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PIONEER MUNICIPAL HIGH INCOME TRUST  
Form N-Q  
March 30, 2012

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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)

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: January 31, 2012

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<br>USD \$ | S&P / Moody's<br>Ratings |  | Value        |
|----------------------------|--------------------------|--|--------------|
|                            |                          | TAX-EXEMPT<br>OBLIGATIONS<br>127.0% of Net Assets  |              |
|                            |                          | Alabama — 2.2%   |              |
| 2,500,000                  | B-/B2                    | Alabama Industrial Development Authority Solid<br>Waste Disposal Revenue, 6.45%, 12/1/23                     | \$ 2,261,250 |
| 1,000,000                  | NR/NR                    | Huntsville-Redstone Village Special Care<br>Facilities Financing Authority, 5.5%, 1/1/28                     | 925,950      |
| 4,500,000                  | NR/NR                    | Huntsville-Redstone Village Special Care<br>Facilities Financing Authority, 5.5%, 1/1/43                     | 3,565,710    |
|                            |                          |  | \$ 6,752,910 |
|                            |                          | Arizona — 2.4%   |              |
| 5,000,000                  | BBB-/Baa3                | Apache County Industrial Development<br>Authority, 5.85%, 3/1/28   | \$ 5,001,800 |
| 994,000                    | NR/Baa3                  | Pima County Industrial Development Authority,<br>6.75%, 7/1/31   | 994,398      |
| 950,000                    | NR/Baa3                  | Pima County Industrial Development Authority,<br>7.25%, 7/1/31   | 952,175      |
| 500,000                    | NR/Baa2                  | Yavapai County Industrial Development<br>Authority, 6.0%, 8/1/33   | 508,005      |
|                            |                          |  | \$ 7,456,378 |
|                            |                          | California — 9.7%  |              |
| 3,000,000                  | NR/A1                    | ABAG Finance Authority for Nonprofit Corp.<br>Revenue Bonds, 5.75%, 7/1/37                                   | \$ 3,155,250 |
| 1,000,000                  | NR/NR                    | California Enterprise Development Authority<br>Recovery Zone Facility Revenue, 8.5%, 4/1/31                  | 1,064,650    |
| 7,885,000(a)               | AA-/NR                   | California State University Revenue, RIB,<br>11.126%, 9/20/28 (144A)   | 9,595,178    |
| 3,000,000                  | BB+/NR                   | California Statewide Communities Development<br>Authority, 7.25%, 10/1/38 (144A)                             | 3,112,410    |
| 568,006(b)                 | NR/NR                    | California Statewide Communities Development<br>Authority Environmental Facilities Revenue,<br>9.0%, 12/1/38 | 5,504        |
| 5,150,000†                 | AA+/Aaa                  | Golden State Tobacco Securitization Corp., 7.8%,<br>6/1/42   | 5,651,713    |
| 7,000,000†                 | AA+/Aaa                  | Golden State Tobacco Securitization Corp.,   | 7,688,590    |

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7.875%, 6/1/42

|               |          |   |    |            |
|---------------|----------|---|----|------------|
|               |          |   | \$ | 30,273,295 |
| 2,000,000     | BBB+/NR  | Colorado — 1.0%<br>Colorado Health Facilities Authority Revenue,<br>5.25%, 5/15/42                                      | \$ | 1,993,820  |
| 1,000,000     | NR/NR    | Kremmling Memorial Hospital District, 7.125%,<br>12/1/45  |    | 1,055,510  |
|               |          |   | \$ | 3,049,330  |
| 10,335,000(a) | NR/Aaa   | Connecticut — 6.0%<br>Connecticut Health & Educational Facilities<br>Authority Revenue, RIB, 11.885%, 8/21/35<br>(144A) | \$ | 13,715,475 |
| 1,000,000     | NR/NR    | Hamden Facility Revenue Bonds, Series 2009A,<br>7.75%, 1/1/43   |    | 1,043,060  |
| 5,000,000     | CCC+/NR  | Mohegan Tribe Indians Gaming Authority,<br>6.25%, 1/1/31  |    | 4,133,650  |
|               |          |   | \$ | 18,892,185 |
| 5,000,000     | BBB/Baa1 | District Of Columbia — 3.7%<br>District of Columbia Tobacco Settlement<br>Financing Corp., 6.5%, 5/15/33                | \$ | 5,417,800  |
| 6,000,000     | BBB/Baa1 | District of Columbia Tobacco Settlement<br>Financing Corp., 6.75%, 5/15/40  |    | 6,070,320  |
|               |          |   | \$ | 11,488,120 |
| 1,500,000     | NR/NR    | Florida — 7.6%<br>Alachua County Health Facilities Authority<br>Revenue, 8.125%, 11/15/41                               | \$ | 1,520,685  |
| 1,500,000     | NR/NR    | Alachua County Health Facilities Authority<br>Revenue, 8.125%, 11/15/46   |    | 1,520,685  |
| 1,600,000     | NR/NR    | Beacon Lakes Community Development, 6.9%,<br>5/1/35   |    | 1,626,656  |
| 1,000,000     | NR/Ba3   | Capital Trust Agency Revenue Bonds, 7.75%,<br>1/1/41  |    | 1,049,710  |
| 1,000,000     | NR/NR    | Florida Development Finance Corp., Educational<br>Facilities Revenue, 6.0%, 9/15/40                                     |    | 1,016,050  |
| 2,000,000     | NR/NR    | Florida Development Finance Corp., Educational<br>Facilities Revenue, 7.625%, 6/15/41                                   |    | 2,095,400  |
| 1,000,000     | NR/NR    | Florida Development Finance Corp., Educational<br>Facilities Revenue, 7.75%, 6/15/42                                    |    | 1,025,430  |
| 1,000,000†    | NR/WR    | Hillsborough County Industrial Development<br>Authority Revenue, 8.0%, 8/15/32  |    | 1,457,140  |
| 2,330,000     | NR/NR    | Liberty County Subordinate Revenue, 8.25%,<br>7/1/28  |    | 2,334,707  |
| 2,500,000     | A-/A2    | Miami-Dade County Florida Aviation Revenue,<br>5.5%, 10/1/41  |    | 2,769,725  |
| 1,000,000     | NR/NR    | St. Johns County Industrial Development<br>Authority Revenue, 5.25%, 1/1/26   |    | 849,060    |
| 2,000,000     | NR/NR    |   |    | 1,526,840  |

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|               |           |   |               |
|---------------|-----------|---|---------------|
|               |           | St. Johns County Industrial Development Authority Revenue, 5.375%, 1/1/40                 |               |
| 5,000,000     | NR/Baa1   | Tallahassee Health Facilities Revenue, 6.375%, 12/1/30                                    | 5,006,600     |
|               |           |   | \$ 23,798,688 |
|               |           | Georgia — 2.6%  |               |
| 4,240,000(a)  | NR/Aa3    | Atlanta Georgia Water and Wastewater Revenue, RIB, 11.126%, 1/30/13 (144A)                | \$ 4,765,506  |
| 500,000       | CCC+/NR   | Clayton County Development Authority Revenue, 9.0%, 6/1/35                                | 536,845       |
| 2,400,000     | NR/NR     | Fulton County Residential Care Facilities Revenue, 5.0%, 7/1/27                           | 1,932,120     |
| 1,100,000     | NR/NR     | Fulton County Residential Care Facilities Revenue, 5.125%, 7/1/42                         | 792,429       |
|               |           |   | \$ 8,026,900  |
|               |           | Idaho — 1.6%  |               |
| 5,000,000     | BBB+/Baa1 | Power County Industrial Development Corp., 6.45%, 8/1/32                                  | \$ 5,005,800  |
|               |           | Illinois — 14.4%  |               |
| 1,000,000(b)  | NR/NR     | Illinois Finance Authority Revenue, 6.0%, 11/15/27  | \$ 500,000    |
| 3,865,000     | BBB+/NR   | Illinois Finance Authority Revenue, 6.0%, 8/15/38   | 4,134,004     |
| 2,000,000     | AA+/Aa2   | Illinois Finance Authority Revenue, 6.0%, 8/15/39   | 2,300,180     |
| 4,000,000(b)  | NR/NR     | Illinois Finance Authority Revenue, 6.0%, 11/15/39  | 2,000,000     |
| 2,450,000     | NR/NR     | Illinois Finance Authority Revenue, 6.375%, 5/15/17                                       | 2,451,739     |
| 2,500,000     | NR/Baa2   | Illinois Finance Authority Revenue, 6.5%, 4/1/39  | 2,724,225     |
| 500,000       | NR/NR     | Illinois Finance Authority Revenue, 7.0%, 5/15/18   | 500,305       |
| 1,700,000     | NR/NR     | Illinois Finance Authority Revenue, 7.625%, 5/15/25                                       | 1,717,340     |
| 600,000       | NR/NR     | Illinois Finance Authority Revenue, 7.75%, 5/15/30  | 604,986       |
| 2,000,000     | NR/NR     | Illinois Finance Authority Revenue, 8.0%, 5/15/40   | 2,018,860     |
| 3,200,000     | NR/NR     | Illinois Finance Authority Revenue, 8.0%, 5/15/46   | 3,230,176     |
| 4,000,000     | NR/NR     | Illinois Finance Authority Revenue, 8.25%, 5/15/45  | 4,032,520     |
| 2,500,000     | NR/NR     | Illinois Finance Authority Revenue, 8.25%, 2/15/46  | 2,498,425     |
| 16,880,000(c) | AAA/A3    | Metropolitan Pier & Exposition Authority Dedicated State Tax Revenue, 0.0%, 6/15/22       | 15,169,043    |
| 1,540,000     | NR/NR     | Southwestern Illinois Development Authority Revenue, 5.625%, 11/1/26                      | 1,153,368     |
|               |           |   | \$ 45,035,171 |
|               |           | Indiana — 2.0%  |               |
| 3,000,000     | A+/A1     | Indiana Health & Educational Facility Financing Authority Hospital Revenue, 5.0%, 2/15/39 | \$ 3,058,110  |
| 3,570,000     | NR/NR     |   | 3,216,641     |

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|              |           |   |               |
|--------------|-----------|---|---------------|
|              |           | Vigo County Hospital Authority Revenue, 5.8%,<br>9/1/47 (144A)  | \$ 6,274,751  |
| 1,500,000    | BBB-/Baa3 | Louisiana — 2.1%<br>Louisiana Local Government Environmental<br>Facilities Revenue, 6.75%, 11/1/32          | \$ 1,619,535  |
| 5,000,000    | NR/Baa1   | Louisiana Public Facilities Authority Revenue,<br>5.5%, 5/15/47   | 5,106,850     |
|              |           |   | \$ 6,726,385  |
| 1,500,000    | NR/Baa3   | Maine — 0.5%<br>Maine Health & Higher Educational Facilities<br>Authority Revenue, 7.5%, 7/1/32             | \$ 1,718,115  |
| 7,100,000    | A/WR      | Massachusetts — 7.6%<br>Massachusetts Development Finance Agency,<br>5.75%, 1/1/42                          | \$ 8,712,907  |
| 2,305,000    | NR/NR     | Massachusetts Development Finance Agency,<br>7.1%, 7/1/32   | 2,063,851     |
| 860,000      | AA/NR     | Massachusetts Educational Financing Authority<br>Revenue, 6.0%, 1/1/28                                      | 993,360       |
| 1,860,000    | AAA/Aaa   | Massachusetts Health & Educational Facilities<br>Authority Revenue, 5.5%, 7/1/32                            | 2,680,613     |
| 1,000,000    | NR/Caa1   | Massachusetts Health & Educational Facilities<br>Authority Revenue, 6.0%, 10/1/23                           | 776,810       |
| 3,500,000†   | NR/NR     | Massachusetts Health & Educational Facilities<br>Authority Revenue, 6.25%, 7/1/22                           | 3,620,680     |
| 4,500,000(b) | NR/NR     | Massachusetts Health & Educational Facilities<br>Authority Revenue, 6.5%, 1/15/38                           | 44,955        |
| 5,000,000    | BB-/NR    | Massachusetts Health & Educational Facilities<br>Authority Revenue, 6.75%, 10/1/33                          | 5,050,600     |
|              |           |   | \$ 23,943,776 |
| 935,000      | NR/NR     | Michigan — 3.1%<br>Doctor Charles Drew Academy, 5.7%, 11/1/36   | \$ 632,855    |
| 1,500,000    | BB-/NR    | John Tolfree Health System Corp., 6.0%, 9/15/23   | 1,320,975     |
| 2,000,000    | BB+/NR    | Kent Hospital Finance Authority Revenue, 6.25%,<br>7/1/40   | 2,025,260     |
| 5,830,000    | B-/NR     | Michigan Tobacco Settlement Finance Authority,<br>6.0%, 6/1/48  | 4,375,648     |
| 1,410,000    | BBB/NR    | Star International Academy Certificates of<br>Participation, 6.125%, 3/1/37                                 | 1,360,100     |
|              |           |   | \$ 9,714,838  |
| 1,675,000    | BB-/NR    | Minnesota — 0.9%<br>Duluth Economic Development Authority Health<br>Care Facilities Revenue, 7.25%, 6/15/32 | \$ 1,691,164  |
| 1,000,000    | NR/NR     | Port Authority of the City of Bloomington<br>Minnesota Facility Revenue Bonds, 9.0%, 12/1/35                | 1,064,690     |
|              |           |   | \$ 2,755,854  |

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|                 |         |  |    |            |
|-----------------|---------|--|----|------------|
|                 |         | Montana — 0.1%   |    |            |
| 1,600,000(b)(d) | NR/NR   | Two Rivers Authority, Inc., Correctional Facility Improvement Revenue, 7.375%, 11/1/27 | \$ | 240,048    |
|                 |         | Nebraska — 0.2%  |    |            |
| 2,000,000(b)(d) | NR/NR   | Grand Island Solid Waste Disposal Facilities Revenue, 7.0%, 6/1/23                     | \$ | 566,220    |
|                 |         | Nevada — 0.0%*   |    |            |
| 2,000,000(b)(d) | NR/NR   | Nevada State Department of Business & Industry, 7.25%, 1/1/23                          | \$ | 2,400      |
|                 |         | New Jersey — 7.9%  |    |            |
| 10,000,000      | B/B3    | New Jersey Economic Development Authority Revenue, 6.25%, 9/15/29                      | \$ | 9,956,900  |
| 6,150,000(e)    | B/B3    | New Jersey Economic Development Authority Revenue, 7.0%, 11/15/30                      |    | 6,150,246  |
| 8,000,000†      | AA+/Aaa | Tobacco Settlement Financing Corp., 6.75%, 6/1/39                                      |    | 8,693,600  |
|                 |         |  | \$ | 24,800,746 |
|                 |         | New Mexico — 1.2%  |    |            |
| 1,500,000       | NR/NR   | Otero County New Mexico Project Revenue, 6.0%, 4/1/23                                  | \$ | 1,337,385  |
| 2,960,000       | NR/NR   | Otero County New Mexico Project Revenue, 6.0%, 4/1/28                                  |    | 2,451,146  |
|                 |         |  | \$ | 3,788,531  |
|                 |         | New York — 10.1%   |    |            |
| 2,000,000       | NR/NR   | Chautauqua County Capital Resource Corp. Revenue, 8.0%, 11/15/30                       | \$ | 2,128,220  |
| 3,000,000       | NR/NR   | Dutchess County Industrial Development Agency Revenue, 7.5%, 3/1/29                    |    | 3,034,230  |
| 2,000,000       | BBB+/NR | Hempstead Local Development Corp. Revenue Bonds, 5.75%, 7/1/39                         |    | 2,186,400  |
| 2,050,000       | NR/NR   | Nassau County New York Industrial Development Agency Revenue, 6.7%, 1/1/43             |    | 1,592,092  |
| 2,000,000       | BB-/B2  | New York City Industrial Development Agency, 5.25%, 12/1/32                            |    | 1,616,240  |
| 2,000,000       | BB-/B2  | New York City Industrial Development Agency, 7.625%, 12/1/32                           |    | 2,001,200  |
| 2,000,000       | NR/C    | New York City Industrial Development Agency, 8.0%, 8/1/12                              |    | 1,843,640  |
| 1,000,000       | NR/Ba1  | New York State Dormitory Authority Revenue, 6.125%, 12/1/29                            |    | 1,024,080  |
| 7,040,000(a)    | NR/Aaa  | New York State Dormitory Authority Revenue, RIB, 13.432%, 5/29/14 (144A)               |    | 10,790,771 |
| 2,750,000       | BB/NR   | Seneca Nation Indians Capital Improvement Authority Revenue, 5.25%, 12/1/16 (144A)     |    | 2,606,697  |
| 3,000,000       | NR/NR   | Suffolk County Industrial Development Agency, 7.25%, 1/1/30                            |    | 2,999,580  |
|                 |         |  | \$ | 31,823,150 |
|                 |         | North Carolina — 2.9%  |    |            |

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|              |           |  |    |            |
|--------------|-----------|--|----|------------|
| 4,785,000    | NR/NR     | Charlotte North Carolina Special Facilities Revenue, 5.6%, 7/1/27                                | \$ | 4,171,228  |
| 4,795,000    | NR/NR     | Charlotte North Carolina Special Facilities Revenue, 7.75%, 2/1/28                               |    | 4,801,665  |
|              |           | Oklahoma — 0.3%  | \$ | 8,972,893  |
| 1,225,000(b) | NR/NR     | Tulsa Municipal Airport Revenue, 6.25%, 6/1/20   | \$ | 921,004    |
|              |           | Pennsylvania — 2.5%  |    |            |
| 1,550,000    | NR/Baa2   | Allegheny County Hospital Development Authority Revenue, 5.125%, 5/1/25                          | \$ | 1,550,186  |
| 1,000,000    | CC/NR     | Columbia County Hospital Authority Health Care Revenue, 5.9%, 6/1/29                             |    | 961,640    |
| 665,000      | BBB+/Baa3 | Hazleton Health Services Authority Hospital Revenue, 5.625%, 7/1/17                              |    | 665,499    |
| 1,280,000(b) | NR/NR     | Langhorne Manor Borough Higher Education & Health Authority Revenue, 7.35%, 7/1/22               |    | 371,187    |
| 5,000,000    | B-/Caa2   | Pennsylvania Economic Development Financing Authority Solid Waste Disposal Revenue, 6.0%, 6/1/31 |    | 3,939,500  |
| 500,000      | BBB+/NR   | Pennsylvania Higher Educational Facilities Authority Revenue, 5.4%, 7/15/36                      |    | 508,575    |
|              |           | Rhode Island — 2.0%  | \$ | 7,996,587  |
| 6,000,000(d) | NR/NR     | Central Falls Detention Facilities Revenue, 7.25%, 7/15/35                                       | \$ | 4,793,940  |
| 1,500,000    | NR/NR     | Rhode Island Health & Educational Building Corp Revenue, 8.375%, 1/1/46                          |    | 1,547,535  |
|              |           | South Carolina — 1.3%  | \$ | 6,341,475  |
| 3,185,000†   | BBB+/Baa1 | South Carolina Jobs Economic Development Authority Revenue, 6.375%, 8/1/34                       | \$ | 3,462,923  |
| 665,000†     | BBB+/Baa1 | South Carolina Jobs Economic Development Authority Revenue, 6.375%, 8/1/34                       |    | 724,604    |
|              |           | Tennessee — 4.7%   | \$ | 4,187,527  |
| 7,000,000†   | NR/A2     | Johnson City Health & Educational Facilities Board Hospital Revenue, 7.5%, 7/1/33                | \$ | 7,373,450  |
| 2,480,000    | NR/A1     | Knox County Health, Educational & Housing Facilities Board Hospital Revenue, 6.375%, 4/15/22     |    | 2,536,222  |
| 4,600,000    | BBB+/NR   | Sullivan County Health, Educational & Housing Facilities Board Hospital Revenue, 5.25%, 9/1/36   |    | 4,691,632  |
|              |           | Texas — 14.6%  | \$ | 14,601,304 |
| 1,345,000    | NR/B3     | Bexar County Housing Finance Corp., 8.0%, 12/1/36  | \$ | 949,395    |

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|               |          |  |                |
|---------------|----------|--|----------------|
| 2,500,000     | BB+/Ba1  | Central Texas Regional Mobility Authority Revenue, 6.75%, 1/1/41                               | 2,620,825      |
| 4,000,000     | NR/NR    | Decatur Hospital Authority Revenue, 7.0%, 9/1/25   | 4,049,400      |
| 725,078(b)(d) | NR/NR    | Gulf Coast Industrial Development Authority, 7.0%, 12/1/36                                     | 6,990          |
| 3,750,000     | B-/B3    | Houston Airport System Special Facilities Revenue, 5.7%, 7/15/29                               | 3,543,975      |
| 5,340,000     | NR/NR    | Lubbock Health Facilities Development Corp., 6.625%, 7/1/36                                    | 5,240,249      |
| 10,000,000    | BBB+/A3  | North Texas Tollway Authority Revenue, 5.75%, 1/1/33   | 10,908,000     |
| 2,810,000(a)  | NR/Aaa   | Northside Independent School District, RIB, 11.669%, 6/15/12 (144A)                            | 3,159,705      |
| 1,500,000     | NR/NR    | Red River Health Facilities Development Corp., Revenue, 8.0%, 11/15/41                         | 1,536,480      |
| 2,000,000     | NR/NR    | Tarrant County Cultural Education Facilities Finance Corp., 8.0%, 11/15/34                     | 2,061,880      |
| 1,000,000     | NR/NR    | Tarrant County Cultural Education Facilities Finance Corp., 8.125%, 11/15/39                   | 1,023,370      |
| 1,500,000     | NR/NR    | Tarrant County Cultural Education Facilities Finance Corp., 8.25%, 11/15/44                    | 1,539,000      |
| 7,040,000(a)  | NR/Aaa   | Texas State, RIB, 12.64%, 4/1/13 (144A)  | 9,292,518      |
|               |          |  | \$ 45,931,787  |
|               |          | Vermont — 0.5%   |                |
| 1,500,000     | A-/Baa1  | Vermont Educational & Health Buildings Financing Agency Revenue, 6.0%, 10/1/28                 | \$ 1,581,840   |
|               |          | Virginia — 0.3%  |                |
| 1,000,000     | BBB/Ba1  | Peninsula Ports Authority, 6.0%, 4/1/33  | \$ 1,027,090   |
|               |          | Washington — 9.9%  |                |
| 4,710,000     | A+/A2    | Spokane Public Facilities District Hotel/Motel Tax & Sales, 5.75%, 12/1/27                     | \$ 5,040,454   |
| 7,025,000     | BBB/Baa1 | Tobacco Settlement Authority Revenue, 6.625%, 6/1/32   | 7,307,194      |
| 14,315,000    | AA+/Aa1  | Washington State General Obligation, 0.0%, 6/1/22  | 10,931,220     |
| 3,795,000     | A/A2     | Washington State Health Care Facilities Authority Revenue, 6.0%, 1/1/33                        | 4,175,525      |
| 5,000,000     | NR/NR    | Washington State Housing Finance Committee Nonprofit Revenue, 5.625%, 1/1/27                   | 3,635,400      |
|               |          |  | \$ 31,089,793  |
|               |          | West Virginia — 0.3%   |                |
| 745,000       | NR/NR    | West Virginia Hospital Finance Authority Hospital Revenue Bonds, 9.125%, 10/1/41               | \$ 826,808     |
|               |          | Wisconsin — 0.8%   |                |
| 2,500,000     | NR/NR    | Wisconsin Public Finance Authority Continuing Care Retirement Community Revenue, 8.25%, 6/1/46 | \$ 2,622,550   |
|               |          | TOTAL TAX-EXEMPT OBLIGATIONS   | \$ 398,234,249 |



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|                  |       |   |                 |
|------------------|-------|---|-----------------|
|                  |       | (Cost \$374,019,744)  |                 |
|                  |       | MUNICIPAL COLLATERALIZED DEBT OBLIGATION — 2.2% OF NET ASSETS               |                 |
| 10,000,000(d)(e) | NR/NR | Non-Profit Preferred Funding Trust I, 6.75%, 9/15/37 (144A)                 | \$ 6,938,500    |
|                  |       | TOTAL MUNICIPAL COLLATERALIZED DEBT OBLIGATION                              |                 |
|                  |       | (Cost \$10,000,000)   | \$ 6,938,500    |
| Shares           |       |   | Value           |
|                  |       | COMMON STOCK  |                 |
|                  |       | 0.8%  |                 |
|                  |       | Transportation — 0.8%   |                 |
| 251,078(f)       |       | Delta Air Lines, Inc.   | \$ 2,648,873    |
|                  |       | TOTAL COMMON STOCKS   |                 |
|                  |       | (Cost \$6,612,756)  | \$ 2,648,873    |
|                  |       | TOTAL INVESTMENTS IN SECURITIES — 130.0%                                    |                 |
|                  |       | (Cost \$390,632,500)(g)(h)  | \$ 407,821,622  |
|                  |       | OTHER ASSETS AND LIABILITIES — 2.2%   | \$ 6,757,926    |
|                  |       | PREFERRED SHARES AT REDEMPTION VALUE, INCLUDING DIVIDENDS PAYABLE — (32.2)% | \$(101,001,172) |
|                  |       | NET ASSETS APPLICABLE TO COMMON SHAREOWNERS — 100.0%                        | \$ 313,578,376  |

(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 January 31, 2012, the value of these securities amounted to \$67,193,401 or 21.4% of total net assets applicable to common shareowners.

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

RIB Residual Interest Bonds

WR Withdrawn rating

† 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.

\* Amount rounds to less than 0.1%.

(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 January 31, 2012.

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

(c) Debt obligation initially issued at one coupon which converts to a higher coupon at a specific date. The rate shown is the rate at January 31, 2012.

(d) Indicates a security that has been deemed illiquid. The aggregate cost of illiquid securities is \$22,082,721. The aggregate fair value of \$12,548,098 represents 4.0% of the total net assets applicable to common shareowners.

(e) The interest rate is subject to change periodically. The interest rate shown is the coupon rate at January 31, 2012.

(f) Non-income producing.

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

|                |                           |      |   |
|----------------|---------------------------|------|---|
| Insured:       | NATL-RE                   | 5.1  | % |
|                | FSA                       | 3.6  |   |
|                | AMBAC                     | 2.9  |   |
|                | NATL-RE FGIC              | 2.7  |   |
|                | PSF-GTD                   | 0.8  |   |
| Revenue Bonds: | Medical Revenue           | 21.7 |   |
|                | Other Revenue             | 13.5 |   |
|                | Tobacco Revenue           | 11.3 |   |
|                | Health Revenue            | 9.9  |   |
|                | Development Revenue       | 7.3  |   |
|                | Education Revenue         | 6.2  |   |
|                | Airport Revenue           | 6.0  |   |
|                | Facilities Revenue        | 3.1  |   |
|                | Pollution Control Revenue | 3.0  |   |
|                | Transportation Revenue    | 2.7  |   |
|                | Housing Revenue           | 0.2  |   |
|                | Utilities Revenue**       | 0.0  |   |
|                |                           | 100  | % |

Various inputs are used in determining the value of the Trust's investments.

These inputs are summarized in the three broad levels listed 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 risk, etc.)

Level 3 – significant unobservable inputs (including the Trust's own assumptions in determining fair value of investments)

Generally, equity securities are categorized as Level 1, fixed income securities and senior loans

are categorized as Level 2 and securities valued using fair value methods (other than prices supplied by independent pricing services) are categorized as Level 3.

|  | Level 1 | Level 2       | Level 3 | Total         |
|--|---------|---------------|---------|---------------|
| Tax exempt obligations                   | \$—     | \$398,234,249 | \$—     | \$398,234,249 |
| Municipal collateralized debt obligation | —       | 6,938,500     | —       | 6,938,500     |

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|               |             |               |     |               |
|---------------|-------------|---------------|-----|---------------|
| Common stocks | 2,648,873   | —             | —   | 2,648,873     |
| Total         | \$2,648,873 | \$405,172,749 | \$— | \$407,821,622 |

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 CFR 270.30a-3(b)) and Rule 13a-15(b) or 15d-15(b) under the Exchange Act (17 CFR 240.13a-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 CFR 270.30a-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. <PAGE>

SIGNATURES [See General Instruction F] Pursuant to the requirements of the Securities Exchange Act of 1934 and the Investment Company Act of 1940, the registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized. (Registrant) Pioneer Municipal High Income Trust By (Signature and Title)\* /s/ John F. Cogan, Jr. John F. Cogan, Jr, President Date March 30, 2012 Pursuant to the requirements of the Securities Exchange Act of 1934 and the Investment Company Act of 1940, this report has been signed below by the following persons on behalf of the registrant and in the capacities and on the dates indicated. By (Signature and Title)\* /s/ John F. Cogan, Jr. John F. Cogan, Jr., President Date March 30, 2012 By (Signature and Title)\* /s/ Mark Bradley Mark Bradley, Treasurer Date March 30, 2012 \* Print the name and title of each signing officer under his or her signature.