

PIONEER MUNICIPAL HIGH INCOME TRUST
Form N-CSR/A
March 06, 2013

OMB APPROVAL
OMB Number: 3235-0570
Expires: August 31, 2013
Estimated average burden
hours per response.....18.9

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)

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

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

Date of fiscal year end: April 30

Date of reporting period: May 1, 2012 through October 31, 2012

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

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

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ITEM 1. REPORTS TO SHAREOWNERS.

Pioneer Municipal High
Income Trust

Semiannual Report | October 31, 2012

Ticker Symbol: MHI

[LOGO] PIONEER
Investments (R)

visit us: us.pioneerinvestments.com

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President's Letter

Dear Shareowner,

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

All of these factors contributed to gains for investors who owned riskier assets, including equities and higher-yielding corporate bonds. Year to date through the end of the third quarter, the Standard & Poor's 500 Index returned

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

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

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

* Dividends are not guaranteed.

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

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

Sincerely,

/s/ Daniel K. Kingsbury

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

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

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Portfolio Management Discussion | 10/31/12

Strong investor demand and limited supply helped produce solid returns from

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municipal bond investments during the six months ended October 31, 2012. In the following interview, David Eurkus discusses the factors that influenced the performance of Pioneer Municipal High Income Trust during the six-month period. Mr. Eurkus, senior vice president and portfolio manager at Pioneer, is responsible for the daily management of the Trust.

Q How did Pioneer Municipal High Income Trust perform during the six months ended October 31, 2012?

A Pioneer Municipal High Income Trust produced a total return of 8.33% at net asset value, and 7.53% at market price during the six months ended October 31, 2012. During the same period, the Trust's benchmarks, the Barclays Capital High Yield Municipal Bond Index and the Barclays Capital Municipal Bond Index, returned 7.45% and 3.34%, respectively. The Barclays Capital High Yield Municipal Bond Index is designed to track the performance of lower-rated municipal bonds. The Barclays Capital Municipal Bond Index is designed to track the performance of investment-grade municipal bonds. During the same six months ended October 31, 2012, the average return (at market price) of the 12 closed end funds in Lipper's High Yield Municipal Debt Closed End Funds category (which may or may not be leveraged) was 8.75%.

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

The shares of the Trust were selling at a 9.0% premium to net asset value at the end of the period.

On October 31, 2012, the standardized 30-day SEC yield on the Trust's shares was 2.83%.

Q How would you describe the investment environment for municipal bonds during the six months ended October 31, 2012?

A The municipal market enjoyed healthy inflows of new money during the six months ended October 31, 2012, from both traditional investors seeking tax advantages and institutional investors who were attracted by the competitive yields available from municipal securities compared with taxable investments. During the period, both investment-grade and higher-yielding, below-investment-grade municipal securities produced more

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income than comparable-quality and similar-maturity taxable securities, on an after-tax basis. As demand increased during the six-month period, the supply of municipal securities remained limited. As a consequence, municipal bond prices rose and interest rates declined, delivering total returns in the asset class that often were superior to those available in the taxable market. In addition to offering attractive relative values, municipal revenue bonds continued to be perceived as a relatively safe place for investors' money.

Q What investment strategies did you pursue during the six months ended October 31, 2012, and how did the strategies affect the Trust's performance?

A In a favorable market for municipal bonds, the Trust outperformed its two benchmarks, aided by quality security selection in both investment-grade and high-yield municipals, and the Trust's longer-duration positioning as compared with the two Barclays Capital municipal indices' weighted average duration. The longer-duration positioning helped the Trust to capture price

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gains as interest rates declined during the period.

We kept the Trust fully invested during the six-month period and maintained a duration positioning that was longer than that of the benchmarks. In addition, the Trust's portfolio of investments included many established positions with adequate call protection that had much higher yields than those currently available. Call protection limits the issuers' ability to pre-pay their debt in order to refinance into lower-yielding substitutes.

During the period, we maintained the Trust's traditional emphasis on project revenue bonds, which are secured by dedicated revenue streams from specific projects, such as hospitals or airport facilities. We focus the Trust's investments on these securities because of the reliability of their funding sources as compared with general obligation bonds, which do not require dedicated revenue streams and can be more affected by credit rating downgrades or the general fiscal problems of a municipality or agency.

At the end of the period on October 31, 2012, health care revenue bonds represented the largest allocation in the Trust's total investment portfolio, at 17.1% of invested assets, followed by insurance revenue bonds, which accounted for 14.9% of the Trust's total investment portfolio. Other project revenue allocations in the Trust's portfolio included those in education, housing, transportation and pollution control facilities.

As of October 31, 2012, 44.8% of the Trust's total investment portfolio was invested in securities with investment-grade credit ratings, while 55.2% of the Trust's total investment portfolio was held in high-yield securities.

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Q What types of investments had a material effect on the Trust's performance during the six months ended October 31, 2012?

A The Trust's performance during the period benefited from strong results generated by both the investment-grade and high-yield allocations in the portfolio, across a range of areas, including the hospital/health care sector and the transportation and industrial development groups. We believe the Trust's performance during the period provides evidence of the value of our disciplined investment process, which relies on basic, fundamental research and the analysis of individual securities as well as the reliability of the securities' funding sources.

Among individual Trust holdings during the period, standout performers included a British Airways transportation revenue bond issued in New York and an industrial development authority security issued by the Pennsylvania Economic Development Authority (backed by a U.S. Gypsum project). In the hospital/health care sector, the Trust saw positive results from several Massachusetts Health and Education Authority bonds. The Trust owned a security backed by the Mohegan Sun Casino in Connecticut, which also fared well during the period, as did holdings of several state revenue bonds backed by proceeds from tobacco liability settlements.

Among the Trust's investments that detracted from results during the period were bonds backed by revenues of two continuing care retirement communities, one in Nassau County, New York, and one issued by the Illinois state financing authority.

Q How did the level of leverage employed by the Trust change over the six months ended Sept. 30, 2012?

A At the end of the six-month period ended October 31, 2012, 23.3% of the

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Trust's total managed assets were financed by leverage, compared with 24.1% of the Trust's total managed assets financed by leverage at the start of the period on May 1, 2012. The decrease was due to changes in the values of securities in which the Trust invested.

Q What is your investment outlook?

A We continue to see what we believe to be good values and attractive opportunities in the municipal market, both in high-yield and investment-grade securities. We believe we will see in the future the continued need for financing of essential projects, and that need should provide quality investment opportunities for those who focus on fundamental research of the strengths and financial reliability of each proposed project. We think credit research will remain essential for investment success.

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The municipal markets as well as the capital markets in general do face a number of issues that can affect values, including the continuing political debate in the U.S. over the country's national debt, levels of taxation, and discretionary spending policies.

We plan to stay focused on intensive, independent research when selecting securities for the Trust's portfolio, looking at the different sectors involved in public finance and examining which areas we believe are most likely to have secure revenues, and which services are considered to be most essential. We are watching carefully for new areas of investment opportunity, which may include financing for charter schools, seaport facility expansions, toll road construction and maintenance, and energy production. In the current environment, we also will be paying close attention to which type of projects may be affected by any change in federal tax or spending policies.

Please refer to the Schedule of Investments on pages 13-23 for a full listing of Trust securities.

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

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

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

When interest rates rise, the prices of debt securities held by the Trust will generally fall. Conversely, when interest rates fall the prices of debt 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 the issuers of the underlying securities and the issuers' inability to meet their debt obligations.

The Trust may invest up to 20% of its total assets in illiquid securities.

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Illiquid securities may be difficult to dispose of at a fair price at the times when the Trust believes it is desirable to do so, and their market price is generally more volatile than that of more liquid securities. Illiquid securities are also more difficult to value and investment of the Trust's assets in illiquid securities may restrict the Trust's ability to take advantage of market opportunities.

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

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

Risks of investing in the Trust are discussed in greater detail in the Trust's original offering prospectus and in shareowner reports issued from time to time.

These risks may increase share price volatility.

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

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

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Portfolio Summary | 10/31/12

Portfolio Diversification

(As a percentage of total investment portfolio)

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

Health Care Revenue Bonds	17.0%
Other Revenue Bonds	16.2%
Insured	14.9%
Facilities Revenue Bonds	13.9%
Tobacco Revenue Bonds	13.7%
Development Revenue Bonds	8.0%
Education Revenue Bonds	6.2%
Airport Revenue Bonds	5.6%

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Transportation Revenue Bonds	2.7%
Pollution Control Revenue Bonds	1.8%
Utilities Revenue Bonds	0.0%*

* Amount is less than 0.1%

Portfolio Quality

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

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

NR	38.7%
AA	14.3%
BBB	13.9%
AAA	11.1%
B	10.7%
BB	5.8%
A	5.5%

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

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

10 Largest Holdings

(As a percentage of long-term holdings)*

1.	Metropolitan Pier & Exposition Authority Dedicated State Tax Revenue, 0.0%, 6/15/22	3.77
2.	Lehman Municipal Trust Receipts Revenue, 11.545%, 8/21/35	3.34
3.	State of Washington, GO, 0.0%, 6/1/22	2.71
4.	North Texas Tollway Authority Transportation Revenue, 5.75%, 1/1/33	2.66
5.	New York State Dormitory Authority Revenue, 13.073%, 5/29/14 (144A)	2.53
6.	Lehman Municipal Trust Receipts Revenue, RIB, 10.829%, 9/20/28 (144A)	2.40
7.	Massachusetts Development Finance Agency Revenue, 5.75%, 1/1/42	2.26
8.	State of Texas, GO, 12.332%, 4/1/13	2.17
9.	Tobacco Settlement Financing Corp., Revenue, 6.75%, 6/1/39	1.99
10.	Tobacco Settlement Authority Revenue, 6.625%, 6/1/32	1.76

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

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Prices and Distributions | 10/31/12

Market Value per Common Share

	10/31/12	4/30/12
	\$16.04	\$15.49
Premium	9.0%	9.7%

Net Asset Value per Common Share

	10/31/12	4/30/12
	\$14.72	\$14.12

Distributions per Common Share

	Net Investment Income	Short-Term Capital Gains	Long-Term Capital Gains
5/1/12 - 10/31/12	\$0.570	\$ --	\$ --

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Performance Update | 10/31/12

Investment Returns

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

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Barclays Capital Municipal Bond Index and Barclays Capital High Yield Municipal Bond Index.

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

Period	Net Asset Value (NAV)	Market Price
Life-of-Trust (7/17/2003)	7.66%	8.13%
5 Years	7.15	10.06
1 Year	16.52	21.22

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

Market Value of \$10,000 Investment

	Pioneer Municipal High Income Trust	Barclays Capital High Yield Municipal Bond Index	Barclays Capital Municipal Bond Index
7/31/2003	\$ 10,000	\$ 10,000	\$ 10,000
10/31/2003	\$ 10,097	\$ 10,419	\$ 10,319
10/31/2004	\$ 10,504	\$ 11,446	\$ 10,941
10/31/2005	\$ 11,261	\$ 12,522	\$ 11,219
10/31/2006	\$ 11,991	\$ 14,009	\$ 11,863
10/31/2007	\$ 12,789	\$ 14,326	\$ 12,209
10/31/2008	\$ 8,865	\$ 11,614	\$ 11,805
10/31/2009	\$ 13,395	\$ 13,303	\$ 13,411
10/31/2010	\$ 16,540	\$ 15,147	\$ 14,454
10/31/2011	\$ 17,043	\$ 15,656	\$ 15,001
10/31/2012	\$ 20,660	\$ 18,307	\$ 16,355

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

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

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

Closed-end funds, unlike open-end funds, are not continuously offered. There is a one-time public offering and once issued, shares of closed-end funds are sold in the open market through a stock exchange and frequently trade at prices lower than their NAV. NAV 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

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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 do not employ leverage. It is not possible to invest directly in the indices.

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Schedule of Investments | 10/31/12 (unaudited)

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

		TAX EXEMPT OBLIGATIONS --	
		123.8% of Net Assets	
		Alabama -- 2.4%	
2,500,000	B-/B2	Alabama Industrial Development Authority Solid Waste Disposal Revenue, 6.45%, 12/1/23	\$ 2,499,650
1,000,000	NR/NR	Huntsville-Redstone Village Special Care Facilities Financing Authority Nursing Home Revenue, 5.5%, 1/1/28	1,013,270
4,500,000	NR/NR	Huntsville-Redstone Village Special Care Facilities Financing Authority Nursing Home Revenue, 5.5%, 1/1/43	4,507,920

			\$ 8,020,840

		Arizona -- 0.7%	
984,000	NR/Baa3	Pima County Industrial Development Authority Education Revenue, 6.75%, 7/1/31	\$ 985,191
950,000	NR/Baa3	Pima County Industrial Development Authority Education Revenue, 7.25%, 7/1/31	951,871
500,000	NR/Baa2	Yavapai County Industrial Development Authority Medical Revenue, 6.0%, 8/1/33	517,465

			\$ 2,454,527

		California -- 12.3%	
3,000,000 (a)	NR/A1	Abag Finance Authority for Nonprofit Corp. Revenue, 5.75%, 7/1/37	\$ 3,480,270
5,100,000	B-/NR	California County Tobacco Securitization Agency Revenue, 5.125%, 6/1/38	4,441,998
1,450,000	NR/NR	California Enterprise Development Authority	

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568,006 (b)	NR/NR	Recovery Zone Facility Revenue, 8.5%, 4/1/31 California Statewide Communities Development Authority Environmental Facilities Revenue, 9.0%, 12/1/38	1,680,463 5,027
4,000,000	BB/NR	California Statewide Communities Development Authority Revenue Higher Education Revenue, 7.25%, 10/1/38 (144A)	4,116,880
5,150,000 (a)	AA+/Aaa	Golden State Tobacco Securitization Corp., Revenue Bonds, 7.8%, 6/1/42	5,376,136
7,000,000 (a)	AA+/Aaa	Golden State Tobacco Securitization Corp., Revenue Bonds, 7.875%, 6/1/42	7,310,240
7,885,000	AA-/WR	Lehman Municipal Trust Receipts Revenue, RIB, 10.829%, 9/20/28 (144A)	9,995,263
2,000,000	B-/Caa1	Tobacco Securitization Authority of Northern California, Revenue, 5.375%, 6/1/38	1,694,820
3,000,000	BB+/B3	Tobacco Securitization Authority of Southern California Revenue, 5.0%, 6/1/37	2,555,310
			\$ 40,656,407

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

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Schedule of Investments | 10/31/12 (unaudited) (continued)

Principal Amount USD (\$)	S&P/Moody's Ratings		Value
2,000,000	BBB+/NR	Colorado -- 1.0% Colorado Health Facilities Authority Revenue, 5.25%, 5/15/42	\$ 2,065,900
1,000,000	NR/NR	Kremmling Memorial Hospital District Certificate of Participation, 7.125%, 12/1/45	1,122,100
			\$ 3,188,000
1,000,000	NR/NR	Connecticut -- 6.0% Hamden Connecticut Facility Revenue, 7.75%, 1/1/43	\$ 1,096,950
10,335,000 (c)	AAA/WR	Lehman Municipal Trust Receipts Revenue, 11.545%, 8/21/35	13,915,457
5,000,000	B/NR	Mohegan Tribe of Indians Gaming Authority, 6.25%, 1/1/31	5,004,450
			\$ 20,016,857
5,000,000	BBB/Baa1	District of Columbia -- 3.6% District of Columbia Tobacco Settlement Financing Corp., Revenue, 6.5%, 5/15/33	\$ 5,905,800
6,000,000	BBB/Baa1	District of Columbia Tobacco Settlement Financing Corp., Revenue, 6.75%, 5/15/40	6,119,340
			\$ 12,025,140

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		Florida -- 7.4%	
1,500,000	NR/NR	Alachua County Health Facilities Authority Revenue, 8.125%, 11/15/41	\$ 1,746,045
1,500,000	NR/NR	Alachua County Health Facilities Authority Revenue, 8.125%, 11/15/46	1,746,045
1,500,000	NR/NR	Beacon Lakes Community Development District Special Assessment, 6.9%, 5/1/35	1,531,380
500,000	NR/Ba3	Capital Trust Agency Revenue Bonds, 7.75%, 1/1/41	559,550
1,000,000	NR/NR	Florida Development Finance Corp., Educational Facilities Revenue, 6.0%, 9/15/40	1,081,920
2,000,000	NR/NR	Florida Development Finance Corp., Educational Facilities Revenue, 7.625%, 6/15/41	2,337,560
1,000,000	NR/NR	Florida Development Finance Corp., Educational Facilities Revenue, 7.75%, 6/15/42	1,134,480
1,000,000 (a)	NR/WR	Hillsborough County Industrial Development Authority Revenue, 8.0%, 8/15/32	1,420,040
2,260,000	NR/NR	Liberty County Subordinate Revenue, 8.25%, 7/1/28	2,291,663
2,500,000	A/A2	Miami-Dade County Florida Aviation Revenue, 5.5%, 10/1/41	2,855,825

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

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Principal Amount USD (\$)	S&P/Moody's Ratings		Value
		Florida -- (continued)	
1,000,000	NR/NR	St. Johns County Industrial Development Authority Revenue, 5.25%, 1/1/26	\$ 960,430
2,000,000	NR/NR	St. Johns County Industrial Development Authority Revenue, 5.375%, 1/1/40	1,806,740
5,000,000	NR/Baa1	Tallahassee Health Facilities Revenue, 6.375%, 12/1/30	5,018,250

			\$ 24,489,928
		Georgia -- 2.7%	
4,240,000	AA-/WR	Atlanta Georgia Water and Wastewater Revenue, RIB, 10.829%, 1/30/13 (144A)	\$ 4,980,728
500,000	B-/NR	Clayton County Development Authority Revenue, 9.0%, 6/1/35	558,730
2,400,000	NR/NR	Fulton County Residential Care Facilities Revenue, 5.0%, 7/1/27	2,394,888
1,100,000	NR/NR	Fulton County Residential Care Facilities Revenue, 5.125%, 7/1/42	1,058,178

			\$ 8,992,524

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5,000,000	BBB+/Baa1	Idaho -- 1.5% Power County Industrial Development Corp., Revenue, 6.45%, 8/1/32	\$ 5,008,150

1,000,000 (b)	NR/NR	Illinois -- 14.1% Illinois Finance Authority Revenue, 6.0%, 11/15/27	\$ 302,570
3,865,000	BBB+/NR	Illinois Finance Authority Revenue, 6.0%, 8/15/38	4,399,027
2,000,000	AA+/Aa2	Illinois Finance Authority Revenue, 6.0%, 8/15/39	2,351,180
4,000,000 (b)	NR/NR	Illinois Finance Authority Revenue, 6.0%, 11/15/39	1,210,280
2,450,000	NR/NR	Illinois Finance Authority Revenue, 6.375%, 5/15/17	2,452,891
2,500,000	NR/Baa2	Illinois Finance Authority Revenue, 6.5%, 4/1/39	2,835,125
500,000	NR/NR	Illinois Finance Authority Revenue, 7.0%, 5/15/18	500,780
1,700,000	NR/NR	Illinois Finance Authority Revenue, 7.625%, 5/15/25	2,009,893
600,000	NR/NR	Illinois Finance Authority Revenue, 7.75%, 5/15/30	704,826
2,000,000	NR/NR	Illinois Finance Authority Revenue, 8.0%, 5/15/40	2,355,080
3,200,000	NR/NR	Illinois Finance Authority Revenue, 8.0%, 5/15/46	3,768,128

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

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Schedule of Investments | 10/31/12 (unaudited) (continued)

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

4,000,000	NR/NR	Illinois -- (continued) Illinois Finance Authority Revenue, 8.25%, 5/15/45	\$ 4,291,280
2,500,000	NR/NR	Illinois Finance Authority Revenue, 8.25%, 2/15/46	2,723,200
16,880,000 (e)	AAA/A3	Metropolitan Pier & Exposition Authority Dedicated State Tax Revenue, 0.0%, 6/15/22	15,702,958
1,515,000	NR/NR	Southwestern Illinois Development Authority Revenue, 5.625%, 11/1/26	1,297,385

			\$ 46,904,603

250,000	NR/NR	Indiana -- 1.6% City of Carmel Indiana Nursing Home Revenue, 7.0%, 11/15/32	\$ 257,505
750,000	NR/NR	City of Carmel Indiana Nursing Home Revenue, 7.125%, 11/15/42	772,440
500,000	NR/NR	City of Carmel Indiana Nursing Home	

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3,570,000	NR/NR	Revenue, 7.125%, 11/15/47 Vigo County Hospital Authority Revenue, 5.8%, 9/1/47 (144A)	513,125 3,694,415 \$ 5,237,485
1,500,000	BBB-/Baa3	Louisiana -- 2.1% Louisiana Local Government Environmental Facilities & Community Development Authority Revenue, 6.75%, 11/1/32	\$ 1,688,160
5,000,000	NR/Baa1	Louisiana Public Facilities Authority Revenue, 5.5%, 5/15/47	5,282,200 \$ 6,970,360
1,500,000	NR/Baa3	Maine -- 0.6% Maine Health & Higher Educational Facilities Authority Revenue, 7.5%, 7/1/32	\$ 1,917,945
7,100,000	A/WR	Massachusetts -- 6.5% Massachusetts Development Finance Agency Revenue, 5.75%, 1/1/42	\$ 9,420,990
2,250,000	NR/NR	Massachusetts Development Finance Agency Revenue, 7.1%, 7/1/32	2,250,945
825,000	AA/NR	Massachusetts Educational Financing Authority Revenue, 6.0%, 1/1/28	959,796
1,860,000	AAA/Aaa	Massachusetts Health & Educational Facilities Authority Revenue, 5.5%, 7/1/32	2,693,522
940,000	NR/Baa2	Massachusetts Health & Educational Facilities Authority Revenue, 6.0%, 10/1/23	941,711
4,500,000 (b)	NR/NR	Massachusetts Health & Educational Facilities Authority Revenue, 6.5%, 1/15/38	23,040

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

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Principal Amount USD (\$)	S&P/Moody's Ratings		Value
5,000,000	BB-/NR	Massachusetts -- (continued) Massachusetts Health & Educational Facilities Authority Revenue, 6.75%, 10/1/33	\$ 5,084,800 \$ 21,374,804
935,000	NR/NR	Michigan -- 3.3% Doctor Charles Drew Academy Certificate of Participation, 5.7%, 11/1/36	\$ 682,943
1,500,000	BB-/NR	John Tolfree Health System Corp. Revenue, 6.0%, 9/15/23	1,499,880
2,000,000	BB+/NR	Kent Hospital Finance Authority Revenue, 6.25%, 7/1/40	2,099,700
5,830,000	B-/NR	Michigan Tobacco Settlement Finance Authority Revenue, 6.0%, 6/1/48	5,102,766

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1,410,000 (a)	BBB/NR	Star International Academy Certificates of Participation, 6.125%, 3/1/37	1,463,932
			\$ 10,849,221
1,675,000	BB-/NR	Minnesota -- 0.9% Duluth Economic Development Authority Health Care Facilities Revenue, 7.25%, 6/15/32	\$ 1,694,229
1,000,000	NR/NR	Port Authority of the City of Bloomington, Recovery Zone Facility Revenue, 9.0%, 12/1/35	1,196,590
			\$ 2,890,819
1,600,000 (b) (d)	NR/NR	Montana -- 0.1% Two Rivers Authority Inc., Project Revenue, 7.375%, 11/1/27	\$ 239,440
2,000,000 (b) (d)	NR/NR	Nevada -- 0.0%+ Director of the State of Nevada Department of Business & Industry Transportation Revenue, 7.25%, 1/1/23	\$ 20
1,500,000	NR/NR	New Jersey -- 8.0% New Jersey Economic Development Authority Revenue, 10.5%, 6/1/32 (144A)	\$ 1,657,065
5,000,000	B/B3	New Jersey Economic Development Authority Revenue, 5.25%, 9/15/29	5,118,550
2,500,000	B-/B3	New Jersey Economic Development Authority Revenue, 5.75%, 9/15/27	2,545,425
6,150,000	B/B3	New Jersey Economic Development Authority Revenue, 7.0%, 11/15/30	6,172,878
3,000,000	B-/B1	Tobacco Settlement Financing Corp., Revenue, 4.625%, 6/1/26	2,861,460
8,000,000 (a)	AA+/#Aaa	Tobacco Settlement Financing Corp., Revenue, 6.75%, 6/1/39	8,304,640
			\$ 26,660,018

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

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Schedule of Investments | 10/31/12 (unaudited) (continued)

Principal Amount USD (\$)	S&P/Moody's Ratings		Value
1,500,000	NR/NR	New Mexico -- 1.2% Otero County New Mexico Project Revenue, 6.0%, 4/1/23	\$ 1,372,110
2,960,000	NR/NR	Otero County New Mexico Project Revenue, 6.0%, 4/1/28	2,576,325

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			\$ 3,948,435

		New York -- 7.9%	
2,000,000	NR/NR	Chautauqua County Capital Resource Corp., Revenue, 8.0%, 11/15/30	\$ 2,187,140
3,000,000	NR/NR	Dutchess County Industrial Development Agency Revenue, 7.5%, 3/1/29	3,085,770
2,000,000	BBB+/NR	Hempstead Local Development Corp. Revenue, 5.75%, 7/1/39	2,284,560
2,000,000	BB/B2	New York City Industrial Development Agency Revenue, 5.25%, 12/1/32	2,000,020
2,000,000	BB/B2	New York City Industrial Development Agency Revenue, 7.625%, 12/1/32	2,050,000
7,040,000 (c)	AAA/WR	New York State Dormitory Authority Revenue, 13.073%, 5/29/14 (144A)	10,545,709
1,000,000	NR/Ba1	New York State Dormitory Authority Revenue, 6.125%, 12/1/29	1,115,410
3,000,000	NR/NR	Suffolk County Industrial Development Agency Revenue, 7.25%, 1/1/30	3,002,730

			\$ 26,271,339

		North Carolina -- 2.8%	
4,795,000	NR/NR	Charlotte North Carolina Special Facilities Revenue, 7.75%, 2/1/28	\$ 4,802,240
4,785,000	NR/NR	Charlotte Special Facilities Revenue, 5.6%, 7/1/27	4,464,788

			\$ 9,267,028

		Oklahoma -- 0.4%	
1,225,000	NR/WR	Tulsa Municipal Airport Trust Revenue, 6.25%, 6/1/20	\$ 1,228,063

		Pennsylvania -- 2.2%	
1,550,000	NR/Baa2	Allegheny County Hospital Development Authority Revenue, 5.125%, 5/1/25	\$ 1,550,481
1,280,000 (b)	NR/WR	Langhorne Manor Borough Higher Education Authority Revenue, 7.35%, 7/1/22	371,174
5,000,000	B-/Caa2	Pennsylvania Economic Development Financing Authority Solid Waste Disposal Revenue, 6.0%, 6/1/31	4,974,750

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

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

		Pennsylvania -- (continued)	
500,000	BBB+/NR	Pennsylvania Higher Educational Facilities Authority Development Revenue, 5.4%, 7/15/36	\$ 513,270

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			\$ 7,409,675

6,000,000 (d)	NR/NR	Rhode Island -- 2.1% Central Falls Rhode Island Detention Facility Corp., Revenue, 7.25%, 7/15/35	\$ 5,198,880
1,500,000	NR/NR	Rhode Island Health & Educational Building Corp., Revenue, 8.375%, 1/1/46	1,764,270

			\$ 6,963,150

3,850,000 (a)	BBB+/Baa1	South Carolina -- 1.2% South Carolina Jobs Economic Development Authority Revenue, 6.375%, 8/1/34	\$ 4,025,868

4,600,000	BBB+/NR	Tennessee -- 1.5% Sullivan County Health, Educational & Housing Facilities Board Revenue, 5.25%, 9/1/36	\$ 4,810,542

1,345,000	NR/Caa2	Texas -- 16.9% Bexar County Housing Finance Corp., Multi Family Housing Revenue, 8.0%, 12/1/36	\$ 930,444
2,500,000	BB+/Ba1	Central Texas Regional Mobility Authority Revenue, 6.75%, 1/1/41	2,882,525
4,000,000	NR/NR	Decatur Hospital Authority Medical Revenue, 7.0%, 9/1/25	4,263,160
725,078 (b) (d)	NR/NR	Gulf Coast Industrial Development Authority Revenue, 7.0%, 12/1/36	6,707
3,750,000	B-/B3	Houston Airport System Special Facilities Revenue, 5.7%, 7/15/29	3,759,112
3,000,000	NR/NR	Jefferson County Industrial Development Corp., Revenue, 8.25%, 7/1/32	2,865,180
5,340,000	NR/NR	Lubbock Health Facilities Development Corp., Nursing Home Revenue, 6.625%, 7/1/36	5,589,325
10,000,000	BBB+/A3	North Texas Tollway Authority Transportation Revenue, 5.75%, 1/1/33	11,084,400
2,810,000 (c)	AAA/Aaa	Northside Independent School District, GO, 11.408%, 9/29/12 (144A)	3,340,781
1,500,000	NR/NR	Red River Health Facilities Development Corp., Revenue, 8.0%, 11/15/41	1,714,800
3,000,000	NR/NR	Sanger Industrial Development Corp., Revenue, 8.0%, 7/1/38	3,013,890
7,040,000 (c)	AA+/Aaa	State of Texas, GO, 12.332%, 4/1/13	9,039,078

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

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Schedule of Investments | 10/31/12 (unaudited) (continued)

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

Texas -- (continued)

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2,000,000	NR/NR	Tarrant County Cultural Education Facilities Finance Corp., Revenue, 8.0%, 11/15/34	\$ 2,267,080
1,000,000	NR/NR	Tarrant County Cultural Education Facilities Finance Corp., Revenue, 8.125%, 11/15/39	1,116,870
1,500,000	NR/NR	Tarrant County Cultural Education Facilities Finance Corp., Revenue, 8.25%, 11/15/44	1,681,365
2,500,000	NR/NR	Travis County Health Facilities Development Corp., Revenue, 7.125%, 1/1/46	2,631,850

			\$ 56,186,567

1,500,000 (a)	A-/Baa1	Vermont -- 0.5% Vermont Educational & Health Buildings Financing Agency Higher Education Revenue, 6.0%, 10/1/28	\$ 1,577,775

1,000,000	BBB/Baa1	Virginia -- 0.3% Peninsula Ports Authority Development Revenue, 6.0%, 4/1/33	\$ 1,018,200

4,710,000	A+/A2	Washington -- 9.9% Spokane Public Facilities District Hotel/Motel Tax & Sales, 5.75%, 12/1/27	\$ 4,926,472
14,315,000 (e)	AA+/Aa1	State of Washington, GO, 0.0%, 6/1/22	11,295,537
7,025,000	BBB/Baa1	Tobacco Settlement Authority Revenue, 6.625%, 6/1/32	7,323,562
3,795,000	A/A2	Washington State Health Care Facilities Authority Revenue, 6.0%, 1/1/33	4,291,955
5,000,000	NR/NR	Washington State Housing Finance Committee Nonprofit Revenue, 5.625%, 1/1/27	5,033,650

			\$ 32,871,176

745,000	NR/NR	West Virginia -- 0.3% West Virginia Hospital Finance Authority Hospital Revenue, 9.125%, 10/1/41	\$ 919,449

2,320,000 (f)	NR/NR	Wisconsin -- 1.8% Aztalan Township, 7.5%, 5/1/18	\$ --
2,500,000	NR/NR	Wisconsin Public Finance Authority Continuing Care Retirement Community Revenue, 8.25%, 6/1/46	2,975,675
1,500,000	NR/NR	Wisconsin State Public Finance Authority Revenue, 8.375%, 6/1/20	1,516,665
1,500,000	NR/NR	Wisconsin State Public Finance Authority Revenue, 8.625%, 6/1/47	1,584,345

			\$ 6,076,685

		TOTAL TAX EXEMPT OBLIGATIONS (Cost \$369,551,948)	\$410,471,040

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

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Principal Amount USD (\$)	S&P/Moody's Ratings		Value
10,000,000 (c) (d)	NR/NR	MUNICIPAL COLLATERALIZED DEBT OBLIGATION -- 1.9% of Net Assets Non-Profit Preferred Funding Trust I, 6.75%, 9/15/37 (144A)	\$ 6,316,500
		TOTAL MUNICIPAL COLLATERALIZED DEBT OBLIGATION (Cost \$10,000,000)	\$ 6,316,500
		TOTAL INVESTMENTS IN SECURITIES -- 125.7% (Cost -- \$379,551,948) (g) (h)	\$ 416,787,540
		OTHER ASSETS AND LIABILITIES -- 4.8%	\$ 15,908,220
		PREFERRED SHARES AT REDEMPTION VALUE, INCLUDING DIVIDENDS PAYABLE -- (30.5)%	\$ (101,003,500)
		NET ASSETS APPLICABLE TO COMMON SHAREOWNERS -- 100.0%	\$ 331,692,260

+ Amount rounds to less than 0.1%.

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

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

(144A) Security is exempt from registration under Rule 144A of the Securities Act of 1933. Such securities may be resold normally to qualified institutional buyers in a transaction exempt from registration. At October 31, 2012, the value of these securities amounted to \$44,647,341, or 13.5% of total net assets applicable to common shareowners.

RIB Residual Interest Bond. The interest rate is subject to change periodically and inversely based upon prevailing market rates. The interest rate shown is the rate at October 31, 2012.

GO General Obligation.

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

(b) Security is in default and is non income producing.

(c) The interest rate is subject to change periodically. The interest is shown is the rate at October 31, 2012.

(d) Indicates a security that has been deemed as illiquid. The aggregate cost of illiquid securities is \$20,088,607. The aggregate fair value of \$11,761,547 represents 3.5% of total net assets applicable to common shareowners.

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

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accretion of discount.

- (f) Security is valued using fair value methods (other than prices supplied by independent pricing services). (See Note 1A).

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

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Schedule of Investments | 10/31/12 (unaudited) (continued)

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

Insured		
NATL-RE		4.9%
FSA		3.6
NATL-RE FGIC		2.7
AMBAC GO OF INSTN		2.3
PSF-GTD		0.8
GO OF INSTN		0.6
Revenue Bonds:		
Health Revenue		17.0
Other Revenue		16.2
Facilities Revenue		13.9
Tobacco Revenue		13.7
Development Revenue		8.0
Education Revenue		6.2
Airport Revenue		5.6
Transportation Revenue		2.7
Pollution Control Revenue		1.8
Utilities Revenue		0.0*

		100.0%
		=====

* Amount is less than 0.1%

- (h) At October 31, 2012, the net unrealized gain on investments based on cost for federal tax purposes of \$379,816,340 was as follows:

Aggregate gross unrealized gain for all investments in which there is an excess of value over tax cost	\$ 52,631,449
Aggregate gross unrealized loss for all investments in which there is an excess of tax cost over value	(15,660,249)

Net unrealized gain	\$ 36,971,200
	=====

For financial reporting purposes net unrealized gain on investments was \$37,235,592 and the cost of investments aggregated was \$379,551,948.

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Purchases and sales of securities (excluding temporary cash investments) for the six months ended October 31, 2012 aggregated \$26,147,981 and \$16,836,658, respectively.

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

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

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

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

The following is a summary of the inputs used as of October 31, 2012, in valuing the Trust's investments.

	Level 1	Level 2	Level 3	Total
Tax exempt obligations:	\$ --	\$410,471,040	\$ --	\$410,471,040
Municipal collateralized debt obligation:	--	6,316,500	--	6,316,500
Total	\$ --	\$416,787,540	\$ --	\$416,787,540

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

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

* Transfers are calculated on the beginning of period values.

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

During the six months ended October 31, 2012, there were no transfers between Levels 1, 2 and 3.

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

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Statement of Assets and Liabilities | 10/31/12 (unaudited)

ASSETS:	
Investments in securities, at value (cost \$379,551,948)	\$416,787,540
Cash	5,115,032
Receivables --	
Investment securities sold	2,190,476
Interest receivable	8,881,161
Reinvestment of distributions	84,667
Prepaid expenses	12,482
Other assets	22,500
<hr style="border-top: 1px dashed black;"/>	
Total assets	\$433,093,858
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LIABILITIES:	
Due to affiliates	\$ 234,050
Administration fee payable	61,985
Accrued expenses	102,063
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Total liabilities	\$ 398,098
<hr style="border-top: 1px dashed black;"/>	
PREFERRED SHARES AT REDEMPTION VALUE:	
\$25,000 liquidation value per share applicable to 4,040 shares, including dividends payable of \$3,500	\$101,003,500
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NET ASSETS APPLICABLE TO COMMON SHAREOWNERS:	
Paid-in capital	\$320,770,151
Undistributed net investment income	8,184,252
Accumulated net realized loss on investments	(34,497,735)
Net unrealized gain on investments	37,235,592
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Net assets applicable to common shareowners	\$331,692,260
<hr style="border-top: 1px dashed black;"/>	
NET ASSET VALUE PER COMMON SHARE:	
No par value (unlimited number of shares authorized)	
Based on \$331,692,260/22,530,811 common shares	\$ 14.72
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Statement of Operations (unaudited)

For the six months ended 10/31/12

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INVESTMENT INCOME:		
Interest		\$ 14,925,168

EXPENSES:		
Management fees	\$ 1,291,038	
Administration fees	103,276	
Transfer agent fees and expenses	13,621	
Shareholder communications expense	5,743	
Auction agent fees	127,090	
Custodian fees	3,535	
Registration fees	11,977	
Professional fees	49,910	
Printing expenses	16,749	
Trustees' fees	6,894	
Pricing fees	4,357	
Miscellaneous	30,665	

Total expenses		\$ 1,664,855

Net investment income		\$ 13,260,313

REALIZED AND UNREALIZED GAIN (LOSS) ON INVESTMENTS:		
Net realized loss on investments	\$ (1,106,827)	
Change in net unrealized gain on Investments	\$ 14,353,016	

Net gain on investments		\$ 13,246,189

DISTRIBUTIONS TO PREFERRED SHAREOWNERS FROM NET INVESTMENT INCOME:		\$ (150,826)

Net increase in net assets applicable to common shareowners resulting from operations		\$ 26,355,676
=====		

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

Pioneer Municipal High Income Trust | Semiannual Report | 10/31/12 25

Statements of Changes in Net Assets (unaudited)

	Six Months Ended 10/30/12 (unaudited)	Year Ended 4/30/12

FROM OPERATIONS:		
Net investment income	\$ 13,260,313	\$ 23,022,348
Net realized loss on investments	(1,106,827)	(8,740,047)
Change in net unrealized gain (loss) on investments	14,353,016	37,817,446
Distributions to preferred shareowners from net investment income	(150,826)	(234,733)

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Net increase in net assets applicable to common shareowners resulting from operations	\$ 26,355,676	\$ 51,865,014

DISTRIBUTIONS TO COMMON SHAREOWNERS:		
Net investment income (\$0.570 and \$1.197 per share, respectively)	\$ (12,831,067)	\$ (26,857,057)

Total distributions to common shareowners	\$ (12,831,067)	\$ (26,857,057)

FROM TRUST SHARE TRANSACTIONS:		
Reinvestment of distributions	\$ 537,091	\$ 1,569,243

Net increase in net assets applicable to common shareowners from Trust share transactions	\$ 537,091	\$ 1,569,243

Net increase in net assets applicable to common shareowners	\$ 14,061,700	\$ 26,577,200
NET ASSETS APPLICABLE TO COMMON SHAREOWNERS:		
Beginning of period	317,630,560	291,053,360

End of period	\$ 331,692,260	\$ 317,630,560

Undistributed net investment income	\$ 8,184,252	\$ 7,905,832
=====		

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

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Financial Highlights

	Six Months Ended 10/31/12 (unaudited)	Year Ended 4/30/12	Year Ended 4/30/11	Year Ended 4/30/10

Per Share Operating Performance				
Net asset value, beginning of period	\$14.12	\$13.00	\$ 13.86	\$11.86

Increase (decrease) from investment operations: (a)				
Net investment income	\$ 0.59	\$ 1.03	\$ 1.12	\$ 1.12
Net realized and unrealized gain (loss) on investments and interest rate swaps	0.59	1.30	(0.89)	2.00
Distributions to preferred shareowners from:				
Net investment income	(0.01)	(0.01)	(0.02)	(0.02)

Net increase (decrease) from investment operations	\$ 1.17	\$ 2.32	\$ 0.21	\$ 3.10

Distributions to common shareowners from:				
Net investment income	(0.57)	(1.20)	(1.07)	(0.86)

Net increase (decrease) in net asset value	\$ 0.60	\$ 1.12	\$ (0.86)	\$ 2.24

Net asset value, end of period (b)	\$14.72	\$14.12	\$ 13.00	\$13.86

Market value, end of period (b)	\$16.04	\$15.49	\$ 13.40	\$14.12

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Total return at market value (c)	7.53%	25.95%	1.04%	48
Ratios to average net assets of common shareowners:				
Net expenses (d)	1.01% (e)	1.08%	1.12%	1
Net investment income before preferred share distributions	8.07% (e)	7.50%	8.26%	9
Preferred share distributions	0.09% (e)	0.08%	0.14%	0
Net investment income available to common shareowners	7.98% (e)	7.42%	8.12%	8

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

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Financial Highlights (continued)

	Six Months Ended 10/31/12 (Unaudited)	Year Ended 4/30/12	Year Ended 4/30/11	
Portfolio turnover	4%	11%		
Net assets of common shareowners, end of period (in thousands)	\$331,692	\$317,631	\$291,631	
Preferred shares outstanding (in thousands)	\$100,997	\$101,000	\$101,000	
Asset coverage per preferred share, end of period	\$107,100	\$103,623	\$ 97,631	
Average market value per preferred share (f)	\$ 24,999	\$ 25,000	\$ 25,000	
Liquidation value, including dividends payable, per preferred share	\$ 24,998	\$ 25,001	\$ 25,000	
Ratios to average net assets of common shareowners before waivers and reimbursement of expenses				
Net expenses (d)	1.01% (e)	1.08%	1.12%	
Net investment income before preferred share distributions	8.07% (e)	7.50%	8.26%	
Preferred share distributions	0.09% (e)	0.08%	0.14%	
Net investment income available to common shareowners	7.98% (e)	7.42%	8.12%	

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

The information above represents the audited operating performance data for a

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

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

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Notes to Financial Statements | 10/31/12 (unaudited)

1. Organization and Significant Accounting Policies

Pioneer Municipal High Income Trust (the Trust) was organized as a Delaware 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 investment objective of the Trust is to seek a high level of current income exempt from regular federal income tax, and the Trust may, as a secondary objective, also seek capital appreciation to the extent that it is consistent with its primary investment objective.

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

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

A. Security Valuation

Security transactions are recorded as of trade date. Fixed income securities with remaining maturity of more than sixty days are valued at prices supplied by independent pricing services, which consider such factors as market prices, market events, quotations from one or more brokers, Treasury spreads, yields, maturities and ratings. Valuations may be supplemented by dealers and other sources, as required. The values of interest rate swaps are determined by obtaining dealer quotations. Equity securities that have traded on an exchange are valued at the last sale price on the principal exchange where they are traded. Equity securities that have not traded on the date of valuation, or securities for which sale prices are not available, generally are valued using the mean between the last bid and asked prices. Short-term fixed income securities with remaining maturities of sixty days or less generally are valued at amortized cost. Money market mutual funds are valued at net asset value.

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Securities for which independent pricing services are unable to supply prices or for which market prices and/or quotations are not readily available or are considered to be unreliable are valued using fair value methods pursuant to procedures adopted by the Board of Trustees. The Trust may use fair value methods if it is determined that a significant event has occurred after the close of the exchange or market on which the security

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trades and prior to the determination of the Trust's net asset value. Examples of a significant event might include political or economic news, corporate restructurings, natural disasters, terrorist activity or trading halts. Thus, the valuation of the Trust's securities may differ from exchange prices.

At October 31, 2012, one security was valued using fair value methods (in addition to securities valued using prices supplied by independent pricing services) representing 0.0% of net assets. Inputs used when applying fair value methods to value a security may include credit ratings, the financial condition of the company, current market conditions and comparable securities.

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

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

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

B. Federal Income Taxes

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

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

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The tax character of current year distributions payable to common and preferred shareowners will be determined at the end of the current taxable year. The tax character of distributions paid during the year ended April 30, 2012 was as follows:

	2012

Distribution paid from:	
Tax-exempt income	\$25,801,273
Ordinary income	1,290,517

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Total taxable distribution \$27,091,790

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The following shows the components of distributable earnings (losses) on a federal income tax basis at April 30, 2012:

	2012

Distributable earnings:	
Undistributed tax-exempt income	\$ 8,944,200
Undistributed ordinary income	137,848
Capital loss carryforward	(25,495,311)
Post-October loss deferred	(8,801,617)
Dividends payable	(5,804)
Unrealized appreciation	22,618,184

Total	\$ (2,602,500)
=====	

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, the deferral of post-October capital losses for tax purposes and other temporary differences.

C. Automatic Dividend Reinvestment Plan

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

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

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

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

D. Risks

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

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

2. Management Agreement

Pioneer Investment Management, Inc. (PIM), the Trust's investment adviser, a wholly owned indirect subsidiary of UniCredit S.p.A. (UniCredit), manages the Trust's portfolio. Management fees payable under the Trust's Advisory Agreement with PIM are calculated daily at the annual rate of 0.60% of the Trust's average daily managed assets. "Managed assets" means (a) the total assets of the Trust, including any form of investment leverage, minus (b) all accrued liabilities incurred in the normal course of operations, which shall not include any liabilities or obligations attributable to investment leverage obtained through (i) indebtedness of any type (including, without limitation, borrowing through a credit facility of the issuance of debt securities), (ii) the issuance of preferred stock or other similar preference securities, and/or (iii) any other means. For the six months ended October 31, 2012, the net management fee was 0.60% of the Trust's average daily managed assets, which was equivalent to 0.80% 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,

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2012, \$296,035 was payable to PIM related to management costs, administrative costs and certain other reimbursements and is included in "Due to affiliates" and "Administration fee" on the Statement of Assets and Liabilities.

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

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3. Transfer Agents

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

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

4. Expense Offset Agreements

The Trust has entered into an arrangement with its custodian whereby credits realized as a result of uninvested cash balances are used to reduce a portion of the Trust's custodian expenses. For the six months ended October 31, 2012, the Trust expenses were not reduced under such arrangement.

5. Interest Rate Swaps

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

An interest rate swap is an agreement between two parties, which involves exchanging floating rate and fixed rate interest payments for a specified period of time. Interest rate swaps involve the accrual of the net interest payments between the parties on a daily basis, with the net amount recorded within the unrealized appreciation/depreciation of interest rate swaps on the Statement of Assets and Liabilities. Once the interim payments are settled in cash, at the pre-determined dates specified in the agreement, the net amount is recorded as realized gain or loss from interest rate swaps on the Statement of Operations. During the term of the swap, changes in the value of the swap are recognized as unrealized gains and losses by "marking-to-market" the value of the swap based on values obtained from dealer quotations. When the swap is terminated, the

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Trust will record a realized gain or loss equal to the difference, if any, between the proceeds from (or cost of) closing the contract and the cost basis of the contract. The Trust is exposed to credit risk in the

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

There were no interest rate swap contracts open during the six months ended October 31, 2012 or outstanding at October 31, 2012.

6. Trust Shares

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

Transactions in common shares of beneficial interest for the six months ended October 31, 2012 and the year ended April 30, 2012 were as follows:

	10/31/12	4/30/12
Shares outstanding at beginning of period	22,495,129	22,381,423
Reinvestment of distributions	35,682	113,706
Shares outstanding at end of period	22,530,811	22,495,129

The Trust may classify or reclassify any unissued shares of beneficial interest into one or more series of preferred shares of beneficial interest. As of October 31, 2012, 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 to be reset every seven days based on the results of an auction. An auction fails if there are more APS offered for sale than there are buyers. When an auction fails, the dividend rate for the period will be the maximum rate on the auction dates described in the prospectus for the APS. Preferred shareowners are not able to sell their APS at an auction if the auction fails. Since February 2008, the Trust's auctions related to the APS have failed. The maximum rate for each series is 110% of the 7 day commercial paper rate or adjusted Kenny rate. Dividend rates on APS ranged from 0.278% to 0.364% during the six months ended October 31, 2012.

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

The APS are redeemable at the option of the Trust, in whole or in part, on any dividend payment date at \$25,000 per share plus any accumulated or unpaid dividends, whether or not declared. The APS are also subject to mandatory redemption at \$25,000 per share plus any accumulated or unpaid dividends,

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

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

7. Subsequent Events

The Board of Trustees of the Trust declared on November 5, 2012 a dividend from undistributed net investment income of \$0.095 per common share payable November 30, 2012, to common shareowners of record on November 16, 2012.

Subsequent to October 31, 2012, dividends declared and paid on preferred shares totaled \$15,545 in aggregate for the two outstanding preferred share series through November 19, 2012.

Results of Shareholder Meeting (unaudited)

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

Proposal 1 -- To elect Class III Trustees.

Nominee	For	Withheld
Thomas J. Perna	19,189,584.943	557,728.569
Marguerite A. Piret*	2,557.000	69.000

* Elected by preferred shares only.

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Trustees, Officers and Service Providers

Trustees

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

Officers

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

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Marguerite A. Piret
Stephen K. West

Investment Adviser and Administrator
Pioneer Investment Management, Inc.

Custodian and Sub-Administrator
Brown Brothers Harriman & Co.

Legal Counsel
Bingham McCutchen LLP

Transfer Agent
Pioneer Investment Management Shareholder Services, Inc

Shareowner Services and Transfer Agent
American Stock Transfer & Trust Company

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

* Chief Executive Officer of the Trust

** Chief Financial and Accounting Officer of the Trust

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How to Contact Pioneer

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

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

Account Information 1-800-710-0935

Or write to AST:

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

Website www.amstock.com

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

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

[LOGO] Pioneer
Investment (R)

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

Securities offered through Pioneer Funds Distributor, Inc.
60 State Street, Boston, MA 02109
Underwriter of Pioneer Mutual Funds, Member SIPC
(c) 2012 Pioneer Investments 19442-06-1212

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

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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.

(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

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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