

PIONEER MUNICIPAL HIGH INCOME TRUST  
Form N-Q  
March 29, 2019

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

FORM N-Q

QUARTERLY SCHEDULE OF PORTFOLIO HOLDINGS  
OF REGISTERED MANAGEMENT INVESTMENT COMPANY

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, 2019

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 270.30b1-5). 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.

File the schedules as of the close of the reporting period as set forth in ss. 210.12-12 – 12-14 of Regulation S-X [17 CFR 210.12-12 – 12-14]. The schedules need not be audited.

Pioneer Municipal High  
Income Trust

NQI January 31, 2019

Ticker Symbol: MHI

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| Principal Amount USD (\$) |  | Value        |
|---------------------------|--|--------------|
|                           | UNAFFILIATED ISSUERS - 142.7%  |              |
|                           | DEBTOR IN POSSESSION FINANCING - 1.2% of Net Assets  |              |
|                           | Building Materials - 1.2%  |              |
| 2,522,000                 | Texas Pellets, Inc. / German Pellets Texas LLC, 8.0%, 9/30/18 (144A)   | \$2,522,000  |
| 745,000                   | Texas Pellets, Inc. / German Pellets Texas LLC, 8.0%, 3/29/19 (144A)   | 745,000      |
|                           | Total Building Materials   | \$3,267,000  |
|                           | TOTAL DEBTOR IN POSSESSION FINANCING   |              |
|                           | (Cost \$3,267,000)   | \$3,267,000  |
|                           | TAX EXEMPT OBLIGATIONS - 141.5% of Net Assets(a)   |              |
|                           | Arizona - 2.9%   |              |
| 1,000,000                 | Arizona Industrial Development Authority, Bridgewater Avondale Project, 5.375%, 1/1/38                                   | \$1,009,370  |
| 4,000,000(b)              | City of Phoenix, 5.0%, 7/1/27  | 4,807,120    |
| 2,250,000                 | City of Phoenix, Industrial Development Authority, 3rd & Indian School Assisted Living Project, 5.4%, 10/1/36            | 2,326,770    |
| 24,000                    | County of Pima, Industrial Development Authority, Arizona Charter Schools Project, Series C, 6.75%, 7/1/31               | 24,211       |
|                           | Total Arizona  | \$8,167,471  |
|                           | California - 8.2%  |              |
| 10,000,000(c)             | California County Tobacco Securitization Agency, Capital Appreciation, Stanislaus County, Subordinated, Series A, 6/1/46 | \$2,014,700  |
| 1,450,000                 | California Enterprise Development Authority, Sunpower Corp., 8.5%, 4/1/31  | 1,534,433    |
| 530,000                   | California Municipal Finance Authority, Santa Rosa Academy Project, Series A, 5.75%, 7/1/30                              | 563,597      |
| 4,750,000                 | California Pollution Control Financing Authority, 5.0%, 7/1/37 (144A)  | 4,758,027    |
| 1,725,000(d)              | California School Finance Authority, Classical Academies Project, Series A, 7.375%, 10/1/43                              | 2,069,379    |
| 1,400,000                 | California Statewide Communities Development Authority, Lancer Plaza Project, 5.625%, 11/1/33                            | 1,503,530    |
| 568,006(e)                | California Statewide Communities Development Authority, Microgy Holdings Project, 9.0%, 12/1/38                          | 6            |
| 2,000,000(b)              | Los Angeles Community College District, Series G, 4.0%, 8/1/39   | 2,056,520    |
| 1,605,000                 | Los Angeles County Metropolitan Transportation Authority, Series A, 5.0%, 7/1/30   | 1,949,882    |
| 6,750,000                 | Tobacco Securitization Authority of Southern California, Series A-1, 5.0%, 6/1/37  | 6,751,688    |
|                           | Total California   | \$23,201,762 |
|                           | Colorado - 1.4%  |              |
| 1,500,000(d)              | Colorado Educational & Cultural Facilities Authority, Rocky Mountain Classical Academy Project, 8.0%, 9/1/43             | \$1,894,950  |
| 1,665,000(f)              | Tender Option Bond Trust Receipts/Certificates, RIB, Series 2018, 0%, 6/1/39 (144A)                                      | 1,965,249    |
|                           | Total Colorado   | \$3,860,199  |
|                           | Connecticut - 3.3%   |              |
| 2,915,000                 | Mohegan Tribal Finance Authority, 7.0%, 2/1/45 (144A)  | \$2,999,448  |
| 5,000,000(b)              | State of Connecticut, Series E, 4.0%, 9/1/30   | 5,208,100    |
| 1,000,000                 | Town of Hamden, Whitney Center Project, Series A, 7.75%, 1/1/43  | 1,025,940    |
|                           | Total Connecticut  | \$9,233,488  |
|                           | District of Columbia - 6.4%  |              |

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|                           |  |              |
|---------------------------|--|--------------|
| 3,705,000                 | District of Columbia Tobacco Settlement Financing Corp., Asset-Backed, 6.5%, 5/15/33                           | \$3,979,133  |
| 6,000,000                 | District of Columbia Tobacco Settlement Financing Corp., Asset-Backed, 6.75%, 5/15/40                          | 6,213,600    |
| 25,000,000(c)             | District of Columbia Tobacco Settlement Financing Corp., Capital Appreciation, Asset-Backed, Series A, 6/15/46 | 3,827,500    |
| 3,975,000                 | District of Columbia, Deed Tax Housing Product Trust Fund, Series A, 4.25%, 6/1/37 (NATL Insured)              | 3,995,789    |
|                           | Total District of Columbia Florida - 6.1%  | \$18,016,022 |
| 1,500,000                 | Alachua County Health Facilities Authority, Terraces Bonita Springs Project, Series A, 8.125%, 11/15/41        | \$1,629,435  |
| 1,500,000                 | Alachua County Health Facilities Authority, Terraces Bonita Springs Project, Series A, 8.125%, 11/15/46        | 1,627,395    |
| 2,500,000(d)              | County of Miami-Dade, Aviation Revenue, Series B, 5.5%, 10/1/41  | 2,564,600    |
| 5,000,000                 | County of Miami-Dade, Water & Sewer System Revenue, Series A, 4.0%, 10/1/44                                    | 5,151,200    |
| 5,000,000                 | Florida's Turnpike Enterprise, Department of Transportation, Series A, 4.0%, 7/1/34                            | 5,260,050    |
| 1,000,000(d)              | Hillsborough County Industrial Development Authority, Various Health Facilities, 8.0%, 8/15/32                 | 1,043,070    |
|                           | Total Florida Georgia - 2.5%   | \$17,275,750 |
| 2,500,000                 | Clayton County Development Authority, Delta Air Lines, Series A, 8.75%, 6/1/29                                 | \$2,705,975  |
| 4,000,000                 | Private Colleges & Universities Authority, Emory University, Series A, 5.0%, 10/1/43                           | 4,396,920    |
|                           | Total Georgia Idaho - 1.8%   | \$7,102,895  |
| 5,000,000                 | Power County Industrial Development Corp., FMC Corp. Project, 6.45%, 8/1/32                                    | \$5,026,500  |
|                           | Total Idaho Illinois - 16.5%   | \$5,026,500  |
| 2,087,000(f)              | Illinois Finance Authority, Clare Oaks Project, Series B, 4.0%, 11/15/52                                       | \$1,811,620  |
| 1,305,000(c)              | Illinois Finance Authority, Clare Oaks Project, Series C-1, 11/15/52   | 55,750       |
| 261,000                   | Illinois Finance Authority, Clare Oaks Project, Series C-2, 4.0%, 11/15/52                                     | 80,276       |
| 261,000(c)                | Illinois Finance Authority, Clare Oaks Project, Series C-3, 11/15/52   | 50,201       |
| 2,000,000(d)              | Illinois Finance Authority, Northwestern Memorial Hospital, Series A, 6.0%, 8/15/39                            | 2,045,500    |
| 2,500,000(d)              | Illinois Finance Authority, Roosevelt University Project, 6.5%, 4/1/39   | 2,579,100    |
| 3,865,000(d)              | Illinois Finance Authority, Swedish Covenant, Series A, 6.0%, 8/15/38  | 4,031,929    |
| 3,500,000                 | Illinois Finance Authority, The Admiral at the Lake Project, 5.25%, 5/15/42                                    | 3,453,415    |
| 4,000,000                 | Illinois Finance Authority, The Admiral at the Lake Project, 5.5%, 5/15/54                                     | 4,007,560    |
| 1,700,000(d)              | Illinois Finance Authority, The Admiral at the Lake Project, Series A, 7.625%, 5/15/25                         | 1,814,155    |
| Principal Amount USD (\$) |  | Value        |
|                           | Illinois - (continued)   |              |
| 600,000(d)                | Illinois Finance Authority, The Admiral at the Lake Project, Series A, 7.75%, 5/15/30                          | \$643,098    |
| 2,000,000(d)              | Illinois Finance Authority, The Admiral at the Lake Project, Series A, 8.0%, 5/15/40                           | 2,151,080    |
| 3,200,000(d)              | Illinois Finance Authority, The Admiral at the Lake Project, Series A, 8.0%, 5/15/46                           | 3,444,416    |

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|              |  |              |
|--------------|--|--------------|
| 1,610,000(g) | Metropolitan Pier & Exposition Authority, McCormick Place, 5.65%, 6/15/22 (NATL-RE Insured)                            | 1,804,729    |
| 13,785,000   | Metropolitan Pier & Exposition Authority, McCormick Place, 5.65%, 6/15/22 (NATL-RE Insured)                            | 15,144,339   |
| 1,000,000    | Metropolitan Pier & Exposition Authority, McCormick Place, Series B, 5.0%, 6/15/52 (ST APPROP Insured)                 | 1,017,390    |
| 1,485,000(g) | Metropolitan Pier & Exposition Authority, McCormick Place, Series B, 5.65%, 6/15/22 (NATL Insured)                     | 1,684,406    |
| 820,000      | Southwestern Illinois Development Authority, Village of Sauget Project, 5.625%, 11/1/26                                | 808,463      |
|              | Total Illinois   | \$46,627,427 |
|              | Indiana - 1.7%   |              |
| 250,000      | City of Carmel, Barrington Carmel Project, Series A, 7.0%, 11/15/32  | \$220,000    |
| 750,000      | City of Carmel, Barrington Carmel Project, Series A, 7.125%, 11/15/42  | 660,000      |
| 500,000      | City of Carmel, Barrington Carmel Project, Series A, 7.125%, 11/15/47  | 440,000      |
| 1,000,000    | City of Evansville, Silver Birch Evansville Project, 5.45%, 1/1/38   | 1,004,220    |
| 1,500,000    | City of Mishawaka, Silver Birch Mishawaka Project, 5.375%, 1/1/38 (144A)   | 1,508,460    |
| 1,000,000    | Indiana Finance Authority, Multipurpose Educational Facilities, Avondale Meadows Academy Project, 5.375%, 7/1/47       | 1,010,390    |
|              | Total Indiana  | \$4,843,070  |
|              | Kentucky - 1.9%  |              |
| 5,000,000(d) | Kentucky Economic Development Finance Authority, Owensboro Medical Health System, Series A, 6.375%, 6/1/40             | \$5,299,600  |
|              | Total Kentucky   | \$5,299,600  |
|              | Louisiana - 0.7%   |              |
| 2,260,000    | Jefferson Parish Hospital Service District No. 2, East Jefferson General Hospital, 6.375%, 7/1/41                      | \$2,118,140  |
|              | Total Louisiana  | \$2,118,140  |
|              | Maine - 2.3%   |              |
| 1,500,000    | Maine Health & Higher Educational Facilities Authority, Maine General Medical Center, 7.5%, 7/1/32                     | \$1,620,750  |
| 4,480,000    | Maine Turnpike Authority, Series A, 5.0%, 7/1/42   | 4,834,502    |
|              | Total Maine  | \$6,455,252  |
|              | Maryland - 0.5%  |              |
| 1,390,000    | Maryland Health & Higher Educational Facilities Authority, City Neighbors, Series A, 6.75%, 7/1/44                     | \$1,510,833  |
|              | Total Maryland   | \$1,510,833  |
|              | Massachusetts - 10.2%  |              |
| 7,000,000(c) | Massachusetts Bay Transportation Authority, Series A, 7/1/28   | \$5,265,190  |
| 1,550,000    | Massachusetts Development Finance Agency, Harvard University, Series A, 5.0%, 7/15/36                                  | 2,010,583    |
| 5,000,000    | Massachusetts Development Finance Agency, Harvard University, Series A, 5.0%, 7/15/40                                  | 6,507,900    |
| 1,000,000    | Massachusetts Development Finance Agency, Partners Healthcare System, 4.0%, 7/1/41                                     | 1,015,750    |
| 7,100,000    | Massachusetts Development Finance Agency, WGBH Foundation, Series A, 5.75%, 1/1/42 (AMBAC Insured)                     | 9,658,698    |
| 240,000      | Massachusetts Educational Financing Authority, Series I, 6.0%, 1/1/28  | 249,098      |
| 3,100,000    | Massachusetts Health & Educational Facilities Authority, Massachusetts Institute of Technology, Series K, 5.5%, 7/1/32 | 4,137,136    |
|              | Total Massachusetts  | \$28,844,355 |

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|                           |   |              |
|---------------------------|---|--------------|
|                           | Michigan - 3.2%   |              |
| 2,640,000                 | Michigan State University, Series A, 5.0%, 8/15/41  | \$2,905,558  |
| 6,100,000                 | Michigan Tobacco Settlement Finance Authority, Series A, 6.0%, 6/1/48                               | 6,008,378    |
|                           | Total Michigan  | \$8,913,936  |
|                           | Minnesota - 4.6%  |              |
| 2,000,000                 | Bloomington Port Authority, Radisson Blu Mall of America, 9.0%, 12/1/35                             | \$2,169,660  |
| 1,000,000                 | City of Ham Lake, DaVinci Academy, Series A, 5.0%, 7/1/47   | 1,024,510    |
| 2,300,000                 | City of Rochester, Mayo Clinic, Series B, 5.0%, 11/15/35  | 2,875,874    |
| 6,000,000(b)              | State of Minnesota, Series B, 4.0%, 8/1/27  | 6,818,520    |
|                           | Total Minnesota   | \$12,888,564 |
|                           | Mississippi - 2.3%  |              |
| 600,000(f)                | Mississippi Business Finance Corp., Chevron USA, Inc. Project, Series C, 1.45%, 12/1/30             | \$600,000    |
| 5,800,000(f)              | Mississippi Business Finance Corp., Chevron USA, Inc. Project, Series C, 1.45%, 12/1/30             | 5,800,000    |
|                           | Total Mississippi   | \$6,400,000  |
|                           | Montana - 0.0%†   |              |
| 1,600,000(e)              | Two Rivers Authority, Inc., 7.375%, 11/1/27   | \$64,000     |
|                           | Total Montana   | \$64,000     |
|                           | New Hampshire - 0.3%  |              |
| 1,000,000                 | New Hampshire Health & Education Facilities Authority Act, Catholic Medical Centre, 3.75%, 7/1/40   | \$950,960    |
|                           | Total New Hampshire   | \$950,960    |
|                           | New Jersey - 2.5%   |              |
| 1,000,000                 | New Jersey Economic Development Authority, Charter Marion P Thomas, 5.375%, 10/1/50 (144A)          | \$1,014,600  |
| 3,000,000                 | New Jersey Economic Development Authority, Continental Airlines, 5.25%, 9/15/29                     | 3,238,320    |
| 2,500,000                 | New Jersey Economic Development Authority, Continental Airlines, 5.75%, 9/15/27                     | 2,702,200    |
|                           | Total New Jersey  | \$6,955,120  |
| Principal Amount USD (\$) |   | Value        |
|                           | New Mexico - 1.6%   |              |
| 1,500,000                 | County of Otero, Otero County Jail Project, 9.0%, 4/1/23  | \$1,494,525  |
| 2,960,000(f)              | County of Otero, Otero County Jail Project, 9.0%, 4/1/28  | 2,930,696    |
|                           | Total New Mexico  | \$4,425,221  |
|                           | New York - 8.2%   |              |
| 2,000,000(d)              | Hempstead Local Development Corp., Molloy College Project, 5.75%, 7/1/39                            | \$2,035,060  |
| 8,000,000                 | New York State Dormitory Authority, Series A, 4.0%, 7/1/41  | 8,417,120    |
| 7,500,000                 | New York State Dormitory Authority, Series C, 5.0%, 3/15/39   | 8,356,500    |
| 1,500,000                 | New York State Dormitory Authority, Trustees of Columbia University, 5.0%, 10/1/45                  | 1,928,100    |
| 2,410,177                 | Westchester County Healthcare Corp., Series A, 5.0%, 11/1/44  | 2,544,207    |
|                           | Total New York  | \$23,280,987 |
|                           | North Carolina - 2.9%   |              |
| 3,300,000(f)              | Charlotte-Mecklenburg Hospital Authority, North Carolina Health Care System Revenue, 1.65%, 1/15/38 | \$3,300,000  |
| 4,225,000(f)              | Tender Option Bond Trust Receipts/Certificates, RIB, Series 2018, 0%, 1/1/38 (144A)                 | 4,875,988    |

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|                 |  |              |
|-----------------|--|--------------|
|                 | Total North Carolina   | \$8,175,988  |
|                 | North Dakota - 1.0%  |              |
| 2,525,000(d)    | County of Burleigh, St. Alexius Medical Center, 5.0%, 7/1/38   | \$2,774,723  |
|                 | Total North Dakota   | \$2,774,723  |
|                 | Ohio - 5.2%  |              |
| 1,325,000       | Buckeye Tobacco Settlement Financing Authority, Asset-Backed, Series A-2, 5.75%, 6/1/34  | \$1,215,687  |
| 2,500,000       | Buckeye Tobacco Settlement Financing Authority, Asset-Backed, Series A-2, 5.875%, 6/1/47                                       | 2,321,875    |
| 1,700,000       | Buckeye Tobacco Settlement Financing Authority, Asset-Backed, Series A-2, 6.0%, 6/1/42   | 1,589,500    |
| 6,000,000       | Buckeye Tobacco Settlement Financing Authority, Asset-Backed, Series A-2, 6.5%, 6/1/47   | 5,880,000    |
| 1,000,000       | Ohio Housing Finance Agency, Sanctuary Springboro Project, 5.45%, 1/1/38 (144A)  | 1,009,950    |
| 2,500,000(b)(d) | State of Ohio, Common Schools, Series B, 5.0%, 6/15/29   | 2,756,050    |
|                 | Total Ohio   | \$14,773,062 |
|                 | Oregon - 2.4%  |              |
| 1,000,000       | Oregon Health & Science University, Series A, 5.0%, 7/1/42   | \$1,128,530  |
| 5,190,000       | Oregon Health & Science University, Series E, 5.0%, 7/1/32   | 5,669,919    |
|                 | Total Oregon   | \$6,798,449  |
|                 | Pennsylvania - 5.1%  |              |
| 3,000,000       | Geisinger Authority, Geisinger Health System, series A-1, 5.0%, 2/15/45  | \$3,317,040  |
| 1,280,000(e)    | Langhorne Manor Borough Higher Education Authority, Lower Bucks Hospital, 7.35%, 7/1/22  | 422,400      |
| 5,000,000       | Pennsylvania Economic Development Financing Authority, USG Corp. Project, 6.0%, 6/1/31   | 5,001,200    |
| 500,000         | Philadelphia Authority for Industrial Development, Greater Philadelphia Health Action, Inc., Project, Series A, 6.625%, 6/1/50 | 516,725      |
| 2,000,000       | Philadelphia Authority for Industrial Development, Nueva Esperanze, Inc., 8.2%, 12/1/43  | 2,190,380    |
| 1,000,000       | Philadelphia Authority for Industrial Development, Performing Arts Charter School Project, 6.5%, 6/15/33 (144A)                | 1,026,660    |
| 2,000,000       | Philadelphia Authority for Industrial Development, Performing Arts Charter School Project, 6.75%, 6/15/43 (144A)               | 2,053,420    |
|                 | Total Pennsylvania   | \$14,527,825 |
|                 | Puerto Rico - 1.0%   |              |
| 6,255,000(b)(e) | Commonwealth of Puerto Rico, Series A, 8.0%, 7/1/35  | \$2,877,300  |
|                 | Total Puerto Rico  | \$2,877,300  |
|                 | Rhode Island - 2.7%  |              |
| 5,900,000(e)    | Central Falls Detention Facility Corp., 7.25%, 7/15/35   | \$931,610    |
| 2,000,000       | Rhode Island Health & Educational Building Corp., Brown University, Series A, 4.0%, 9/1/37                                     | 2,111,580    |
| 1,500,000(d)    | Rhode Island Health & Educational Building Corp., Tockwatten Home Issue, 8.375%, 1/1/46  | 1,731,300    |
| 2,500,000(f)    | Tender Option Bond Trust Receipts/Certificates, RIB, 0%, 9/1/47 (144A)   | 2,758,500    |
|                 | Total Rhode Island   | \$7,532,990  |
|                 | Texas - 9.8%   |              |
| 1,000,000       | Arlington Higher Education Finance Corp., Universal Academy, Series A, 7.0%, 3/1/34  | \$1,047,130  |
| 2,500,000(d)    | Central Texas Regional Mobility Authority, Sub Lien, 6.75%, 1/1/41   | 2,734,325    |

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|------------------|---|--------------|
| 1,490,000(b)     | County of Harris, Series A, 5.0%, 10/1/26   | 1,760,912    |
| 5,000,000(b)     | Goose Creek Consolidated Independent School District, Series C, 4.0%, 2/15/26 (PSF-GTD Insured)                   | 5,456,500    |
| 725,078(e)       | Gulf Coast Industrial Development Authority, Microgy Holdings Project, 7.0%, 12/1/36                              | 7            |
| 3,400,000(f)     | Harris County Health Facilities Development Corp., The Methodist Hospital System, Series A-2, 1.65%, 12/1/41      | 3,400,000    |
| 3,785,000        | North Texas Tollway Authority, Series A, 5.0%, 1/1/35   | 4,228,905    |
| 1,500,000(d)     | Red River Health Facilities Development Corp., MRC Crestview, Series A, 8.0%, 11/15/41                            | 1,755,075    |
| 3,960,000+(e)    | Sanger Industrial Development Corp., Texas Pellets Project, Series B, 8.0%, 7/1/38                                | 1,520,640    |
| 1,000,000(e)     | Tarrant County Cultural Education Facilities Finance Corp., Mirador Project, Series A, 4.875%, 11/15/48           | 450,000      |
| 1,000,000(e)     | Tarrant County Cultural Education Facilities Finance Corp., Mirador Project, Series A, 5.0%, 11/15/55             | 450,000      |
| 2,000,000(d)     | Tarrant County Cultural Education Facilities Finance Corp., MRC Crestview Project, 8.0%, 11/15/34                 | 2,215,380    |
| 2,500,000(d)     | Travis County Health Facilities Development Corp., Longhorn Village Project, 7.125%, 1/1/46                       | 2,738,225    |
|                  | Total Texas   | \$27,757,099 |
|                  | Utah - 0.4%   |              |
| 1,000,000        | Salt Lake City Corp., Airport Revenue, Series B, 5.0%, 7/1/35   | \$1,138,230  |
|                  | Total Utah  | \$1,138,230  |
|                  | Virginia - 4.9%   |              |
| 2,200,000(b)     | County of Arlington, 4.0%, 8/15/35  | \$2,347,400  |
| 1,415,000(b)     | County of Fairfax, Series A, 4.0%, 10/1/33 (ST AID WITHHLDG Insured)  | 1,530,860    |
| Principal Amount |   |              |
| USD (\$)         |   | Value        |
|                  | Virginia - (continued)  |              |
| 5,000,000        | University of Virginia, Series A, 5.0%, 4/1/42  | \$5,716,000  |
| 4,000,000        | Upper Occoquan Sewage Authority, 4.0%, 7/1/41   | 4,148,480    |
|                  | Total Virginia  | \$13,742,740 |
|                  | Washington - 11.2%  |              |
| 3,745,000        | City of Seattle, Water System Revenue, 4.0%, 8/1/32   | \$4,065,347  |
| 2,500,000(b)     | King County, Issaquah School District No. 411, 4.0%, 12/1/31 (SCH BD GTY Insured)                                 | 2,681,925    |
| 14,315,000(b)(c) | State of Washington, Motor Vehicle Sales Tax, Series C, 6/1/22 (NATL Insured)                                     | 13,301,784   |
| 3,285,000(f)     | Tender Option Bond Trust Receipts/Certificates, RIB, Series 2018, 0%, 1/1/45 (144A)                               | 3,681,762    |
| 2,500,000        | University of Washington, Series B, 5.0%, 6/1/29  | 2,898,350    |
| 3,795,000(d)     | Washington State Health Care Facilities Authority, Fred Hutchinson Cancer Research Center, Series A, 6.0%, 1/1/33 | 3,864,525    |
| 1,150,000        | Washington State Housing Finance Commission, Mirabella Project, Series A, 6.75%, 10/1/47 (144A)                   | 1,224,083    |
|                  | Total Washington  | \$31,717,776 |
|                  | Wisconsin - 5.8%  |              |
| 1,500,000        | Public Finance Authority, Gardner Webb University, 5.0%, 7/1/31 (144A)  | \$1,512,255  |
| 5,000,000        | Public Finance Authority, Glenridge Palmer Ranch, Series A, 8.25%, 6/1/46 (144A)                                  | 5,574,950    |
| 750,000          | Public Finance Authority, Roseman University Health Sciences Project, 5.875%, 4/1/45                              | 816,442      |



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|              |  |                 |
|--------------|--|-----------------|
| 1,000,000    | Public Finance Authority, SearStone CCRC Project, Series A, 5.3%, 6/1/47   | 1,002,660       |
| 1,490,000(d) | Public Finance Authority, SearStone CCRC Project, Series A, 8.625%, 6/1/47 | 1,783,426       |
| 5,000,000    | Wisconsin Department of Transportation, Series A, 5.0%, 7/1/28             | 5,685,500       |
|              | Total Wisconsin  | \$16,375,233    |
|              | TOTAL TAX EXEMPT OBLIGATIONS   |                 |
|              | (Cost \$391,253,470)   | \$399,652,967   |
|              | TOTAL INVESTMENTS IN UNAFFILIATED ISSUERS - 142.7%                         |                 |
|              | (Cost \$394,520,470)   | \$402,919,967   |
|              | OTHER ASSETS AND LIABILITIES - 1.7%  | \$4,694,953     |
|              | VARIABLE RATE MUNIFUND TERM PREFERRED SHARES                               |                 |
|              | AT REDEMPTION VALUE - (44.4)%  | (\$125,356,830) |
|              | NET ASSETS APPLICABLE TO   |                 |
|              | COMMON SHAREOWNERS - 100.0%  | \$282,258,090   |

RIB Residual Interest Bond is purchased in a secondary market. The interest rate is subject to change periodically and inversely based upon prevailing market rates. The interest rate shown is the rate at January 31, 2019. 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, 2019, the value of these securities amounted to \$39,230,352, or 13.9% of net assets applicable to common shareowners.

† Amount rounds to less than 0.1%.

+ Securities that used significant unobservable inputs to determine their value.

(a) Consists of Revenue Bonds unless otherwise indicated.

(b) Represents a General Obligation Bond.

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

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.

(e) Security is in default.

(f) The interest rate is subject to change periodically. The interest rate and/or reference index and spread shown at January 31, 2019.

(g) Escrow to maturity.

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).

The following is a summary of the inputs used as of January 31, 2019, in valuing the Trust's investments.

|                                | Level 1 | Level 2     | Level 3 | Total       |
|--------------------------------|---------|-------------|---------|-------------|
| Debtor in Possession Financing | \$ -    | \$3,267,000 | \$-     | \$3,267,000 |
| Tax Exempt Obligations         |         |             |         |             |

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|                                  |      |               |             |               |
|----------------------------------|------|---------------|-------------|---------------|
| Texas                            | –    | 26,236,459    | 1,520,640   | 27,757,099    |
| All Other Tax Exempt Obligations | –    | 371,895,868   | –           | 371,895,868   |
| Total Investments in Securities  | \$ – | \$401,399,327 | \$1,520,640 | \$402,919,967 |

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

|  | Tax Exempt<br>Obligations |
|--|---------------------------|
| Balance as of 4/30/18                            | \$ 1,485,000              |
| Realized gain (loss)                             | –                         |
| Change in unrealized appreciation (depreciation) | 39,350                    |
| Accrued discounts/premiums                       | (3,710 )                  |
| Purchases  | –                         |
| Sales  | –                         |
| Transfers in to Level 3*                         | –                         |
| Transfers out of Level 3*                        | –                         |
| Balance as of 1/31/19                            | \$ 1,520,640              |

\* Transfers are calculated on the beginning of period value. During the nine months ended January 31, 2019, there were no transfers between Levels 1, 2 and 3.

Net change in unrealized appreciation (depreciation) of Level 3 investments still held and considered Level 3 at January 31, 2019: \$39,350.

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ITEM 2. CONTROLS AND PROCEDURES.

(a) Disclose the conclusions of the registrant's principal executive and principal financial officers, or persons performing similar functions, regarding 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 the 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.

File as exhibits as part of this Form a separate certification for each principal executive officer and principal financial officer of the registrant as required by Rule 30a-2(a) under the Act (17 CFR 270.30a-2(a)), exactly as set forth below:

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## CERTIFICATIONS

I, [identify the certifying individual], certify that:

1. I have reviewed this report on Form N-Q of [identify registrant];
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the schedules of investments included in this report fairly present in all material respects the investments of the registrant as of the end of the fiscal quarter for which the report is filed;
4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Rule 30a-3(c) under the Investment Company Act of 1940) and internal control over financial reporting (as defined in Rule 30a-3(d) under the Investment Company Act of 1940) for the registrant and have:
  - (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
  - (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
  - (c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of a date within 90 days prior to the filing date of this report, based on such evaluation; and
  - (d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officer(s) and I have disclosed to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
  - (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize, and report financial information; and
  - (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: [Signature] [Title]

Filed herewith.



SIGNATURES

[See General Instruction F]

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

(Registrant) Pioneer Municipal High Income Trust

By (Signature and Title)\* /s/ Lisa M. Jones

Lisa M. Jones, President and Chief Executive Officer

Date March 29, 2019

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/ Lisa M. Jones

Lisa M. Jones, President and Chief Executive Officer

Date March 29, 2019

By (Signature and Title)\* /s/ Mark E. Bradley

Mark E. Bradley, Treasurer and Chief Accounting and Financial Officer

Date March 29, 2019

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