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PIONEER MUNICIPAL HIGH INCOME TRUST
Form N-Q
September 29, 2009

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

FORM N-Q

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: July 31, 2009

Form N-Q is to be used by management investment companies, other than small business investment companies registered on Form N-5 (239.24 and 274.5 of this chapter), to file reports with the Commission, not later than 60 days after close of the first and third fiscal quarters, pursuant to Rule 30b1-5 under the Investment Company Act of 1940 (17 CFR 270.30b-5). The Commission may use the information provided on Form N-Q in its regulatory, disclosure review, inspection, and policymaking roles.

A registrant is required to disclose the information specified by Form N-Q, and the Commission will make this information public. A registrant is not required to respond to the collection of information contained in Form N-Q 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. Schedule of Investments.

Principal Amount (\$)	Pioneer Municipal High Income Trust SCHEDULE OF INVESTMENTS 7/31/09 (unaudited)	Value (\$)
	TAX EXEMPT OBLIGATIONS - 130.4% of Net Assets	
	Alabama - 0.8%	
1,000,000	Huntsville-Redstone Village Special Care Facilities	727,580
2,000,000	Huntsville-Redstone Village Special Care Facilities	1,303,940
		2,031,520
	Arizona - 2.2%	
5,000,000	Apache County Industrial Development Authority, 5.84%	536,450
970,000	Pima County Industrial Development Authority, 7.25%	768,347
500,000	Yavapai County Industrial Development Authority, 6.46%	464,680
		5,769,477
	California - 10.7%	
7,885,000 (a)	California State University Revenue, RIB, 9.532%	17,279,511
4,500,000	California Statewide Communities Development Authority Environmental Facilities Revenue, 9.0%, 12/1/38	3,593,610
1,000,000	California Statewide Communities Development Authority	827,730
5,150,000	+ Golden State Tobacco Securitization Corp., 7.8%, 6/6/30	1,231,231
7,000,000	+ Golden State Tobacco Securitization Corp., 7.875%, 8/8/30	5,832,600
1,000,000	University of California Revenue, 5.0%, 5/15/25	1,014,040
655,000	Valley Health System Hospital Revenue, 6.5%, 5/15/25	360,119
		27,959,501
	Connecticut - 5.4%	
10,335,000 (a)	Connecticut Health & Educational Facilities Authority	10,804,416
5,000,000	Mohegan Tribe Indians Gaming Authority, 6.25%, 1/1/33	356,750
		14,161,166
	Delaware - 0.4%	
765,000	Sussex County Delaware Revenue, 5.9%, 1/1/26	607,723
600,000	Sussex County Delaware Revenue, 6.0%, 1/1/35	434,646
		1,042,369
	District of Columbia - 3.5%	
5,000,000	District of Columbia Tobacco Settlement Financing C4	2,230,000
6,000,000	District of Columbia Tobacco Settlement Financing C5	2,025,060
		9,255,060
	Florida - 5.4%	
1,700,000	Beacon Lakes Community Development, 6.9%, 5/1/35	1,227,281
2,000,000	Brevard County Health Facilities Authority Revenue	1,561,420
2,445,000	Liberty County Subordinate Revenue, 8.25%, 7/1/28	2,045,756
2,500,000	Miami-Dade County Aviation Revenue, 5.5%, 10/1/41	2,426,450
1,000,000	St. Johns County Industrial Development Authority R	710,910
2,000,000	St. Johns County Industrial Development Authority R1	1,272,640
5,000,000	Tallahassee Health Facilities Revenue, 6.375%, 12/14/84	4,849,400
		14,093,857
	Georgia - 2.6%	
4,240,000 (a)	Atlanta Georgia Water & Waste Revenue, RIB, 9.03%	3,779,705
2,400,000	Fulton County Residential Care Facilities Revenue	1,709,856
1,100,000	Fulton County Residential Care Facilities Revenue	668,063
1,000,000	Rockdale County Development Authority Revenue, 6.12%	719,200
		6,876,824
	Idaho - 1.8%	
5,000,000	Power County Industrial Development Corp., 6.45%	84,605,650
	Illinois - 9.8%	

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2,000,000	(b)	Centerpoint Intermodal Center, 10.0%, 6/15/23 (144A1,040,600	
12,000,000		Chicago O'Hare International Airport Special Facili	4,443,600
1,000,000		Illinois Finance Authority Revenue, 6.0%, 11/15/27	760,840
2,000,000		Illinois Finance Authority Revenue, 6.0%, 8/15/39	2,066,940
4,000,000		Illinois Finance Authority Revenue, 6.0%, 11/15/39	2,722,800
1,500,000	(c)	Illinois Health Facilities Authority Revenue, 6.9%,	660,900
16,880,000	(d)	Metropolitan Pier & Exposition Authority Dedicated	12,771,914
1,800,000		Southwestern Illinois Development Authority Revenue	1,160,406
			25,628,000
		Indiana - 4.5%	
5,000,000		Indiana Health & Educational Facility Financing Aut	4,203,300
1,000,000		Indiana State Development Finance Authority Revenue	921,790
4,300,000		Indiana State Development Finance Authority Revenue	4,134,235
2,500,000	(b)	Rockport Pollution Control Revenue, 6.25%, 6/1/25	2,614,025
			11,873,350
		Louisiana - 2.0%	
1,500,000		Louisiana Local Government Environmental Facilities	1,247,670
5,000,000		Louisiana Public Facilities Authority Revenue, 5.5%	4,027,400
			5,275,070
		Massachusetts - 4.5%	
2,385,000		Massachusetts Development Finance Agency Revenue,	71,855,387
1,000,000		Massachusetts Educational Financing Authority Reven	1,011,520
3,500,000		Massachusetts Health & Educational Facilities Autho	3,276,105
2,500,000		Massachusetts Health & Educational Facilities Autho	1,805,700
5,000,000		Massachusetts Health & Educational Facilities Autho	3,854,300
			11,803,012
		Michigan - 3.5%	
950,000		Doctor Charles Drew Academy, 5.7%, 11/1/36	517,949
1,525,000		Flint Michigan Hospital Building Authority Revenue,	1,297,058
1,500,000		John Tolfree Health System Corp., 6.0%, 9/15/23	1,177,215
2,000,000		Michigan State Hospital Finance Authority Revenue,	1,384,240
5,830,000		Michigan Tobacco Settlement Finance Authority, 6.0%	3,517,530
1,470,000		Star International Academy Certificates of Particip	1,126,814
			9,020,806
		Minnesota - 0.6%	
1,675,000		Duluth Economic Development Authority Health Care F	1,512,391
		Mississippi - 1.0%	
3,000,000		Mississippi Business Finance Corp. Pollution Contro	2,726,640
		Montana - 0.1%	
1,600,000	(c)	Two Rivers Authority, Inc. Correctional Facility Im	312,304
		Nebraska - 0.5%	
2,000,000		Grand Island Solid Waste Disposal Facilities Revenu	1,362,080
		Nevada - 0.0%	
2,000,000	(c)	Nevada State Department of Business & Industry, 7.2	100,000
		New Jersey - 12.2%	
2,000,000		New Jersey Economic Development Authority Revenue,	1,541,220
13,350,000		New Jersey Economic Development Authority Revenue,	9,143,415
1,000,000		New Jersey Economic Development Authority Revenue,	737,560
6,150,000	(b)	New Jersey Economic Development Authority Revenue,	4,583,964
10,370,000		New Jersey Transportation Trust Fund Authority, 0.03	759,229
10,000,000	+	Tobacco Settlement Financing Corp., 6.75%, 6/1/39	12,043,800
			31,809,188
		New Mexico - 1.3%	
1,500,000		Otero County New Mexico Project Revenue, 6.0%, 4/1/1,	184,700
2,960,000		Otero County New Mexico Project Revenue, 6.0%, 4/1/2,	206,473
			3,391,173
		New York - 8.6%	

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2,500,000	Albany New York Industrial Development Agency Civic	2,130,150
3,000,000	Dutchess County Industrial Development Agency Reven	2,799,420
1,000,000	Nassau County New York Industrial Development Agenc	766,510
2,000,000	New York City Industrial Development Agency, 5.375%	1,794,860
990,000	New York City Industrial Development Agency, 6.9%	398,831
7,040,000	(a) New York State Dormitory Authority Revenue, RIB,	128,727,277
2,000,000	Suffolk County Industrial Development Agency, 7.25%	1,678,580
4,000,000	Triborough Bridge & Tunnel Authority Revenue, 5.25%	4,070,280
		22,365,908
	North Carolina - 2.8%	
4,530,000	Charlotte North Carolina Special Facilities Revenue	2,753,470
5,740,000	Charlotte North Carolina Special Facilities Revenue	4,477,257
		7,230,727
	Oklahoma - 3.7%	
4,500,000	+ Oklahoma Development Finance Authority Revenue, 5.64%	553,955
1,225,000	Tulsa Municipal Airport Revenue, 6.25%, 6/1/20	893,209
4,350,000	Tulsa Municipal Airport Revenue, 7.35%, 12/1/11	4,113,795
		9,560,959
	Pennsylvania - 8.9%	
3,000,000	Allegheny County Hospital Development Authority Rev	1,910,310
1,550,000	Allegheny County Hospital Development Authority Rev	1,323,948
12,300,000	+ Allegheny County Hospital Development Authority Rev	13,894,080
1,000,000	Columbia County Hospital Authority Health Care Reve	715,510
845,000	Hazleton Health Services Authority Hospital Revenue	727,106
1,280,000	Langhorne Manor Borough Higher Education & Health A	921,485
5,000,000	Pennsylvania Economic Development Financing Authority	
	Solid Waste Disposal Revenue, 6.0%, 6/1/31	3,212,400
500,000	Pennsylvania Higher Educational Facilities Authorit	446,115
		23,150,954
	Rhode Island - 1.6%	
6,000,000	Central Falls Detention Facilities Revenue, 7.25%	4,171,200
	South Carolina - 2.6%	
5,185,000	+ South Carolina Jobs Economic Development Authority	5,955,284
665,000	+ South Carolina Jobs Economic Development Authority	771,500
		6,726,784
	Tennessee - 5.2%	
7,000,000	+ Johnson City Health & Educational Facilities Board	7,974,610
2,480,000	Knox County Health, Educational & Housing Facilities Board	
	Hospital Revenue,	
	6.375%, 4/15/22	2,525,012
4,600,000	Sullivan County Health, Educational & Housing Facilities Board	
	Hospital Revenue,	
	5.25%, 9/1/36	3,132,508
		13,632,130
	Texas - 14.4%	
1,345,000	Bexar County Housing Finance Corp., 8.0%, 12/1/36	992,179
1,000,000	Dallas-Fort Worth International Airport Revenue, 6.	480,750
4,000,000	Decatur Hospital Authority Revenue, 7.0%, 9/1/25	3,466,200
2,000,000	Gulf Coast Industrial Development Authority Revenue	878,600
3,750,000	Houston Airport System Special Facilities Revenue, 2,	370,750
5,340,000	Lubbock Health Facilities Development Corp., 6.625%	4,025,826
10,000,000	North Texas Tollway Authority Revenue, 5.75%, 1/1/3	9,650,600
2,810,000	(a) Northside Independent School District, RIB, 10.778%	2,936,057
500,000	Sabine River Authority Pollution Control Revenue, 6	222,545
7,040,000	(a) Texas State, RIB, 11.59%, 4/1/30 (144A)	7,596,442
1,075,000	Willacy County Local Government Corp. Revenue, 6.0%	1,062,154
5,250,000	Willacy County Local Government Corp. Revenue, 6.	3,968,685
		37,650,788
	Utah - 0.2%	
800,000	Spanish Fork City Charter School Revenue, 5.55%, 11	616,776

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	Vermont - 0.6%	
1,500,000	Vermont Educational & Health Buildings Financing Ag	1,555,665
	Virginia - 0.4%	
1,000,000	Peninsula Ports Authority, 6.0%, 4/1/33	970,420
	Washington - 8.6%	
4,710,000	Spokane Public Facilities District Hotel/Motel Tax	4,924,022
7,025,000	Tobacco Settlement Authority Revenue, 6.625%, 6/1/35	947,716
14,315,000	Washington State General Obligation, 0.0%, 6/1/22	7,987,770
5,000,000	Washington State Housing Finance Committee Nonprofi	3,609,700
		22,469,208
	Wisconsin - 0.0%	
2,320,000	Aztalan Wisconsin Exempt Facilities Revenue, 7.5%	121,800
	TOTAL TAX-EXEMPT OBLIGATIONS	
	(Cost \$370,184,198)	340,832,757
	MUNICIPAL COLLATERALIZED DEBT OBLIGATION - 2.7% of Net Assets	
10,000,000 (b)	(Non-Profit Preferred Funding Trust I, 12.0%, 9/15/376,970,800	
	TOTAL MUNICIPAL COLLATERALIZED DEBT OBLIGATION	
	(Cost \$10,000,000)	6,970,800
Shares	COMMON STOCK - 0.7% of Net Assets	
248,558 (f)	Delta Air Lines, Inc.	1,722,507
	TOTAL COMMON STOCK	
	(Cost \$6,612,756)	1,722,507
	TAX-EXEMPT MONEY MARKET MUTUAL FUND - 1.5% of Net Assets	
4,000,000	BlackRock Liquidity Funds MuniFund Portfolio	4,000,000
	TOTAL TAX-EXEMPT MONEY MARKET MUTUAL FUND	
	(Cost \$4,000,000)	4,000,000
	TOTAL INVESTMENTS IN SECURITIES - 135.3%	
	(Cost \$390,796,954) (g) (h)	353,526,064
	OTHER ASSETS AND LIABILITIES - 3.4%	8,814,365
	PREFERRED SHARES AT REDEMPTION VALUE,	
	INCLUDING DIVIDENDS PAYABLE - (38.7)%	(101,004,219)
	NET ASSETS APPLICABLE TO COMMON SHAREOWNERS-100.0	261,336,210
RIB	Residual Interest Bonds	
(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 July 31, 2009 the value of these securities amounted to \$49,751,584 or 19.0% 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 July 31, 2009.	
(b)	The interest rate is subject to change periodically. The interest rate shown is the coupon rate at July 31, 2009.	

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- (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 July 31, 2009.
- (e) Indicates a security that has been deemed illiquid. The aggregate cost of illiquid securities is \$10,000,000. The aggregate value \$6,970,800 represents 2.7% of net assets applicable to common shareowners.

(f) Non-income producing.

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

Insured:		
	NATL-RE	8.4%
	FSA	1.1
	MBIA	1.0
	ACA	0.9
	PSF	0.8
	AMBAC	0.3
Revenue Bonds:		
	Health Revenue	30.4
	Tobacco Revenue	13.0
	Other Revenue	11.8
	Airport Revenue	10.9
	Pollution Control Revenue	4.4
	Facilities Revenue	4.2
	Education Revenue	4.0
	Development Revenue	3.7
	Transportation Revenue	2.8
	Utilities Revenue	1.0
	Gaming Revenue	1.0
	Housing Revenue	0.3
		100.0%

(h) At July 31, 2009, the net unrealized loss on investments based on cost for federal income tax purposes of \$389,042,834 was as follows:

Aggregate gross unrealized gain for all investments \$17,347,518
there is an excess of value over tax cost

Aggregate gross unrealized loss for all investments (52,864,288)
there is an excess of tax cost over value (\$35,516,770)
Net unrealized loss

For financial reporting purposes net unrealized loss on investments was \$37,270,890 and cost of investments aggregated \$390,796,954.

Various inputs are used in determining the value of the Fund'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,

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credit risk, etc.)
Level 3 - significant unobservable inputs (including the Fund's own assumptions in determining fair value of investments)

The following is a summary of the inputs used as of July 31, 2009, in valuing the Fund's assets:

	Level 1	Level 2	Level 3	Total
Municipal bonds	\$ -	\$340,832,757	\$-	\$340,832,757
Municipal collateralized debt	-	6,970,800	-	6,970,800
Common stock	1,722,507	-	-	1,722,507
Temporary cash investments	4,000,000	-	-	4,000,000
Total	\$5,722,507	\$347,803,557	\$ -	\$353,526,064

ITEM 2. 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-3(c) under the Act (17 CFR 270.30a-3(c))) as of a date within 90 days of the filing date of the report that includes the disclosure required by this paragraph, based on their evaluation of these controls and procedures required by Rule 30a-3(b) under the Act (17 CFR270.30a-3(b)) and Rule 13a-15(b) or 15d-15(b) under the Exchange Act (17 CFR240.13a-15(b) or 240.15d-15(b)).

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 any change in the registrant's internal controls over financial reporting (as defined in Rule 30a-3(d) under the Act (17 CFR270.30a-3(d))) that occurred during the registrant's last fiscal quarter that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting.

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.

ITEM 3. EXHIBITS.

(a) 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]

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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 September 28, 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 September 28, 2009

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

Date September 28, 2009

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