

PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST  
Form N-Q  
February 26, 2014

OMB APPROVAL  
OMB Number: 3235-0578  
Expires: January 31, 2016  
Estimated average burden  
hours per response.....  
10.5

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 811-21823

Pioneer Municipal High Income Advantage 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: March 31

Date of reporting period: December 31, 2013

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.

Edgar Filing: PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST - Form N-Q

<PAGE>

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 Advantage Trust

| December 31, 2013

Ticker Symbol: MAV

| Principal<br>Amount<br>USD (\$) | S&P/Moody's<br>Ratings   | Value        |
|---------------------------------|--|--------------|
|                                 | TAX EXEMPT<br>OBLIGATIONS - 150.8% of<br>Net Assets  |              |
| 2,500,000                       | Alabama - 1.7%<br>NR/B2Alabama Industrial<br>Development Authority Solid<br>Waste Disposal Revenue,<br>6.45%, 12/1/23    | \$ 2,498,925 |
| 2,500,000                       | NR/NRHuntsville-Redstone Village<br>Special Care Facilities<br>Financing Authority Nursing<br>Home Revenue, 5.5%, 1/1/43 | 1,990,675    |
|                                 |  | \$ 4,489,600 |
| 5,000,000                       | Arizona - 2.8%<br>NR/NRCasa Grande Industrial<br>Development Authority   | \$ 4,072,600 |

Edgar Filing: PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST - Form N-Q

|               |   |              |
|---------------|---|--------------|
|               | Hospital Revenue, 7.625%,<br>12/1/29  |              |
| 2,640,000     | NR/NRPima County Industrial<br>Development Authority, 7.0%,<br>1/1/38   | 2,574,211    |
| 32,000        | NR/Baa3Pima County Industrial<br>Development Authority<br>Education Revenue, 6.75%,<br>7/1/31                                   | 31,405       |
| 1,000,000     | NR/NRSan Luis Facility<br>Development Corp., 7.25%,<br>5/1/27   | 749,550      |
|               |   | \$ 7,427,766 |
|               | California - 16.0%  |              |
| 6,990,000     | CCC/NRCalifornia County Tobacco<br>Securitization Agency<br>Revenue, 5.25%, 6/1/46  | \$ 4,688,962 |
| 1,550,000     | NR/NRCalifornia Enterprise<br>Development Authority<br>Recovery Zone Facility<br>Revenue, 8.5%, 4/1/31                          | 1,660,189    |
| 5,000,000     | NR/Baa3California Pollution Control<br>Financing Authority, 5.0%,<br>7/1/37   | 4,555,900    |
| 3,000,000     | BB+/NRCalifornia School Finance<br>Authority, 7.375%, 10/1/43   | 3,059,940    |
| 2,425,000     | A/A1California State General<br>Obligation Various Purpose,<br>5.75%, 4/1/31  | 2,690,586    |
| 1,875,000     | NR/NRCalifornia Statewide<br>Communities Development<br>Authority, 5.875%, 11/1/43  | 1,620,469    |
| 757,342(a)    | NR/NRCalifornia Statewide<br>Communities Development<br>Authority Environmental<br>Facilities Revenue, 9.0%,<br>12/1/38         | 6,574        |
| 4,000,000     | B+/NRCalifornia Statewide<br>Communities Development<br>Authority Revenue Higher<br>Education Revenue, 7.25%,<br>10/1/38 (144A) | 3,519,360    |
| 20,000,000(b) | NR/NRInland Empire Tobacco<br>Securitization Authority<br>Revenue, 0.0%, 6/1/36   | 3,200,400    |
| 3,140,000(c)  | AA-/WRLehman Municipal Trust<br>Receipts Revenue, RIB,<br>11.07%, 9/20/28 (144A)  | 3,367,870    |
| 8,575,000(c)  | AA-/NRLehman Municipal Trust<br>Receipts, General Obligation,<br>13.06%, 7/28/31  | 9,166,846    |

Edgar Filing: PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST - Form N-Q

|                           |                     |  |               |
|---------------------------|---------------------|--|---------------|
| 1,500,000                 | A-/NR               | Madera Irrigation Financing Authority Water Revenue, 6.25%, 1/1/31                 | 1,613,850     |
| 1,500,000                 | A-/NR               | Madera Irrigation Financing Authority Water Revenue, 6.5%, 1/1/40                  | 1,623,465     |
| 2,500,000                 | A-/A2               | San Jose California Airport Revenue, RIB, 5.0%, 3/1/37                             | 2,486,250     |
|                           |                     | Colorado - 0.9%  | \$ 43,260,661 |
| 1,500,000                 | B+/NR               | Colorado Educational & Cultural Facilities Authority, 8.0%, 9/1/43                 | \$ 1,463,265  |
| 1,000,000                 | NR/NR               | Kremmling Memorial Hospital District Certificate of Participation, 7.125%, 12/1/45 | 1,012,230     |
|                           |                     | Connecticut - 0.4%   | \$ 2,475,495  |
| 1,000,000                 | NR/NR               | Hamden Connecticut Facility Revenue, 7.75%, 1/1/43                                 | \$ 1,010,940  |
|                           |                     | District of Colombia - 3.5%  |               |
| 2,700,000                 | BBB/Baa1            | District of Columbia Tobacco Settlement Financing Corp., 6.5%, 5/15/33             | \$ 2,788,803  |
| Principal Amount USD (\$) | S&P/Moody's Ratings |  | Value         |
|                           |                     | District of Colombia - (continued)   |               |
| 6,825,000                 | BBB/Baa1            | District of Columbia Tobacco Settlement Financing Corp., 6.75%, 5/15/40            | \$ 6,790,534  |
|                           |                     | Florida - 3.6%   | \$ 9,579,337  |
| 1,500,000                 | NR/NR               | Alachua County Health Facilities Authority Revenue, 8.125%, 11/15/41               | \$ 1,616,595  |
| 1,500,000                 | NR/NR               | Alachua County Health Facilities Authority Revenue, 8.125%, 11/15/46               | 1,612,605     |
| 500,000                   | NR/B1               | Capital Trust Agency Revenue Bonds, 7.75%, 1/1/41                                  | 527,815       |
| 1,000,000(d)              | NR/WR               | Hillsborough County Industrial Development Authority Revenue, 8.0%, 8/15/32        | 1,349,380     |
| 2,200,000                 | BB/NR               |  | 2,002,330     |

Edgar Filing: PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST - Form N-Q

|              |  |                            |
|--------------|--|----------------------------|
|              | Lee County Industrial<br>Development Authority,<br>5.375%, 6/15/37                                   |                            |
| 2,500,000    | A/A2Miami-Dade County Florida<br>Aviation Revenue, 5.5%,<br>10/1/41                                  | 2,588,100<br>\$ 9,696,825  |
|              | Georgia - 7.9%   |                            |
| 5,210,000(c) | AA-/WRAtlanta Georgia Water and<br>Wastewater Revenue, RIB,<br>12.827%, 11/1/43 (144A)               | \$ 5,222,139               |
| 5,000,000    | B+/NRClayton County Development<br>Authority Revenue, 9.0%,<br>6/1/35                                | 5,283,950                  |
| 900,000      | NR/NRDeKalb County Georgia<br>Hospital Authority Revenue,<br>6.0%, 9/1/30                            | 900,891                    |
| 750,000      | NR/NRDeKalb County Georgia<br>Hospital Authority Revenue,<br>6.125%, 9/1/40                          | 738,548                    |
| 3,360,000    | NR/NRFulton County Residential<br>Care Facilities for the Elderly<br>Authority, 7.0%, 7/1/29         | 2,699,424                  |
| 2,000,000    | NR/NRFulton County Residential<br>Care Facilities Revenue,<br>5.125%, 7/1/42                         | 1,569,700                  |
| 3,100,000    | AA/Aa2Private Colleges &<br>Universities Authority, 5.0%,<br>10/1/43                                 | 3,250,970                  |
| 1,650,000    | NR/NRSavannah Georgia Economic<br>Development Authority<br>Revenue, 7.4%, 1/1/34                     | 1,683,330<br>\$ 21,348,952 |
|              | Guam - 0.4%  |                            |
| 1,000,000    | B+/NRGuam Government of<br>Department Education<br>Certificates of Participation,<br>6.625%, 12/1/30 | \$ 1,027,640               |
|              | Idaho - 1.3%   |                            |
| 2,000,000    | A-/Baa1Power County Industrial<br>Development Corp., Revenue,<br>6.45%, 8/1/32                       | \$ 2,001,560               |
| 1,500,000    | A-/Baa1Power County Pollution<br>Control Revenue, 5.625%,<br>10/1/14                                 | 1,500,045<br>\$ 3,501,605  |
|              | Illinois - 6.9%  |                            |
| 1,000,000    | NR/Baa1City of Country Club Hills,<br>General Obligation, 5.0%,<br>12/1/31                           | \$ 1,000,180               |

Edgar Filing: PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST - Form N-Q

|                                 |                        |  |                               |
|---------------------------------|------------------------|--|-------------------------------|
| 365,400(b)                      | NR/NR                  | Illinois Finance Authority<br>Revenue, 0.0%, 11/15/52                      | 37,536                        |
| 417,400(c)                      | NR/NR                  | Illinois Finance Authority<br>Revenue, 4.0%, 11/15/52                      | 211,271                       |
| 1,450,000                       | A+/A1                  | Illinois Finance Authority<br>Revenue, 5.5%, 4/1/39                        | 1,473,620                     |
| 1,605,000                       | AA-/A3                 | Illinois Finance Authority<br>Revenue, 6.0%, 8/15/25                       | 1,642,525                     |
| 280,000                         | BBB+/NR                | Illinois Finance Authority<br>Revenue, 6.0%, 8/15/38                       | 287,174                       |
| 2,000,000                       | AA+/Aa2                | Illinois Finance Authority<br>Revenue, 6.0%, 8/15/39                       | 2,222,780                     |
| 2,500,000                       | NR/NR                  | Illinois Finance Authority<br>Revenue, 6.125%, 11/15/25                    | 2,444,200                     |
| 45,000                          | NR/NR                  | Illinois Finance Authority<br>Revenue, 7.0%, 11/15/17                      | 43,182                        |
| 160,000                         | NR/NR                  | Illinois Finance Authority<br>Revenue, 7.0%, 11/15/27                      | 142,139                       |
| 6,000,000                       | NR/NR                  | Illinois Finance Authority<br>Revenue, 8.25%, 5/15/45                      | 5,142,780                     |
| 2,500,000                       | NR/NR                  | Illinois Finance Authority<br>Revenue, 8.25%, 2/15/46                      | 2,402,825                     |
| Principal<br>Amount<br>USD (\$) | S&P/Moody's<br>Ratings |  | Value                         |
|                                 |                        | Illinois - (continued)   |                               |
| 2,025,000                       | NR/NR                  | Southwestern Illinois<br>Development Authority<br>Revenue, 5.625%, 11/1/26 | \$ 1,575,409<br>\$ 18,625,621 |
|                                 |                        | Indiana - 1.0%   |                               |
| 250,000                         | NR/NR                  | City of Carmel Indiana<br>Nursing Home Revenue,<br>7.0%, 11/15/32          | \$ 246,372                    |
| 750,000                         | NR/NR                  | City of Carmel Indiana<br>Nursing Home Revenue,<br>7.125%, 11/15/42        | 733,403                       |
| 500,000                         | NR/NR                  | City of Carmel Indiana<br>Nursing Home Revenue,<br>7.125%, 11/15/47        | 485,355                       |
| 250,000                         | NR/Baa3                | East Chicago Indiana Exempt<br>Facilities Revenue, 7.0%,<br>1/1/14         | 250,000                       |
| 1,585,000                       | NR/NR                  | Vincennes Industrial<br>Economic s Revenue, 6.25%,<br>1/1/24               | 927,273<br>\$ 2,642,403       |
|                                 |                        | Kansas - 0.4%  |                               |
| 1,000,000                       | NR/A2                  |  | \$ 1,003,210                  |

Edgar Filing: PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST - Form N-Q

|           |          |   |               |
|-----------|----------|---|---------------|
|           |          | Kansas Development Finance<br>Authority Revenue, 5.0%,<br>5/15/35   |               |
|           |          | Louisiana - 6.1%  |               |
| 7,000,000 | BB+/Baa3 | Jefferson Parish Hospital<br>Service District No. 2,<br>6.375%, 7/1/41  | \$ 7,169,400  |
| 2,500,000 | BBB/Baa3 | Louisiana Local Government<br>Environmental Facilities &<br>Community Development<br>Authority Revenue, 6.75%,<br>11/1/32 | 2,645,325     |
| 6,000,000 | NR/Baa1  | Louisiana Public Facilities<br>Authority Revenue, 5.5%,<br>5/15/47  | 5,969,220     |
| 750,000   | BBB-/NR  | Opelousas Louisiana General<br>Hospital Authority Revenue,<br>5.75%, 10/1/23  | 755,347       |
|           |          |   | \$ 16,539,292 |
|           |          | Maine - 1.9%  |               |
| 1,500,000 | NR/Ba1   | Maine Health & Higher<br>Educational Facilities<br>Authority Revenue, 7.5%,<br>7/1/32                                     | \$ 1,640,925  |
| 3,500,000 | AA-/Aa3  | Maine Turnpike Authority,<br>5.0%, 7/1/42   | 3,617,495     |
|           |          |   | \$ 5,258,420  |
|           |          | Maryland - 3.6%   |               |
| 4,500,000 | A-/A2    | Maryland Health & Higher<br>Educational Facilities<br>Authority Revenue, 5.0%,<br>7/1/43                                  | \$ 4,365,000  |
| 1,250,000 | NR/Baa3  | Maryland Health & Higher<br>Educational Facilities<br>Authority Revenue, 5.75%,<br>7/1/38                                 | 1,154,513     |
| 2,000,000 | NR/NR    | Maryland Health & Higher<br>Educational Facilities<br>Authority Revenue, 6.25%,<br>1/1/45                                 | 2,085,000     |
| 2,245,000 | NR/NR    | Maryland Health & Higher<br>Educational Facilities<br>Authority Revenue, 6.75%,<br>7/1/44                                 | 2,198,169     |
|           |          |   | \$ 9,802,682  |
|           |          | Massachusetts - 9.5%  |               |
| 1,800,000 | NR/NR    | Massachusetts Development<br>Finance Agency Revenue,<br>7.1%, 7/1/32  | \$ 1,752,228  |
| 8,000,000 | A/WR     |   | 8,622,800     |





Edgar Filing: PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST - Form N-Q

|                 |         |  |               |
|-----------------|---------|--|---------------|
|                 |         |  | \$ 2,512,330  |
|                 |         | Montana - 0.8%   |               |
| 2,445,000       | NR/NR   | Hardin Increment Industrial Infrastructure Development Revenue, 0.0%, 9/1/31           | \$ 1,933,115  |
| 1,000,000(a)(e) | NR/NR   | Two Rivers Authority Inc., Project Revenue, 7.375%, 11/1/27                            | 99,880        |
|                 |         |  | \$ 2,032,995  |
|                 |         | Nevada - 2.3%  |               |
| 2,000,000       | A+/A1   | Nevada Highway Revenue, 5.0%, 2/1/43   | \$ 1,981,740  |
| 4,500,000       | A-/A3   | Reno Nevada Hospital Revenue, 5.25%, 6/1/41  | 4,353,795     |
|                 |         |  | \$ 6,335,535  |
|                 |         | New Hampshire - 0.5%   |               |
| 1,125,000(d)    | NR/NR   | New Hampshire Health & Education Facilities Authority Revenue, 5.875%, 7/1/34          | \$ 1,217,734  |
|                 |         | New Jersey - 11.4%   |               |
| 1,500,000       | NR/NR   | Burlington County New Jersey Bridge Commission Revenue, 5.625%, 1/1/38                 | \$ 1,280,340  |
| 6,500,000       | NR/NR   | New Jersey Economic Development Authority Revenue, 10.5%, 6/1/32 (144A)                | 6,302,465     |
| 7,500,000       | B/B2    | New Jersey Economic Development Authority Revenue, 5.75%, 9/15/27                      | 7,190,625     |
| 3,500,000       | NR/NR   | New Jersey Health Care Facilities Financing Authority, 7.25%, 7/1/27                   | 3,429,405     |
| 3,500,000(c)    | AA-/WR  | New Jersey State Turnpike Authority Transportation Revenue, RIB, 13.52%, 7/1/23 (144A) | 4,724,020     |
| 15,375,000(b)   | AA+/Aa1 | New Jersey Transportation Trust Fund Authority Revenue, 0.0%, 12/15/27                 | 7,921,661     |
|                 |         |  | \$ 30,848,516 |
|                 |         | New York - 6.9%  |               |
| 1,630,000       | NR/NR   | Dutchess County Industrial Development Agency, 7.5%, 3/1/29                            | \$ 1,304,326  |
| 7,000,000       | BB/B2   | New York City Industrial Development Agency Revenue, 5.25%, 12/1/32                    | 6,236,370     |
| 3,950,000       | BB/B2   | New York City Industrial Development Agency  | 3,968,328     |

Edgar Filing: PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST - Form N-Q

|                           |                     |  |               |
|---------------------------|---------------------|--|---------------|
|                           |                     | Revenue, 7.625%, 12/1/32   |               |
| 5,000,000                 | AAA/Aaa             | New York State Dormitory Authority Revenue, 5.0%, 10/1/41  | 5,263,450     |
| 2,000,000                 | NR/Ba1              | New York State Dormitory Authority Revenue, 6.125%, 12/1/29                                      | 1,976,880     |
|                           |                     |  | \$ 18,749,354 |
|                           |                     | North Carolina - 2.8%  |               |
| 5,010,000                 | NR/NR               | Charlotte North Carolina Special Facilities Revenue, 7.75%, 2/1/28                               | \$ 5,013,708  |
| 2,575,000                 | NR/NR               | Charlotte Special Facilities Revenue, 5.6%, 7/1/27   | 2,423,873     |
|                           |                     |  | \$ 7,437,581  |
|                           |                     | Ohio - 1.9%  |               |
| 1,500,000                 | NR/NR               | Adams County Hospital Facilities Revenue, 6.5%, 9/1/36   | \$ 1,138,575  |
| 5,000,000                 | B-/B3               | Buckeye Tobacco Settlement Financing Authority Revenue, 6.5%, 6/1/47                             | 4,033,650     |
|                           |                     |  | \$ 5,172,225  |
|                           |                     | Oklahoma - 2.0%  |               |
| 3,000,000(c)              | NR/WR               | Tulsa Airports Improvement Trust, 7.75%, 6/1/35  | \$ 3,114,360  |
| 2,220,000                 | NR/WR               | Tulsa Airports Improvement Trust Revenue, 6.25%, 6/1/20  | 2,216,381     |
|                           |                     |  | \$ 5,330,741  |
| Principal Amount USD (\$) | S&P/Moody's Ratings |  | Value         |
|                           |                     | Oregon - 0.7%  |               |
| 2,000,000                 | BBB+/NR             | Oregon State Facilities Authority Revenue, 5.25%, 10/1/40  | \$ 1,932,920  |
|                           |                     | Pennsylvania - 11.1%   |               |
| 1,965,000                 | B-/NR               | Pennsylvania Economic Development Financing Authority, 8.0%, 5/1/29                              | \$ 2,173,663  |
| 5,000,000                 | CCC+/Caa2           | Pennsylvania Economic Development Financing Authority Solid Waste Disposal Revenue, 6.0%, 6/1/31 | 4,901,900     |
| 5,000,000                 | A-/A3               | Pennsylvania Turnpike Commission, 5.3%, 12/1/41  | 5,049,800     |

Edgar Filing: PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST - Form N-Q

|                 |  |               |
|-----------------|--|---------------|
| 10,000,000      | NR/NRPhiladelphia Authority for Industrial Development, 8.2%, 12/1/43  | 9,987,800     |
| 1,000,000       | BB-/NRPhiladelphia Authority for Industrial Development Revenue, 6.5%, 6/15/33 (144A)                          | 973,100       |
| 3,000,000       | BB-/NRPhiladelphia Authority for Industrial Development Revenue, 6.75%, 6/15/43 (144A)                         | 2,901,390     |
| 5,000,000       | BB+/Ba2Philadelphia Hospitals & Higher Education Facilities Authority Revenue, 5.0%, 7/1/34                    | 3,924,600     |
|                 |  | \$ 29,912,253 |
| 1,355,000(e)    | Rhode Island - 3.9%<br>NR/NRCentral Falls Rhode Island Detention Facility Corp., Revenue, 7.25%, 7/15/35       | \$ 1,008,825  |
| 1,500,000       | NR/NRRhode Island Health & Educational Building Corp., Revenue, 8.375%, 1/1/46                                 | 1,636,830     |
| 8,285,000       | BB/Ba1Tobacco Settlement Financing Corp. Revenue, 6.25%, 6/1/42  | 7,929,822     |
|                 |  | \$ 10,575,477 |
| 4,400,000(f)    | South Carolina - 2.0%<br>BBB/WRTobacco Settlement Revenue Management Authority, 6.375%, 5/15/30                | \$ 5,530,492  |
| 5,000,000       | Tennessee - 3.1%<br>BBB+/Baa1Johnson City Health & Educational Facilities Board Hospital Revenue, 6.5%, 7/1/38 | \$ 5,377,450  |
| 3,000,000       | BBB+/NRSullivan County Health, Educational & Housing Facilities Board Revenue, 5.25%, 9/1/36                   | 2,899,500     |
|                 |  | \$ 8,276,950  |
| 2,500,000       | Texas - 17.0%<br>BB+/Baa3Central Texas Regional Mobility Authority Revenue, 6.75%, 1/1/41                      | \$ 2,595,800  |
| 2,663,453(a)(e) | NR/NRGulf Coast Industrial Development Authority Revenue, 7.0%, 12/1/36  | 23,944        |
| 3,000,000       | NR/A3Houston Higher Education Finance Corp., 5.0%, 9/1/38  | 2,949,690     |

Edgar Filing: PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST - Form N-Q

|                                 |   |              |
|---------------------------------|---|--------------|
| 460,000                         | NR/NRIAH Public Facility Corp.,<br>Facilities Revenue, Series<br>2006, 6.0%, 5/1/16                 | 317,400      |
| 1,000,000                       | NR/NRIAH Public Facility Corp.,<br>Facilities Revenue, Series<br>2006, 6.0%, 5/1/21                 | 640,000      |
| 1,350,000                       | NR/NRIAH Public Facility Corp.,<br>Facilities Revenue, Series<br>2006, 6.125%, 5/1/26               | 796,500      |
| 3,000,000                       | NR/NRJefferson County Industrial<br>Development Corp., Revenue,<br>8.25%, 7/1/32                    | 3,055,770    |
| 2,000,000                       | NR/NRLubbock Health Facilities<br>Development Corp., Nursing<br>Home Revenue, 6.625%,<br>7/1/36     | 2,009,580    |
| 9,750,000                       | BBB+/A3North Texas Tollway<br>Authority Transportation<br>Revenue, 5.75%, 1/1/33                    | 10,271,820   |
| 1,711,000                       | NR/Aa1Panhandle Regional Housing<br>Finance Corp., Multifamily<br>Housing Revenue, 6.6%,<br>7/20/31 | 1,778,191    |
| 1,500,000                       | NR/NRRed River Health Facilities<br>Development Corp., Revenue,<br>8.0%, 11/15/41                   | 1,581,075    |
| 2,000,000                       | AAA/AaaRichardson Independent<br>School District Revenue,<br>5.0%, 2/15/38                          | 2,117,020    |
| 4,000,000                       | NR/NRSanger Industrial<br>Development Corp., Revenue,<br>8.0%, 7/1/38                               | 3,948,040    |
| 1,000,000                       | NR/NRTarrant County Cultural<br>Education Facilities Finance<br>Corp., Revenue, 8.125%,<br>11/15/39 | 1,032,930    |
| Principal<br>Amount<br>USD (\$) | S&P/Moody's<br>Ratings  | Value        |
|                                 | Texas - (continued)   |              |
| 1,500,000                       | NR/NRTarrant County Cultural<br>Education Facilities Finance<br>Corp., Revenue, 8.25%,<br>11/15/44  | \$ 1,552,440 |
| 1,000,000(a)(e)                 | NR/NRTexas Midwest Public Facility<br>Corp. Revenue, 9.0%, 10/1/30                                  | 455,490      |
| 3,000,000                       | BBB-/Baa3Texas Private Activity Bond<br>Surface Transportation Corp.,                               | 3,210,480    |

Edgar Filing: PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST - Form N-Q

|              |  |               |
|--------------|--|---------------|
|              | 7.0%, 12/31/38   |               |
| 2,500,000    | NR/NRTravis County Health<br>Facilities Development Corp.,<br>Revenue, 7.125%, 1/1/46                        | 2,376,000     |
| 5,000,000    | AAA/NRTyler Independent School<br>District, 5.0%, 2/15/38  | 5,339,400     |
|              |  | \$ 46,051,570 |
|              | Virginia - 0.8%  |               |
| 2,000,000    | BBB+/Baa1Washington County Industrial<br>Development Authority<br>Revenue, 7.75%, 7/1/38                     | \$ 2,252,900  |
|              | Washington - 4.1%  |               |
| 1,500,000    | NR/Baa3Washington State Health Care<br>Facilities Authority Revenue,<br>5.5%, 12/1/39                        | \$ 1,401,930  |
| 2,000,000    | BBB/Baa2Washington State Health Care<br>Facilities Authority Revenue,<br>6.125%, 8/15/37                     | 2,041,720     |
| 2,000,000    | BBB/Baa2Washington State Health Care<br>Facilities Authority Revenue,<br>6.25%, 8/15/42                      | 2,047,840     |
| 1,100,000    | NR/NRWashington State Housing<br>Finance Commission<br>Revenue, 6.75%, 10/1/47                               | 989,846       |
| 5,000,000    | NR/NRWashington State Housing<br>Finance Committee Nonprofit<br>Revenue, 5.625%, 1/1/27                      | 4,546,450     |
|              |  | \$ 11,027,786 |
|              | West Virginia - 1.0%   |               |
| 2,000,000    | NR/NRCity of Philippi West<br>Virginia, 7.75%, 10/1/44   | \$ 1,875,860  |
| 740,000      | NR/NRWest Virginia Hospital<br>Finance Authority Hospital<br>Revenue, 9.125%, 10/1/41                        | 878,225       |
|              |  | \$ 2,754,085  |
|              | Wisconsin - 4.5%   |               |
| 5,000,000    | NR/NRWisconsin Public Finance<br>Authority Continuing Care<br>Retirement Community<br>Revenue, 8.25%, 6/1/46 | \$ 5,458,650  |
| 1,000,000(d) | NR/NRWisconsin State Health &<br>Educational<br>Facilities Authority Revenue,<br>6.125%, 4/1/24              | 1,014,840     |
| 1,000,000(d) | NR/NRWisconsin State Health &<br>Educational Facilities<br>Authority Revenue, 6.25%,<br>4/1/34               | 1,015,150     |
| 1,500,000    | A+/A1Wisconsin State Health &<br>Educational Facilities  | 1,610,940     |

Edgar Filing: PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST - Form N-Q

|                  |  |                  |
|------------------|--|------------------|
|                  | Authority Revenue, 6.625%,<br>2/15/39  |                  |
| 1,500,000        | NR/NRWisconsin State Public<br>Finance Authority Revenue,<br>8.375%, 6/1/20          | 1,500,690        |
| 1,500,000        | NR/NRWisconsin State Public<br>Finance Authority Revenue,<br>8.625%, 6/1/47          | 1,542,615        |
|                  |  | \$ 12,142,885    |
|                  | TOTAL TAX EXEMPT<br>OBLIGATIONS<br>(Cost \$408,283,755)                              | \$ 407,302,120   |
|                  | MUNICIPAL<br>COLLATERALIZED DEBT<br>OBLIGATION - 0.9% of Net<br>Assets               |                  |
| 13,000,000(c)(e) | NR/NRNon-Profit Preferred Funding<br>Trust I, 0.0%, 9/15/37 (144A)                   | \$ 2,591,550     |
|                  | TOTAL MUNICIPAL<br>COLLATERALIZED DEBT<br>OBLIGATION<br>(Cost \$13,000,000)          | \$ 2,591,550     |
|                  | TOTAL INVESTMENTS IN<br>SECURITIES - 151.7%<br>(Cost - \$421,283,755) (g)(h)         | \$ 409,893,670   |
|                  | OTHER ASSETS AND<br>LIABILITIES -3.8%  | \$ 10,234,095    |
|                  | PREFERRED SHARES AT<br>REDEMPTION VALUE,<br>INCLUDING DIVIDENDS<br>PAYABLE - (55.5%) | \$ (150,000,516) |
|                  | NET ASSETS APPLICABLE<br>TO<br>COMMON SHAREOWNERS<br>-100.0%                         | \$ 270,127,249   |

NR  
WR  
(144A)

Security not rated by S&P or Moody's.  
Rating withdrawn by either S&P or Moody's.  
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 December 31, 2013, the value of these securities  
amounted to \$29,601,894 or 11.0% 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 December 31, 2013

- (a) Security is in default and is non income producing.
  - (b) Security issued with a zero coupon. Income is recognized through accretion of discount.
  - (c) The interest rate is subject to change periodically. The interest is shown is the rate at December 31, 2013.
  - (d) 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) Indicates a security that has been deemed as illiquid. As of December 31, 2013 the aggregate cost of illiquid securities in the Trust's portfolio was \$27,024,050. As of that date, the aggregate value of illiquid securities in the Trust's portfolio of \$6,692,019 represented 2.5% of total net assets applicable to common shareowners.
  - (f) Escrow to maturity.
-

- (g) At December 31, 2013 the concentration of investments by type of obligation/ market sector is as follows :

|                           |        |
|---------------------------|--------|
| Insured                   |        |
| FSA                       | 3.3%   |
| FSA-CR                    | 2.2    |
| AMBAC GO OF INSTN         | 2.1    |
| BHAC-CR MBIA              | 1.9    |
| PSF-GTD                   | 1.8    |
| AMBAC                     | 0.6    |
| GO OF INSTN               | 0.6    |
| ASSURED GTY               | 0.4    |
| GNMA COLL                 | 0.4    |
| NATL-RE                   | 0.3    |
| Revenue Bonds:            |        |
| Health Revenue            | 20.1   |
| Development Revenue       | 19.2   |
| Facilities Revenue        | 12.8   |
| Tobacco Revenue           | 8.5    |
| Education Revenue         | 8.4    |
| Transportation Revenue    | 5.9    |
| Other Revenue             | 4.0    |
| Airport Revenue           | 3.4    |
| Pollution Control Revenue | 2.2    |
| Water Revenue             | 1.9    |
| Utilities Revenue         | 0.0*   |
|                           | 100.0% |

\* Amount is less than 0.1%.

- (h) At December 31, 2013, the net unrealized depreciation on investments based on cost for federal tax purposes of \$423,400,168 was as follows:

|  |                 |
|--|-----------------|
| Aggregate gross unrealized appreciation for all investments in which there is an excess of value over tax cost | \$ 24,088,160   |
| Aggregate gross unrealized depreciation for all investments in which there is an excess of tax cost over value | (37,594,658)    |
| Net unrealized depreciation  | \$ (13,506,498) |

For financial reporting purposes net unrealized depreciation on investments was \$11,390,085 and cost of investments aggregated \$421,283,755.



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.

The following is a summary of the inputs used as of December 31, 2013, in valuing the Trust's investments.

|   | Level 1 | Level 2       | Level 3 | Total         |
|---|---------|---------------|---------|---------------|
| Tax Exempt Obligations:                   | \$-     | \$407,302,120 | \$-     | \$407,302,120 |
| Municipal Collateralized Debt Obligation: | -       | 2,591,550     | -       | 2,591,550     |
| Total Investments in Securities           | \$-     | \$409,893,670 | \$-     | \$409,893,670 |

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

|                        | Balance as of 3/31/13 | Realized gain (loss) | Change in Unrealized appreciation (depreciation) | Purchases | Sales      | Accrued discounts/ premiums | Transfers in to Level 3* | Transfers out of Level 3* | Balance as of 12/31/13 |
|------------------------|-----------------------|----------------------|--|-----------|------------|-----------------------------|--------------------------|---------------------------|------------------------|
| Tax exempt obligations | \$-                   | \$12,900             | \$ -   | \$-       | \$(12,900) | \$-                         | \$ -                     | \$-                       | \$-                    |
| Total                  | \$-                   | ** \$12,900          | \$ -   | \$-       | \$(12,900) | \$-                         | \$ -                     | \$-                       | \$-                    |

\* Transfers are calculated on the beginning of period value.

\*\* Includes security that is fair valued at \$0.

During the nine months ended December 31, 2013, there were no transfers between Levels 1, 2, 3.

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: 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 registrants 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 registrants 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 registrants internal control over financial reporting that occurred during the registrants most recent fiscal quarter that has materially affected, or is reasonably likely to materially affect, the registrants internal control over financial reporting; and 5. The registrants other certifying officer(s) and I have disclosed to the registrants auditors and the audit committee of the registrants 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 registrants 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 registrants internal control over financial reporting. Date: [Signature] [Title] 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 Advantage Trust By (Signature and Title)\* /s/ Daniel K. Kingsbury ----- Daniel K. Kingsbury, President Date February 28, 2014 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/ Daniel K. Kingsbury ----- Daniel K. Kingsbury, President Date February 28, 2014 By (Signature and Title)\* /s/ Mark Bradley ----- Mark Bradley, Treasurer Date February 28, 2014 \* Print the name and title of each signing officer under his or her signature.