 10,033 |
| 10/08 | 10,549 | 11,805 | 9,042 |
| 10/09 | 13,979 | 13,411 | 9,905 |

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

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

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

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

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

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

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, issued after 12/31/90, deal size over \$20 million, and maturity size of at least \$3 million. Index returns are calculated monthly, assume reinvestment of dividends and, unlike Trust returns, do not reflect any fees, expenses or sales charges. The indices are not leveraged. You cannot invest directly in the indices.

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Schedule of Investments | 10/31/09 (unaudited)

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

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| | | TAX EXEMPT OBLIGATIONS -- 126.5% of Net Assets | | |
|----------------|-----------|--|-----------------|-----------|
| | | | Alabama -- 0.8% | |
| \$ 1,000,000 | NR/NR | Huntsville-Redstone Village Special Care Facilities Financing Authority, 5.5%, 1/1/28 | | \$ 811 |
| 2,000,000 | NR/NR | Huntsville-Redstone Village Special Care Facilities Financing Authority, 5.5%, 1/1/43 | | 1,454 |
| | | | | ----- |
| | | | | \$ 2,266 |
| | | Arizona -- 2.2% | | |
| 5,000,000 | BBB-/Baa3 | Apache County Industrial Development Authority, 5.85%, 3/1/28 | | \$ 4,999 |
| 970,000 | NR/Baa3 | Pima County Industrial Development Authority, 7.25%, 7/1/31 | | 905 |
| 500,000 | BBB-/Baa2 | Yavapai County Industrial Development Authority, 6.0%, 8/1/33 | | 496 |
| | | | | ----- |
| | | | | \$ 6,401 |
| | | California -- 9.8% | | |
| 7,885,000 (a) | AAA/NR | California State University Revenue, RIB, 7.479%, 11/1/39 (144A) | | \$ 7,903 |
| 4,500,000 | NR/NR | California Statewide Communities Development Authority Environmental Facilities Revenue, 9.0%, 12/1/38 | | 3,635 |
| 1,000,000 | BB+/NR | California Statewide Communities Development Authority Revenue, 7.25%, 10/1/38 | | 1,004 |
| 5,150,000+ | AAA/Aaa | Golden State Tobacco Securitization Corp., 7.8%, 6/1/42 | | 6,198 |
| 7,000,000+ | AAA/Aaa | Golden State Tobacco Securitization Corp., 7.875%, 6/1/42 | | 8,441 |
| 1,000,000 | AA/Aa1 | University of California Revenue, 5.0%, 5/15/25 | | 1,035 |
| 655,000 | C/NR | Valley Health System Hospital Revenue, 6.5%, 5/15/25 | | 360 |
| | | | | ----- |
| | | | | \$ 28,579 |
| | | Connecticut -- 5.3% | | |
| 10,335,000 (a) | NR/Aaa | Connecticut Health & Educational Facilities Authority Revenue, RIB, 11.289%, 7/1/42 (144A) | | \$ 11,625 |
| 5,000,000 | B+/NR | Mohegan Tribe Indians Gaming Authority, 6.25%, 1/1/31 | | 3,874 |
| | | | | ----- |
| | | | | \$ 15,500 |
| | | Delaware -- 0.4% | | |
| 765,000 | NR/NR | Sussex County Delaware Revenue, 5.9%, 1/1/26 | | \$ 677 |
| 600,000 | NR/NR | Sussex County Delaware Revenue, 6.0%, 1/1/35 | | 492 |
| | | | | ----- |
| | | | | \$ 1,169 |

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

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Schedule of Investments | 10/31/09 (unaudited) (continued)

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| Principal Amount | S&P/Moody's Ratings (unaudited) | | Value |
|------------------|---------------------------------|--|-----------|
| | | District of Columbia -- 3.6% | |
| \$ 5,000,000 | BBB/Baa3 | District of Columbia Tobacco Settlement Financing Corp., 6.5%, 5/15/33 | \$ 4,713 |
| 6,000,000 | BBB/Baa3 | District of Columbia Tobacco Settlement Financing Corp., 6.75%, 5/15/40 | 5,811 |
| | | | ----- |
| | | | \$ 10,525 |
| | | Florida -- 5.5% | |
| 1,700,000 | NR/NR | Beacon Lakes Community Development, 6.9%, 5/1/35 | \$ 1,458 |
| 2,000,000 | A-/A3 | Brevard County Health Facilities Authority Revenue, 5.0%, 4/1/36 | 1,782 |
| 1,000,000 | BBB/Baa3 | Hillsborough County Industrial Development Authority Revenue, 8.0%, 8/15/32 | 1,114 |
| 2,445,000 | NR/NR | Liberty County Subordinate Revenue, 8.25%, 7/1/28 | 2,084 |
| 2,500,000 | A-/A2 | Miami-Dade County Aviation Revenue, 5.5%, 10/1/41 | 2,519 |
| 1,000,000 | NR/NR | St. Johns County Industrial Development Authority Revenue, 5.25%, 1/1/26 | 758 |
| 2,000,000 | NR/NR | St. Johns County Industrial Development Authority Revenue, 5.375%, 1/1/40 | 1,389 |
| 5,000,000 | NR/Baa2 | Tallahassee Health Facilities Revenue, 6.375%, 12/1/30 | 5,017 |
| | | | ----- |
| | | | \$ 16,124 |
| | | Georgia -- 2.4% | |
| 4,240,000 (a) | NR/Aa3 | Atlanta Georgia Water & Waste Revenue, RIB, 7.2%, 11/1/43 (144A) | \$ 3,728 |
| 2,400,000 | NR/NR | Fulton County Residential Care Facilities Revenue, 5.0%, 7/1/27 | 1,735 |
| 1,100,000 | NR/NR | Fulton County Residential Care Facilities Revenue, 5.125%, 7/1/42 | 711 |
| 1,000,000 | NR/NR | Rockdale County Development Authority Revenue, 6.125%, 1/1/34 | 802 |
| | | | ----- |
| | | | \$ 6,977 |
| | | Idaho -- 1.7% | |
| 5,000,000 | BBB+/Baa2 | Power County Industrial Development Corp., 6.45%, 8/1/32 | \$ 5,009 |
| | | Illinois -- 10.2% | |
| 2,000,000 (b) | NR/NR | Centerpoint Intermodal Center, 10.0%, 6/15/23 (144A) | \$ 1,052 |
| 12,000,000 | NR/Caa2 | Chicago O'Hare International Airport Special Facility Revenue Refunding Bonds, 5.5%, 12/1/30 | 7,794 |
| 1,000,000 | NR/NR | Illinois Finance Authority Revenue, 6.0%, 11/15/27 | 822 |
| 2,000,000 | AA+/Aa2 | Illinois Finance Authority Revenue, 6.0%, 8/15/39 | 2,153 |

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

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| Principal Amount | S&P/Moody's Ratings (unaudited) | | Value |
|------------------|---------------------------------|---|------------|
| ----- | | | |
| | | Illinois -- (continued) | |
| \$ 4,000,000 | NR/NR | Illinois Finance Authority Revenue, 6.0%, 11/15/39 | \$ 2,987, |
| 1,500,000 (c) | NR/NR | Illinois Health Facilities Authority Revenue, 6.9%, 11/15/33 | 662, |
| 16,880,000 (d) | AAA/A2 | Metropolitan Pier & Exposition Authority Dedicated State Tax Revenue, 0.0%, 6/15/22 | 12,975, |
| 1,745,000 | NR/NR | Southwestern Illinois Development Authority Revenue, 5.625%, 11/1/26 | 1,230, |
| | | | ----- |
| | | | \$ 29,677, |
| ----- | | | |
| | | Indiana -- 4.9% | |
| 5,000,000 | A+/A2 | Indiana Health & Educational Facility Financing Authority Hospital Revenue, 5.0%, 2/15/39 | \$ 4,471, |
| 1,000,000 | BBB+/Baa1 | Indiana State Development Finance Authority Revenue, 5.6%, 12/1/32 | 999, |
| 4,300,000 | BBB/NR | Indiana State Development Finance Authority Revenue, 5.75%, 10/1/11 | 4,189, |
| 2,500,000 (b) | BBB/Baa2 | Rockport Pollution Control Revenue, 6.25%, 6/1/25 | 2,715, |
| 2,570,000 | NR/NR | Vigo County Hospital Authority Revenue, 5.8%, 9/1/47 (144A) | 1,969, |
| | | | ----- |
| | | | \$ 14,345, |
| ----- | | | |
| | | Louisiana -- 2.1% | |
| 1,500,000 | BB/Ba3 | Louisiana Local Government Environmental Facilities Revenue, 6.75%, 11/1/32 | \$ 1,437, |
| 5,000,000 | NR/A3 | Louisiana Public Facilities Authority Revenue, 5.5%, 5/15/47 | 4,665, |
| | | | ----- |
| | | | \$ 6,103, |
| ----- | | | |
| | | Massachusetts -- 4.5% | |
| 2,385,000 | NR/NR | Massachusetts Development Finance Agency Revenue, 7.1%, 7/1/32 | \$ 1,857, |
| 1,000,000 | AA/NR | Massachusetts Educational Financing Authority Revenue, 6.0%, 1/1/28 | 1,053, |
| 3,500,000 | BBB/Baa3 | Massachusetts Health & Educational Facilities Authority Revenue, 6.25%, 7/1/22 | 3,518, |
| 2,500,000 | NR/NR | Massachusetts Health & Educational Facilities Authority Revenue, 6.5%, 1/15/38 | 2,163, |
| 5,000,000 | BB-/NR | Massachusetts Health & Educational Facilities Authority Revenue, 6.75%, 10/1/33 | 4,461, |
| | | | ----- |
| | | | \$ 13,055, |
| ----- | | | |
| | | Michigan -- 3.7% | |
| 935,000 | NR/NR | Doctor Charles Drew Academy, 5.7%, 11/1/36 | \$ 518, |
| 1,525,000 | NR/Ba1 | Flint Michigan Hospital Building Authority Revenue, 5.25%, 7/1/16 | 1,402, |
| 1,500,000 | BB/NR | John Tolfree Health System Corp., 6.0%, 9/15/23 | 1,321, |

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

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Schedule of Investments | 10/31/09 (unaudited) (continued)

| Principal Amount | S&P/Moody's Ratings (unaudited) | | Value |
|--------------------|------------------------------------|---|------------|
| ----- | | | |
| | | Michigan -- (continued) | |
| \$ 2,000,000 | BB-/Ba3 | Michigan State Hospital Finance Authority Revenue, 5.5%, 8/15/23 | \$ 1,705, |
| 5,830,000 | BBB/NR | Michigan Tobacco Settlement Finance Authority, 6.0%, 6/1/48 | 4,431, |
| 1,470,000 | BBB/NR | Star International Academy Certificates of Participation, 6.125%, 3/1/37 | 1,330, |
| | | | ----- |
| | | | \$ 10,711, |
| ----- | | | |
| 1,675,000 | BB-/NR | Minnesota -- 0.6% Duluth Economic Development Authority Health Care Facilities Revenue, 7.25%, 6/15/32 | \$ 1,695, |
| ----- | | | |
| 3,000,000 | BBB/Ba1 | Mississippi -- 1.0% Mississippi Business Finance Corp. Pollution Control Revenue, 5.9%, 5/1/22 | \$ 3,003, |
| ----- | | | |
| 1,600,000 (c) | NR/NR | Montana -- 0.1% Two Rivers Authority, Inc. Correctional Facility Improvement Revenue, 7.375%, 11/1/27 | \$ 247, |
| ----- | | | |
| 2,000,000 | NR/NR | Nebraska -- 0.5% Grand Island Solid Waste Disposal Facilities Revenue, 7.0%, 6/1/23 | \$ 1,364, |
| ----- | | | |
| 2,000,000 (c) | NR/NR | Nevada -- 0.0% Nevada State Department of Business & Industry, 7.25%, 1/1/23 | \$ 100, |
| ----- | | | |
| 2,000,000 | B/B3 | New Jersey -- 12.2% New Jersey Economic Development Authority Revenue, 6.25%, 9/15/19 | \$ 1,803, |
| 13,350,000 | B/B3 | New Jersey Economic Development Authority Revenue, 6.25%, 9/15/29 | 11,406, |
| 1,000,000 | B/B3 | New Jersey Economic Development Authority Revenue, 6.4%, 9/15/23 | 891, |
| 6,150,000 (b) | B/B3 | New Jersey Economic Development Authority Revenue, 7.0%, 11/15/30 | 5,710, |
| 10,370,000 | AAA/Aa1 | New Jersey Transportation Trust Fund Authority, 0.0%, 12/15/27 | 4,082, |
| 10,000,000+ | AAA/Aaa | Tobacco Settlement Financing Corp., 6.75%, 6/1/39 | 11,776, |
| | | | ----- |
| | | | \$ 35,670, |
| ----- | | | |
| New Mexico -- 1.2% | | | |

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| | | | |
|-----------|-------|--|-----------|
| 1,500,000 | NR/NR | Otero County New Mexico Project Revenue, 6.0%, 4/1/23 | \$ 1,239, |
| 2,960,000 | NR/NR | Otero County New Mexico Project Revenue, 6.0%, 4/1/28 | 2,292, |
| | | | \$ 3,531, |

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

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| Principal Amount | S&P/Moody's Ratings (unaudited) | | Value |
|---------------------|---------------------------------------|--|------------|
| ----- | | | |
| | | New York -- 8.6% | |
| \$ 2,500,000 | BBB+/Baa2 | Albany New York Industrial Development Agency Civic Facilities Revenue, 5.25%, 11/15/27 | \$ 2,468, |
| 3,000,000 | NR/NR | Dutchess County Industrial Development Agency Revenue, 7.5%, 3/1/29 | 2,916, |
| 2,450,000 | NR/NR | Nassau County New York Industrial Development Agency Revenue, 6.7%, 1/1/43 | 2,093, |
| 2,000,000 | BBB/Baa1 | New York City Industrial Development Agency, 5.375%, 6/1/23 | 2,015, |
| 990,000 | CCC+/Caa2 | New York City Industrial Development Agency, 6.9%, 8/1/24 | 770, |
| 7,040,000 (a) | NR/Aaa | New York State Dormitory Authority Revenue, RIB, 12.79%, 7/1/26 (144A) | 8,994, |
| 2,000,000 | NR/NR | Suffolk County Industrial Development Agency, 7.25%, 1/1/30 | 1,815, |
| 4,000,000 | A+/Aa3 | Triborough Bridge & Tunnel Authority Revenue, 5.25%, 11/15/30 | 4,129, |
| | | | \$ 25,203, |
| ----- | | | |
| | | North Carolina -- 2.9% | |
| 4,790,000 | NR/NR | Charlotte North Carolina Special Facilities Revenue, 5.6%, 7/1/27 | \$ 3,348, |
| 5,740,000 | NR/NR | Charlotte North Carolina Special Facilities Revenue, 7.75%, 2/1/28 | 5,082, |
| | | | \$ 8,431, |
| ----- | | | |
| | | Oklahoma -- 1.8% | |
| 1,225,000 | B-/Caa2 | Tulsa Municipal Airport Revenue, 6.25%, 6/1/20 | \$ 1,038, |
| 4,350,000 | B-/Caa2 | Tulsa Municipal Airport Revenue, 7.35%, 12/1/11 | 4,263, |
| | | | \$ 5,302, |
| ----- | | | |
| | | Pennsylvania -- 8.3% | |
| 3,000,000 | BB/Ba3 | Allegheny County Hospital Development Authority Revenue, 5.0%, 11/15/28 | \$ 2,373, |
| 1,550,000 | NR/Baa2 | Allegheny County Hospital Development Authority Revenue, 5.125%, 5/1/25 | 1,391, |
| 12,300,000+ | AAA/NR | Allegheny County Hospital Development Authority | |

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| | | | |
|-----------|---------|--|---------|
| | | Revenue, 9.25%, 11/15/30 | 13,665, |
| 1,000,000 | B-/NR | Columbia County Hospital Authority Health Care Revenue, 5.9%, 6/1/29 | 821, |
| 845,000 | BBB/Ba2 | Hazleton Health Services Authority Hospital Revenue, 5.625%, 7/1/17 | 767, |
| 1,280,000 | NR/Caa3 | Langhorne Manor Borough Higher Education & Health Authority Revenue, 7.35%, 7/1/22 | 961, |

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

Pioneer Municipal High Income Trust | Semiannual Report | 10/31/09 15

Schedule of Investments | 10/31/09 (unaudited) (continued)

| Principal Amount | S&P/Moody's Ratings (unaudited) | | Value |
|------------------|---------------------------------|--|------------|
| ----- | | | |
| | | Pennsylvania -- (continued) | |
| \$ 5,000,000 | B+/Caa1 | Pennsylvania Economic Development Financing Authority Solid Waste Disposal Revenue, 6.0%, 6/1/31 | \$ 3,895,6 |
| 500,000 | BBB+/NR | Pennsylvania Higher Educational Facilities Authority Revenue, 5.4%, 7/15/36 | 468,4 |
| | | | ----- |
| | | | \$24,346,4 |
| ----- | | | |
| | | Rhode Island -- 1.8% | |
| 6,000,000 | NR/NR | Central Falls Detention Facilities Revenue, 7.25%, 7/15/35 | \$ 5,091,5 |
| ----- | | | |
| | | South Carolina -- 2.3% | |
| 5,185,000+ | BBB+/Baa1 | South Carolina Jobs Economic Development Authority Revenue, 6.375%, 8/1/34 | \$ 6,009,7 |
| 665,000+ | BBB+/Baa1 | South Carolina Jobs Economic Development Authority Revenue, 6.375%, 8/1/34 | 773,4 |
| | | | ----- |
| | | | \$ 6,783,1 |
| ----- | | | |
| | | Tennessee -- 4.9% | |
| 7,000,000+ | NR/A2 | Johnson City Health & Educational Facilities Board Hospital Revenue, 7.5%, 7/1/33 | \$ 7,935,4 |
| 2,480,000 | NR/A1 | Knox County Health, Educational & Housing Facilities Board Hospital Revenue, 6.375%, 4/15/22 | 2,560,0 |
| 4,600,000 | BBB+/NR | Sullivan County Health, Educational & Housing Facilities Board Hospital Revenue, 5.25%, 9/1/36 | 3,823,3 |
| | | | ----- |
| | | | \$14,318,7 |
| ----- | | | |
| | | Texas -- 13.8% | |
| 1,345,000 | NR/Ba2 | Bexar County Housing Finance Corp., 8.0%, 12/1/36 | \$ 1,008,0 |
| 1,000,000 | CCC+/Caa2 | Dallas-Fort Worth International Airport Revenue, 6.0%, 11/1/14 | 855,9 |
| 4,000,000 | NR/NR | Decatur Hospital Authority Revenue, 7.0%, 9/1/25 | 3,869,6 |

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| | | | |
|---------------|----------|---|----------|
| 2,000,000 | NR/NR | Gulf Coast Industrial Development Authority Revenue, 7.0%, 12/1/36 | 1,007,0 |
| 3,750,000 | CCC+/B3 | Houston Airport System Special Facilities Revenue, 5.7%, 7/15/29 | 2,972,8 |
| 5,340,000 | NR/NR | Lubbock Health Facilities Development Corp., 6.625%, 7/1/36 | 4,635,6 |
| 10,000,000 | BBB+/A3 | North Texas Tollway Authority Revenue, 5.75%, 1/1/33 | 10,175,0 |
| 2,810,000 (a) | NR/Aa2 | Northside Independent School District, RIB, 11.113%, 6/15/33 (144A) | 3,057,3 |
| 500,000 | CCC/Caa3 | Sabine River Authority Pollution Control Revenue, 6.15%, 8/1/22 | 258,6 |

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

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| Principal Amount | S&P/Moody's Ratings (unaudited) | | Va |
|----------------------|---------------------------------|--|----|
| Texas -- (continued) | | | |
| \$ 7,040,000 (a) | NR/Aa1 | Texas State, RIB, 11.986%, 4/1/30 (144A) | \$ |
| 630,000 | NR/NR | Willacy County Local Government Corp. Revenue, 6.0%, 9/1/10 | |
| 5,130,000 | NR/NR | Willacy County Local Government Corp. Revenue, 6.875%, 9/1/28 | |
| Utah -- 0.2% | | | |
| 800,000 | NR/NR | Spanish Fork City Charter School Revenue, 5.55%, 11/15/26 (144A) | \$ |
| Vermont -- 0.5% | | | |
| 1,500,000 | A-/A3 | Vermont Educational & Health Buildings Financing Agency Revenue, 6.0%, 10/1/28 | \$ |
| Virginia -- 0.4% | | | |
| 1,000,000 | BBB/Baa2 | Peninsula Ports Authority, 6.0%, 4/1/33 | \$ |
| Washington -- 8.3% | | | |
| 4,710,000 | A+/A2 | Spokane Public Facilities District Hotel/Motel Tax & Sales, 5.75%, 12/1/27 | \$ |
| 7,025,000 | BBB/Baa3 | Tobacco Settlement Authority Revenue, 6.625%, 6/1/32 | |
| 14,315,000 | AA+/Aa1 | Washington State General Obligation, 0.0%, 6/1/22 | |
| 5,000,000 | NR/NR | Washington State Housing Finance Committee Nonprofit Revenue, 5.625%, 1/1/27 | |
| Wisconsin -- 0.0% | | | |
| 2,320,000 | NR/NR | Aztalan Wisconsin Exempt Facilities Revenue, 7.5%, 5/1/18 | \$ |

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| | | | |
|--------------------|-------|---|-----|
| | | TOTAL TAX-EXEMPT OBLIGATIONS (Cost \$371,353,257) | \$3 |
| 10,000,000 (b) (e) | NR/NR | MUNICIPAL COLLATERALIZED DEBT OBLIGATION -- 2.5% of Net Assets Non-Profit Preferred Funding Trust I, 12.0%, 9/15/37 (144A) | \$ |
| | | TOTAL MUNICIPAL COLLATERALIZED DEBT OBLIGATION (Cost \$10,000,000) | \$ |

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

Pioneer Municipal High Income Trust | Semiannual Report | 10/31/09 17

Schedule of Investments | 10/31/09 (unaudited) (continued)

| Shares | S&P/Moody's Ratings (unaudited) | | Value |
|-------------|------------------------------------|---|-----------------|
| 248,558 (f) | | COMMON STOCK -- 0.6% of Net Assets Delta Air Lines, Inc. | \$ 1,774,704 |
| | | TOTAL COMMON STOCK (Cost \$6,612,756) | \$ 1,774,704 |
| 6,000,000 | | TAX-EXEMPT MONEY MARKET MUTUAL FUND -- 2.1% of Net Assets BlackRock Liquidity Funds MuniFund Portfolio | \$ 6,000,000 |
| | | TOTAL TAX-EXEMPT MONEY MARKET MUTUAL FUND (Cost \$6,000,000) | \$ 6,000,000 |
| | | TOTAL INVESTMENTS IN SECURITIES -- 131.7% (Cost \$393,966,013) (g) (h) | \$ 384,583,221 |
| | | OTHER ASSETS AND LIABILITIES 2.9% | \$ 8,492,557 |
| | | PREFERRED SHARES AT REDEMPTION VALUE, INCLUDING DIVIDENDS PAYABLE -- (34.6)% | \$(101,004,135) |
| | | NET ASSETS APPLICABLE TO COMMON SHAREOWNERS -- 100.0% | \$ 292,071,643 |

RIB Residual Interest Bonds

NR Security not rated by 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

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institutional buyers in a transaction exempt from registration. At October 31, 2009 the value of these securities amounted to \$54,310,384 or 18.6% of net assets applicable to common shareowners.

- + Prerefunded bonds have been collateralized by U.S. Treasury securities or U.S. Government Agencies which are held in escrow to pay interest and principal on the tax exempt issue and to retire the bonds in full at the earliest refunding date.
- (a) The interest rate is subject to change periodically and inversely based upon prevailing market rates. The interest rate shown is the coupon rate at October 31, 2009.
- (b) The interest rate is subject to change periodically. The interest rate shown is the coupon rate at October 31, 2009.
- (c) Security is in default and is non-income producing.
- (d) Debt obligation initially issued at one coupon which converts to a higher coupon at a specific date. The rate shown is the coupon rate at October 31, 2009.
- (e) Indicates a security that has been deemed illiquid. The aggregate cost of illiquid securities is \$10,000,000. The aggregate value \$7,403,300 represents 2.5% of net assets applicable to common shareowners.
- (f) Non-income producing.

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

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

| | |
|---------------------------|--------|
| Insured: | |
| NATL-RE | 7.9% |
| MBIA | 1.1 |
| FSA | 1.0 |
| ACA | 0.9 |
| PSF | 0.8 |
| AMBAC | 0.3 |
| Revenue Bonds: | |
| Health Revenue | 29.8 |
| Airport Revenue | 12.6 |
| Tobacco Revenue | 12.6 |
| Other Revenue | 12.0 |
| Pollution Control Revenue | 4.5 |
| Facilities Revenue | 4.1 |
| Education Revenue | 3.8 |
| Development Revenue | 3.7 |
| Transportation Revenue | 2.7 |
| Gaming Revenue | 1.0 |
| Utilities Revenue | 0.9 |
| Housing Revenue | 0.3 |
| | ----- |
| | 100.0% |
| | ===== |

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(h) At October 31, 2009, the net unrealized loss on investments based on cost for federal income tax purposes of \$392,172,049 was as follows:

| | |
|--|----------------|
| Aggregate gross unrealized gain for all investments in which there is an excess of value over tax cost | \$26,595,348 |
| Aggregate gross unrealized loss for all investments in which there is an excess of tax cost over value | (34,184,176) |
| | ----- |
| Net unrealized loss | \$ (7,588,828) |
| | ===== |

For financial reporting purposes net unrealized loss on investments was \$9,382,792 and cost of investments aggregated \$393,966,013.

Purchases and sales of securities (excluding temporary cash investments) for the period ended October 31, 2009, aggregated \$22,362,691 and \$28,099,575, respectively.

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

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

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

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

Pioneer Municipal High Income Trust | Semiannual Report | 10/31/09 19

Schedule of Investments | 10/31/09 (unaudited) (continued)

The following is a summary of the inputs used as of October 31, 2009, in valuing the Trust's investments:

| | Level 1 | Level 2 | Level 3 | Total |
|--|--------------------|----------------------|--------------|---------------|
| Municipal bonds | \$ -- | \$369,405,217 | \$ -- | \$369, |
| Municipal collateralized debt obligation | -- | 7,403,300 | -- | 7, |
| Common stock | 1,774,704 | -- | -- | 1, |
| Temporary cash investments | 6,000,000 | -- | -- | 6, |
| Total | \$7,774,704 | \$376,808,517 | \$ -- | \$384, |

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

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Statement of Assets and Liabilities | 10/31/09 (unaudited)

ASSETS:

| | |
|--|---------------|
| Investments in securities, at value (cost \$393,966,013) | \$384,583,221 |
| Receivables -- | |
| Investment securities sold | 70,000 |
| Interest | 9,056,650 |
| Reinvestment of distributions | 165,007 |
| Prepaid expenses | 32,533 |

| | |
|--------------|---------------|
| Total assets | \$393,907,411 |
|--------------|---------------|

LIABILITIES:

| | |
|----------------------------|------------|
| Due to custodian | \$ 511,111 |
| Due to affiliates | 214,178 |
| Administration fee payable | 23,798 |
| Accrued expenses | 82,546 |

| | |
|-------------------|------------|
| Total liabilities | \$ 831,633 |
|-------------------|------------|

PREFERRED SHARES AT REDEMPTION VALUE:

| | |
|--|---------------|
| \$25,000 liquidation value per share applicable to 4,040 shares, including dividends payable of \$4,135 | \$101,004,135 |
|--|---------------|

NET ASSETS APPLICABLE TO COMMON SHAREOWNERS:

| | |
|--|---------------|
| Paid-in capital | \$315,886,211 |
| Undistributed net investment income | 10,008,929 |
| Accumulated net realized loss on investments | (24,440,705) |
| Net unrealized loss on investments | (9,382,792) |

| | |
|---|---------------|
| Net assets applicable to common shareowners | \$292,071,643 |
|---|---------------|

NET ASSET VALUE PER SHARE:

| | |
|---|----------|
| No par value, (unlimited number of shares authorized) | |
| Based on \$292,071,643/22,177,337 common shares | \$ 13.17 |

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

Pioneer Municipal High Income Trust | Semiannual Report | 10/31/09 21

Statement of Operations (unaudited)

For the Six Months Ended 10/31/09

INVESTMENT INCOME:

| | |
|----------|--------------|
| Interest | \$14,665,409 |
|----------|--------------|

EXPENSES:

| | |
|----------------------------------|--------------|
| Management fees | \$ 1,128,499 |
| Administration fees | 197,185 |
| Transfer agent fees and expenses | 20,896 |
| Auction agent fees | 135,189 |

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| | | |
|---|----------------|--------------|
| Custodian fees | | 6,957 |
| Registration fees | | 11,972 |
| Professional fees | | 44,981 |
| Printing expense | | 15,013 |
| Trustees' fees | | 6,200 |
| Pricing fees | | 7,608 |
| Miscellaneous | | 18,208 |
| ----- | | |
| Total expenses | | \$ 1,592,708 |
| ----- | | |
| Net investment income | | \$13,072,701 |
| ----- | | |
| REALIZED AND UNREALIZED GAIN (LOSS) ON INVESTMENTS: | | |
| Net realized loss from investments | \$ (1,715,675) | |
| Change in net unrealized loss from investments | 43,167,502 | |
| ----- | | |
| Net gain on investments | | \$41,451,827 |
| ----- | | |
| DISTRIBUTIONS TO PREFERRED SHAREOWNERS FROM NET INVESTMENT INCOME: | | |
| | | \$ (273,848) |
| ----- | | |
| Net increase in net assets applicable to common shareowners resulting from operations | | \$54,250,680 |
| ===== | | |

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

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Statement of Changes in Net Assets

For the Six Months Ended 10/31/09 and Year Ended 4/30/09, respectively

| | Six Months Ended 10/31/09 (unaudited) | Year Ended 4/30/09 |
|--|--|--------------------------|
| ----- | | |
| FROM OPERATIONS: | | |
| Net investment income | \$ 13,072,701 | \$ 24,807,728 |
| Net realized loss on investments | (1,715,675) | (6,389,854) |
| Change in net unrealized gain (loss) on investments | 43,167,502 | (60,921,177) |
| Distributions to preferred shareowners from net investment income | (273,848) | (2,525,210) |
| ----- | | |
| Net increase (decrease) in net assets applicable to common shareowners resulting from operations | \$ 54,250,680 | \$ (45,028,513) |
| ----- | | |
| DISTRIBUTIONS TO COMMON SHAREOWNERS: | | |
| Net investment income (\$0.46 and \$0.85 per share, respectively) | \$ (10,190,348) | \$ (18,817,657) |
| ----- | | |
| Total distributions to common shareowners | \$ (10,190,348) | \$ (18,817,657) |
| ----- | | |
| FROM TRUST SHARE TRANSACTIONS: | | |
| Reinvestment of distributions | \$ 451,303 | \$ 175,511 |

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| | | |
|---|---------------|-----------------|
| Net increase in net assets applicable to common shareowners resulting from Trust share transactions | \$ 451,303 | \$ 175,511 |
| Net increase (decrease) in net assets applicable to common shareowners | \$ 44,511,635 | \$ (63,670,659) |
| NET ASSETS APPLICABLE TO COMMON SHAREOWNERS: | | |
| Beginning of period | 247,560,008 | 311,230,667 |
| End of period | \$292,071,643 | \$247,560,008 |
| Undistributed net investment income | \$ 10,008,929 | \$ 7,400,424 |

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

Pioneer Municipal High Income Trust | Semiannual Report | 10/31/09 23

Financial Highlights

| | For the Six Months Ended 10/31/09 (unaudited) | Year Ended 4/30/09 |
|--|---|--------------------|
| Per Common Share Operating Performance | | |
| Net asset value, beginning of period | \$ 11.18 | \$ 14.00 |
| Increase (decrease) from investment operations:(a) | | |
| Net investment income | \$ 0.59 | \$ 1.00 |
| Net realized and unrealized gain (loss) on investments and interest rate swaps | 1.87 | (3.00) |
| Dividends and distributions to preferred shareowners from: | | |
| Net investment income | (0.01) | (0.10) |
| Net realized gains | -- | -- |
| Net increase (decrease) from investment operations | \$ 2.45 | \$ (2.00) |
| Dividends and distributions to common shareowners from: | | |
| Net investment income | (0.46) | (0.00) |
| Net realized gains | -- | -- |
| Capital charge with respect to issuance of: | | |
| Common shares | -- | -- |
| Net increase (decrease) in net asset value | \$ 1.99 | \$ (2.00) |
| Net asset value, end of period(b) | \$ 13.17 | \$ 11.00 |
| Market value, end of period(b) | \$ 13.21 | \$ 10.00 |
| Total return at market value(c) | 31.93% | (18.00%) |
| Ratios to average net assets of common shareowners | | |
| Net expenses(d) | 1.16% (e) | 1.00% |
| Net investment income before preferred share dividends | 9.53% (e) | 9.00% |
| Preferred share dividends | 0.20% (e) | 0.00% |
| Net investment income available to common shareowners | 9.33% (e) | 8.00% |

Financial Highlights

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| | Year Ended 4/30/08 | Year Ended 4/30/07 | Year Ended 4/30/06 |
|--|--------------------------|--------------------------|--------------------------|
| Per Common Share Operating Performance | | | |
| Net asset value, beginning of period | \$ 16.02 | \$ 15.15 | \$ 14.07 |
| Increase (decrease) from investment operations:(a) | | | |
| Net investment income | \$ 1.08 | \$ 1.02 | \$ 0.83 |
| Net realized and unrealized gain (loss) on investments and interest rate swaps | (2.03) | 0.78 | 0.78 |
| Dividends and distributions to preferred shareowners from: | | | |
| Net investment income | (0.17) | (0.16) | (0.16) |
| Net realized gains | -- | -- | -- |
| Net increase (decrease) from investment operations | | | |
| | \$ (1.12) | \$ 1.64 | \$ 1.25 |
| Dividends and distributions to common shareowners from: | | | |
| Net investment income | (0.83) | (0.77) | (0.77) |
| Net realized gains | -- | -- | -- |
| Capital charge with respect to issuance of: | | | |
| Common shares | -- | -- | -- |
| Net increase (decrease) in net asset value | | | |
| | \$ (1.95) | \$ 0.87 | \$ 1.48 |
| Net asset value, end of period(b) | | | |
| | \$ 14.07 | \$ 16.02 | \$ 15.55 |
| Market value, end of period(b) | | | |
| | \$ 13.88 | \$ 15.05 | \$ 14.07 |
| Total return at market value(c) | | | |
| | (2.28)% | 20.04% | 15.52% |
| Ratios to average net assets of common shareowners | | | |
| Net expenses(d) | 1.03% | 1.06% | 1.06% |
| Net investment income before preferred share dividends | 7.17% | 6.49% | 6.49% |
| Preferred share dividends | 1.13% | 1.01% | 1.01% |
| Net investment income available to common shareowners | 6.04% | 5.48% | 5.48% |

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

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| | For the Six Months Ended 10/31/09 (unaudited) | Year Ended 4/30/08 |
|---|--|--------------------------|
| Portfolio turnover | 6% | 6% |
| Net assets of common shareowners, end of period (in thousands) | \$ 292,072 | \$ 247,500 |
| Preferred shares outstanding (in thousands) | \$ 101,000 | \$ 101,000 |
| Asset coverage per preferred share, end of period(f) | \$ 97,296 | \$ 86,200 |
| Average market value per preferred share | \$ 25,000 | \$ 25,000 |
| Liquidation value, including dividends payable, per preferred share | \$ 25,001 | \$ 25,000 |
| Ratios to average net assets of common shareowners before waivers and reimbursement of expenses | | |
| Net expenses(d) | 1.16% (e) | 1.06% |

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| | | |
|--|-----------|----|
| Net investment income before preferred share dividends | 9.53% (e) | 9. |
| Preferred share dividends | 0.20% (e) | 0. |
| Net investment income available to common shareowners | 9.33% (e) | 8. |

| | Year Ended 4/30/08 | Year Ended 4/30/07 | |
|---|--------------------------|--------------------------|----|
| Portfolio turnover | 17% | 18% | |
| Net assets of common shareowners, end of period (in thousands) | \$311,231 | \$354,486 | \$ |
| Preferred shares outstanding (in thousands) | \$101,000 | \$101,000 | \$ |
| Asset coverage per preferred share, end of period(f) | \$102,047 | \$112,759 | \$ |
| Average market value per preferred share | \$ 25,000 | \$ 25,000 | \$ |
| Liquidation value, including dividends payable, per preferred share | \$ 25,010 | \$ 25,014 | \$ |
| Ratios to average net assets of common shareowners before waivers and reimbursement of expenses | | | |
| Net expenses(d) | 1.03% | 1.06% | |
| Net investment income before preferred share dividends | 7.17% | 6.49% | |
| Preferred share dividends | 1.13% | 1.01% | |
| Net investment income available to common shareowners | 6.04% | 5.48% | |

- (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 returns covering less than a full period are not annualized. 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 dividend payments to preferred shareowners.
- (e) Annualized.
- (f) Market value is redemption value without an active market.

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

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

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Notes to Financial Statements | 10/31/09 (unaudited)

1. Organization and Significant Accounting Policies

Pioneer Municipal High Income Trust (the Trust) was organized as a Delaware

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statutory trust on March 13, 2003. Prior to commencing operations on July 21, 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 primary investment objective of the Trust is to seek a high level of current income exempt from regular federal income tax and, as a secondary investment objective, the Trust may seek capital appreciation to the extent consistent with its primary investment objective.

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

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

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

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

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A. Security Valuation

Security transactions are recorded as of trade date. Securities are valued at prices supplied by independent pricing services, which consider such factors as Treasury spreads, yields, maturities and ratings. Valuations may be supplemented by values obtained from dealers and other sources, as required. The values of interest rate swaps are determined by obtaining dealer quotations. Securities for which there are no other readily available valuation methods are valued using fair value methods pursuant to procedures adopted by the Board of Trustees (board determined). The Trust may also use fair value methods to value a security including a non-U.S. security, when the closing market price on the principal exchange where the security is traded no longer reflects the value of the security. Temporary cash investments are valued at amortized cost which approximates market value. At October 31, 2009, there were no securities valued at prices that were board determined.

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

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including interest bearing cash accounts, is recorded on an accrual basis.

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

B. Federal Income Taxes

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

The amounts and characterizations of distributions to shareowners for financial reporting purposes are determined in accordance with federal income tax rules. Therefore, the sources of the Trust's distributions may be shown in the accompanying financial statements as either from or in excess of net investment income or 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.

The tax character of distributions paid to common and preferred shareowners will be determined at the end of the fiscal year. Distributions during the year ended April 30, 2009 were as follows:

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| | |
|--------------------------|--------------|
| | ----- |
| | 2009 |
| | ----- |
| Distributions paid from: | |
| Tax exempt income | \$21,171,440 |
| Ordinary income | 171,427 |
| | ----- |
| Total | \$21,342,867 |
| | ===== |

The following shows the components of distributable earnings (losses) on a federal income tax basis at April 30, 2009.

| | |
|---------------------------------|-----------------|
| | ----- |
| | 2009 |
| | ----- |
| Distributable earnings: | |
| Undistributed tax-exempt income | \$ 5,302,103 |
| Undistributed ordinary income | 118,898 |
| Capital loss carryforward | (15,079,753) |
| Post-October loss deferred | (7,564,631) |
| Dividend payable | (3,430) |
| Unrealized depreciation | (50,648,087) |
| | ----- |
| Total | \$ (67,874,900) |
| | ===== |

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

C. Automatic Dividend Reinvestment Plan

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

Whenever the Trust declares a dividend on common shares payable in cash, participants in the Plan will receive the equivalent in common shares acquired by the Plan Agent either (i) through receipt of additional unissued but authorized common shares from the Trust or (ii) by purchase of outstanding common shares on the New York Stock Exchange or elsewhere. If, on the payment date for any dividend, the net asset value per common share is equal to or less than the market price per share plus estimated brokerage

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trading fees (market premium), the Plan Agent will invest the dividend amount in newly issued common shares. The number of newly issued common shares to be credited to each account will be determined by dividing the dollar amount of the dividend by the net asset value per common share on the date the shares are issued, provided that the maximum discount from the then current market price per share on the date of issuance does not exceed 5%. If, on the payment date for any dividend, the net asset value per common share is greater than the market value (market discount), the Plan Agent will invest the dividend amount in common shares acquired in open-market purchases. There are no brokerage charges with respect to newly issued common shares. However, each participant will pay a pro rata share of brokerage trading fees incurred with respect to the Plan Agent's open-market purchases. Participating in the Plan does not relieve shareowners from any federal, state or local taxes which may be due on dividends paid in any taxable year. Shareowners holding Plan shares in a brokerage account may not be able to transfer the shares to another broker and continue to participate in the Plan.

2. Management Agreement

Pioneer Investment Management, Inc. (PIM), a wholly owned indirect subsidiary of UniCredit S.p.A. (UniCredit), manages the Trust's portfolio. Management fees payable under the Trust's Advisory Agreement with PIM are calculated daily at the annual rate of 0.60% of the Trust's average daily managed assets. "Managed assets" 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 or the

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issuance of debt securities), (ii) the issuance of preferred stock or other similar preference securities, and/or (iii) any other means. For the six months ended October 31, 2009, the net management fee was equivalent to 0.60% of the Trust's average daily managed assets, which was equivalent to 0.82% 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 October 31, 2009, \$214,178 was payable to PIM related to management costs, administrative costs and certain other services and is included in "Due to Affiliates" on the Statement of Assets and Liabilities.

The Trust has retained Princeton Administrators, LLC (Princeton) to provide certain administrative and accounting services to the Trust on its behalf. The Trust pays Princeton a monthly fee at an annual rate of 0.07% of the average

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

3. Transfer Agents

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

4. Trust Shares

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

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

| | 10/2009 | 4/2009 |
|---|------------|------------|
| Shares outstanding at beginning of period | 22,140,525 | 22,127,742 |
| Reinvestment of distributions | 36,812 | 12,783 |
| Shares outstanding at end of period | 22,177,337 | 22,140,525 |

The Trust may classify or reclassify any unissued common shares of beneficial interest into one or more series of preferred shares of beneficial interest. As of October 31, 2009, there were 4,040 APS as follows: Series A-2,000 and Series B-2,040.

Dividends on Series A and Series B are cumulative at a rate which is reset

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every seven days based on the results of an auction. An auction fails if there are more APS offered for sale than there are buyers. When an auction fails, the dividend rate for the period will be the maximum rate on the auction dates described in the prospectus for the APS. Preferred shareowners will not be able to sell their APS at an auction if the auction fails. Since February 2008, the Trust's auctions related to the APS have failed. The maximum rate for the 7-Day Series is 110% of the 7 day commercial rate or Kenny rate. Dividend rates ranged from 0.381% to 0.744% during the six months ended October 31, 2009.

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

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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 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.

5. Subsequent Events

Subsequent to October 31, 2009, the Board of Trustees of the Trust declared a dividend from undistributed net investment income of \$0.085 per common share payable November 30, 2009, to shareowners of record on November 16, 2009.

Subsequent to October 31, 2009, dividends declared and paid on preferred shares totaled \$35,626 in aggregate for the two outstanding preferred share series through December 3, 2009.

In preparing these financial statements, PIM has evaluated the impact of all subsequent events and transactions for potential recognition or disclosure through December 21, 2009, the date the financial statements were issued, and has determined that there were no subsequent events requiring recognition or disclosure in the financial statements.

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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

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

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

CEO CERTIFICATION DISCLOSURE (unaudited)

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

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Trustees, Officers and Service Providers

Trustees

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

Officers

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

Investment Adviser

Pioneer Investment Management, Inc.

Custodian

Brown Brothers Harriman & Co.

Legal Counsel

Bingham McCutchen LLP

Transfer agent

Pioneer Investment Management Shareholder Services, Inc.

Shareowner Services and Sub-Transfer Agent

American Stock Transfer & Trust Company

Preferred Share Auction/Transfer Agent and Registrar

Deutsche Bank Trust Company Americas

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Sub-Administrator
Princeton Administrators, LLC

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

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This page for your notes.

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How to Contact Pioneer

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

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

Account Information 1-800-710-0935

Or write to AST:

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

Write to
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

Visit our web site: www.amstock.com

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

The Trust files a complete statement of investments with the Securities and

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

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

ITEM 2. CODE OF ETHICS.

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

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

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

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

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

Not applicable.

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

Not applicable.

(f) The registrant must:

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

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

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

ITEM 3. AUDIT COMMITTEE FINANCIAL EXPERT.

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

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

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

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

(2) If the registrant provides the disclosure required by paragraph (a)(1)(i) of this Item, it must disclose the name of the audit committee financial expert and whether that person is "independent." In order to be considered "independent" for purposes of this Item, a member of an audit 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:

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

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

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

Not applicable.

ITEM 4. PRINCIPAL ACCOUNTANT FEES AND SERVICES.

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

N/A

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

N/A

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

N/A

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

N/A

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

PIONEER FUNDS

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

SECTION I - POLICY PURPOSE AND APPLICABILITY

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

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

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

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

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

SECTION II - POLICY

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

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project. In most cases, if the Audit-Related Services are not performed by the Audit firm, the scope of the Audit Services would likely increase. The Services are typically well-defined and governed by accounting professional standards (AICPA, SEC, etc.)

AUDIT COMMITTEE APPROVAL POLICY

AUDIT COMMITTEE REPORTING POLICY

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

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

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

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

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

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

SECTION III - POLICY DETAIL, CONTINUED

| SERVICE CATEGORY | SERVICE CATEGORY DESCRIPTION | SPECIFIC PRE-APPROVED SERVICE SUBCATEGORIES |
|-------------------|--|--|
| III. TAX SERVICES | Services which are not prohibited by the Rule, | <ul style="list-style-type: none"> o Tax planning and support o Tax controversy assistance |

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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.

- 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 | <ul style="list-style-type: none"> o Business Risk Management support o Other control and regulatory compliance projects |

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

AUDIT COMMITTEE APPROVAL POLICY

AUDIT COMMITTEE REPORTING POLICY

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

SECTION III - POLICY DETAIL, CONTINUED

| SERVICE CATEGORY | SERVICE CATEGORY DESCRIPTION | SPECIFIC PROHIBITED SERVICE SUBCATEGORIES |
|---------------------|--|---|
| PROHIBITED SERVICES | Services which result in the auditors losing independence status under the Rule. | <ol style="list-style-type: none"> 1. Bookkeeping or other services related to the accounting records or financial statements of the audit client* 2. Financial information systems design and implementation* 3. Appraisal or valuation services, fairness* opinions, or contribution-in-kind reports 4. Actuarial services (i.e., setting actuarial reserves versus actuarial audit work)* 5. Internal audit outsourcing services* |

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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

-
- o These services are not to be performed with the exception of the(*) services that may be permitted if they would not be subject to audit procedures at the audit client (as defined in rule 2-01(f)(4)) level the firm providing the service.

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

GENERAL AUDIT COMMITTEE APPROVAL POLICY:

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

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

N/A

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

N/A

(g) Disclose the aggregate non-audit fees billed by the registrant's accountant for services rendered to the registrant, and rendered to the registrant's investment adviser (not including any sub-adviser whose role is primarily

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portfolio management and is subcontracted with or overseen by another investment adviser), and any entity controlling, controlled by, or under common control with the adviser that provides ongoing services to the registrant for each of the last two fiscal years of the registrant.

N/A

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

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

Item 5. Audit Committee of Listed Registrants

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

N/A

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

N/A

Item 6. Schedule of Investments.

File Schedule 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,

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describe the policies and procedures that it uses to determine how to vote proxies relating to portfolio securities, including the procedures that the company uses when a vote presents a conflict between the interests of its shareholders, on the one hand, and those of the company's investment adviser; principal underwriter; or any affiliated person (as defined in Section 2(a)(3) of the Investment Company Act of 1940 (15 U.S.C. 80a-2(a)(3)) and the rules thereunder) of the company, its investment adviser, or its principal underwriter, on the other. Include any policies and procedures of the company's investment adviser, or any other third party, that the company uses, or that are used on the company's behalf, to determine how to vote proxies relating to portfolio securities.

Information not required in semi annual reports on form NCSR.

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

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

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

Information not required in semi annual reports on form NCSR.

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

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

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

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

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

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

ITEM 11. CONTROLS AND PROCEDURES.

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

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

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

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

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

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

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applicable sales charges was included. Those prospectuses were revised, and the revised prospectuses were distributed to shareholders.

ITEM 12. EXHIBITS.

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

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

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

Filed herewith.

SIGNATURES

[See General Instruction F]

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

(Registrant) Pioneer Municipal High Income Trust

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

Date December 29, 2009

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

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

Date December 29, 2009

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

Date December 29, 2009

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