

PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST
Form N-Q
August 28, 2013

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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 811-21409

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)

Dorothy E. Bourassa, Pioneer Investment Management, Inc.,
60 State Street, Boston, MA 02109
(Name and address of agent for service)

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

Date of fiscal year end: March 31

Date of reporting period: June 30, 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.

<PAGE>

ITEM 1. Schedule of Investments.

Pioneer Municipal High

Income Advantage Trust

June 30, 2013

Ticker Symbol: MAV

| Principal Amount USD (\$) | S&P/Moody's Rating (unaudited) | Value |
|---------------------------------|--|--------------|
| | TAX EXEMPT OBLIGATIONS - 146.8% of Net Assets | |
| 2,500,000 | NR/B2Alabama Industrial Development Authority Solid Waste Disposal Revenue, 6.45%, 12/1/23 | \$ 2,510,550 |
| 2,500,000 | NR/NRHuntsville-Redstone Village Special Care Facilities Financing Authority Nursing Home Revenue, 5.5%, 1/1/43 | 2,176,550 |
| | Arizona - 3.4% | \$ 4,687,100 |
| 5,000,000 | NR/NRCasa Grande Industrial Development Authority Hospital Revenue, 7.625%, 12/1/29 | \$ 5,155,250 |
| 1,477,000 | NR/Baa3Pima County Industrial Development Authority, 6.75%, 7/1/31 | 1,477,237 |

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| | | |
|---------------|---|---------------|
| 2,640,000 | NR/NRPima County Industrial Development Authority, 7.0%, 1/1/38 | 2,646,019 |
| 1,000,000 | NR/NRSan Luis Facility Development Corp., 7.25%, 5/1/27 | 823,200 |
| | California - 14.3% | \$ 10,101,706 |
| 6,990,000 | CCC/NRCalifornia County Tobacco Securitization Agency Revenue, 5.25%, 6/1/46 | \$ 5,013,577 |
| 1,550,000 | NR/NRCalifornia Enterprise Development Authority Recovery Zone Facility Revenue, 8.5%, 4/1/31 | 1,708,038 |
| 5,000,000 | NR/Baa3California Pollution Control Financing Authority, 5.0%, 7/1/37 | 4,870,400 |
| 2,425,000 | A/A1California State General Obligation Various Purpose, 5.75%, 4/1/31 | 2,672,617 |
| 1,875,000 | NR/NRCalifornia Statewide Communities Development Authority, 5.875%, 11/1/43 | 1,648,950 |
| 757,342(a) | NR/NRCalifornia Statewide Communities Development Authority Environmental Facilities Revenue, 9.0%, 12/1/38 | 6,665 |
| 4,000,000 | BB/NRCalifornia Statewide Communities Development Authority Revenue Higher Education Revenue, 7.25%, 10/1/38 (144A) | 3,973,680 |
| 20,000,000(b) | NR/NRInland Empire Tobacco Securitization Authority, 0.0%, 6/1/36 | 3,155,800 |
| 3,140,000 | AA-/WRLehman Municipal Trust Receipts Revenue, RIB, 13.124%, 9/20/28 (144A) | 3,572,378 |
| 8,575,000(c) | AA-/NRLehman Municipal Trust Receipts, General Obligation, 13.031%, 7/28/31 | 9,534,885 |
| 1,500,000 | A-/NRMadera Irrigation Financing Authority Water Revenue, 6.25%, 1/1/31 | 1,636,965 |
| 1,500,000 | A-/NRMadera Irrigation Financing Authority Water Revenue, 6.5%, 1/1/40 | 1,659,615 |
| 2,500,000 | A-/A2San Jose California Airport Revenue, RIB, 5.0%, 3/1/37 | 2,540,050 |

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| Principal Amount USD (\$) | S&P/Moody's Rating (unaudited) | Value |
|------------------------------|--|---------------------------|
| | | \$ 41,993,620 |
| 1,000,000 | Colorado - 3.1% NR/NR Kremmling Memorial Hospital District Certificate of Participation, 7.125%, 12/1/45 | \$ 1,054,450 |
| 7,500,000 | AA+/Aa2 Regional Transportation District, 5.0%, 11/1/31 | 8,164,875 \$ 9,219,325 |
| 1,000,000 | Connecticut - 0.4% NR/NR Hamden Connecticut Facility Revenue, 7.75%, 1/1/43 | \$ 1,042,900 |
| 2,700,000 | District of Columbia - 3.4% BBB/Baa1 District of Columbia Tobacco Settlement Financing Corp., 6.5%, 5/15/33 | \$ 2,937,843 |
| 6,825,000 | BBB/Baa1 District of Columbia Tobacco Settlement Financing Corp., 6.75%, 5/15/40 | 6,944,164 \$ 9,882,007 |
| | | |
| | | |
| 1,500,000 | Florida - 5.5% NR/NR Alachua County Health Facilities Authority Revenue, 8.125%, 11/15/41 | \$ 1,656,450 |
| 1,500,000 | NR/NR Alachua County Health Facilities Authority Revenue, 8.125%, 11/15/46 | 1,652,160 |
| 500,000 | NR/B1 Capital Trust Agency Revenue Bonds, 7.75%, 1/1/41 | 540,050 |
| 1,000,000 | NR/NR Florida Development Finance Corp., Educational Facilities Revenue, 6.0%, 9/15/40 | 1,009,200 |
| 2,000,000 | NR/NR Florida Development Finance Corp., Educational Facilities Revenue, 7.625%, 6/15/41 | 2,177,920 |
| 1,000,000 | NR/NR Florida Development Finance Corp., Educational Facilities Revenue, 7.75%, 6/15/42 | 1,074,360 |
| 1,980,000 | NR/NR Hillsborough County Industrial Development Authority Revenue, 6.75%, 7/1/29 | 1,980,614 |
| 1,000,000(d) | NR/WR Hillsborough County Industrial Development Authority Revenue, 8.0%, 8/15/32 | 1,353,850 |
| 2,200,000 | BB/NR | 2,047,452 |

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| | Lee County Industrial Development Authority, 5.375%, 6/15/37 | |
| 2,500,000 | A/A2Miami-Dade County Florida Aviation Revenue, 5.5%, 10/1/41 | 2,648,825 \$ 16,140,881 |
| | Georgia - 4.3% | |
| 5,210,000 | AA-/WRAtlanta Georgia Water and Wastewater Revenue, RIB, 12.845%, 11/1/43 (144A) | \$ 5,348,378 |
| 1,000,000 | B/NRClayton County Development Authority Revenue, 9.0%, 6/1/35 | 1,085,890 |
| 900,000 | NR/NRDeKalb County Georgia Hospital Authority Revenue, 6.0%, 9/1/30 | 956,412 |
| 750,000 | NR/NRDeKalb County Georgia Hospital Authority Revenue, 6.125%, 9/1/40 | 792,570 |
| 3,360,000 | NR/NRFulton County Residential Care Facilities for the Elderly Authority, 7.0%, 7/1/29 | 2,820,619 |
| 1,650,000 | NR/NRSavannah Georgia Economic Development Authority Revenue, 7.4%, 1/1/34 | 1,663,612 \$ 12,667,481 |
| | Guam - 1.9% | |
| 1,000,000 | B/NRGuam Government of Department Education Certificates of Participation, 6.625%, 12/1/30 | \$ 1,041,960 |
| 4,400,000(d) | AA+/B2Northern Mariana Islands, 6.75%, 10/1/33 | 4,470,268 \$ 5,512,228 |
| | Idaho - 1.2% | |
| 2,000,000 | A-/Baa1Power County Industrial Development Corp., Revenue, 6.45%, 8/1/32 | \$ 2,002,080 |
| 1,500,000 | A-/Baa1Power County Pollution Control Revenue, 5.625%, 10/1/14 | 1,500,525 \$ 3,502,605 |
| | Illinois - 6.9% | |
| 1,000,000 | NR/Baa1City of Country Club Hills, General Obligation, 5.0%, 12/1/31 | \$ 1,006,990 |
| – | NR/NRIllinois Finance Authority Revenue, 0.0%, 11/15/52 | 42,026 |
| 417,400(c) | NR/NRIllinois Finance Authority Revenue, 4.0%, 11/15/52 | 284,583 |
| 1,450,000 | A+/A1 | 1,510,045 |

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| Principal Amount USD (\$) | S&P/Moody's Rating (unaudited) | Value |
|------------------------------|--|---------------|
| | Illinois Finance Authority Revenue, 5.5%, 4/1/39 | |
| 1,605,000 | AA-/A3 Illinois Finance Authority Revenue, 6.0%, 8/15/25 | 1,661,095 |
| 280,000 | BBB+/NR Illinois Finance Authority Revenue, 6.0%, 8/15/38 | 298,379 |
| 2,000,000 | AA+/Aa2 Illinois Finance Authority Revenue, 6.0%, 8/15/39 | 2,272,460 |
| 2,500,000 | NR/NR Illinois Finance Authority Revenue, 6.125%, 11/15/25 | 2,518,700 |
| 45,000 | NR/NR Illinois Finance Authority Revenue, 7.0%, 11/15/17 | 44,282 |
| – | NR/NR Illinois Finance Authority Revenue, 7.0%, 11/15/27 | 156,702 |
| 6,000,000 | NR/NR Illinois Finance Authority Revenue, 8.25%, 5/15/45 | 6,104,220 |
| | Illinois - (continued) | |
| 2,500,000 | NR/NR Illinois Finance Authority Revenue, 8.25%, 2/15/46 | 2,552,475 |
| 2,135,000 | NR/NR Southwestern Illinois Development Authority Revenue, 5.625%, 11/1/26 | 1,714,042 |
| | | \$ 20,165,999 |
| | Indiana - 1.0% | |
| 250,000 | NR/NR City of Carmel Indiana Nursing Home Revenue, 7.0%, 11/15/32 | \$ 264,042 |
| 750,000 | NR/NR City of Carmel Indiana Nursing Home Revenue, 7.125%, 11/15/42 | 788,370 |
| 500,000 | NR/NR City of Carmel Indiana Nursing Home Revenue, 7.125%, 11/15/47 | 522,000 |
| 250,000 | NR/Baa3 East Chicago Indiana Exempt Facilities Revenue, 7.0%, 1/1/14 | 249,830 |
| 1,700,000 | NR/NR Vincennes Industrial Economic Development Revenue, 6.25%, 1/1/24 | 1,008,729 |
| | | \$ 2,832,971 |
| | Kansas - 0.3% | |
| 1,000,000 | NR/A2 Kansas Development Finance Authority Revenue, 5.0%, 5/15/35 | \$ 1,023,980 |
| | Louisiana - 6.8% | |
| 7,000,000 | BBB-/Baa3 | \$ 7,504,700 |

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| | | Jefferson Parish Hospital Service Revenue, 6.375%, 7/1/41 | |
| 2,500,000 | BBB-/Baa3 | Louisiana Local Government Environmental Facilities & Community Development Authority Revenue, 6.75%, 11/1/32 | 2,674,975 |
| 6,000,000 | NR/Baa1 | Louisiana Public Facilities Authority Revenue, 5.5%, 5/15/47 | 6,166,740 |
| 750,000 | BBB-/NR | Opelousas Louisiana General Hospital Authority Revenue, 5.75%, 10/1/23 | 759,840 |
| 2,915,000 | A-/A3 | Tobacco Settlement Financing Corp. Revenue, 5.875%, 5/15/39 | 2,907,713 |
| | | | \$ 20,013,968 |
| | | Maine - 0.6% | |
| 1,500,000 | NR/Baa3 | Maine Health & Higher Educational Facilities Authority Revenue, 7.5%, 7/1/32 | \$ 1,784,220 |
| | | Maryland - 3.2% | |
| 4,500,000 | A-/A2 | Maryland Health & Higher Educational Facilities Authority Revenue, 5.0%, 7/1/43 | \$ 4,565,160 |
| 460,000 | NR/NR | Maryland Health & Higher Educational Facilities Authority Revenue, 5.25%, 1/1/27 | 441,517 |
| 1,250,000 | NR/NR | Maryland Health & Higher Educational Facilities Authority Revenue, 5.3%, 1/1/37 | 1,121,388 |
| 1,250,000 | NR/Baa3 | Maryland Health & Higher Educational Facilities Authority Revenue, 5.75%, 7/1/38 | 1,259,300 |
| 2,000,000 | NR/NR | Maryland Health & Higher Educational Facilities Authority Revenue, 6.25%, 1/1/45 | 2,148,420 |
| | | | \$ 9,535,785 |
| | | Massachusetts - 9.2% | |
| 595,000 | BB/NR | Massachusetts Development Finance Agency Revenue, 5.25%, 10/1/18 | \$ 597,499 |
| 8,000,000 | A/WR | Massachusetts Development Finance Agency Revenue, 5.75%, 1/1/42 | 9,044,960 |
| 1,845,000 | NR/NR | Massachusetts Development Finance Agency Revenue, 7.1%, 7/1/32 | 1,844,982 |
| 2,195,000 | BBB-/Baa3 | Massachusetts Health & Educational Facilities Authority | 2,178,164 |

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|---------------------------------|--------------------------------------|---|---------------------------------------|
| 2,000,000 | AAA/Aaa | Revenue, 5.375%, 7/15/28 Massachusetts Health & Educational Facilities Authority | |
| 3,420,000(a) | NR/NR | Revenue, 5.5%, 7/1/32 Massachusetts Health & Educational Facilities Authority | 2,482,040 |
| 10,760,000 | AA-/Aa3 | Revenue, 6.5%, 1/15/38 Massachusetts Housing Finance Agency Revenue, 5.35%, 12/1/45 | 15,082 10,763,228 \$ 26,925,955 |
| Principal Amount USD (\$) | S&P/Moody's Rating (unaudited) | | Value |
| 2,000,000 | NR/Ba1 | Michigan - 3.6% Flint Michigan Hospital Building Authority Revenue, 7.375%, 7/1/35 | \$ 2,227,940 |
| 2,235,000 | BB+/NR | Kent Hospital Finance Authority Revenue, 6.25%, 7/1/40 | 2,319,081 |
| 675,000 | NR/NR | Michigan Public Educational Facilities Authority Revenue, 7.0%, 10/1/36 | 664,247 |
| 5,000,000 | AA/Aa1 | Michigan State University, 5.0%, 8/15/41 | 5,369,750 \$ 10,581,018 |
| 1,000,000 | NR/NR | Minnesota - 0.4% Port Authority of the City of Bloomington, Minnesota Recovery Zone Facility Revenue, 9.0%, 12/1/35 | \$ 1,136,500 |
| 1,000,000 | NR/NR | Missouri - 1.3% Kansas City Tax Increment Financing Commission Tax Increment Revenue, 6.5%, 6/1/25 | \$ 1,011,570 |
| 1,500,000(a)(e) | NR/Ca | St. Louis Industrial Development Authority Revenue, 7.2%, 12/15/28 | 495,000 |
| 6,640,000(a)(e) | NR/Ca | St. Louis Industrial Development Authority Revenue, 7.25%, 12/15/35 | 2,191,200 \$ 3,697,770 |
| 2,445,000(b) | NR/NR | Montana - 0.7% Hardin Increment Industrial Infrastructure Development Revenue, 0.0%, 9/1/31 | \$ 1,945,658 |

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| 1,000,000(a)(e) | NR/NRTwo Rivers Authority Inc., Project Revenue, 7.375%, 11/1/27 | 146,630 \$ 2,092,288 |
| | Nevada - 2.3% | |
| 2,000,000 | A+/A1Nevada Highway Revenue, 5.0%, 2/1/43 | \$ 2,046,780 |
| 4,500,000 | A-/A3Reno Nevada Hospital Revenue, 5.25%, 6/1/41 | 4,560,255 \$ 6,607,035 |
| | New Hampshire - 0.4% | |
| 1,125,000(d) | NR/NRNew Hampshire Health & Education Facilities Authority Revenue, 5.875%, 7/1/34 | \$ 1,233,068 |
| | New Jersey - 11.1% | |
| 2,500,000 | NR/NRBurlington County New Jersey Bridge Commission Revenue, 5.625%, 1/1/38 | \$ 2,503,925 |
| 6,500,000 | NR/NRNew Jersey Economic Development Authority Revenue, 10.5%, 6/1/32 (144A) | 6,516,835 |
| 7,500,000 | B/B2New Jersey Economic Development Authority Revenue, 5.75%, 9/15/27 | 7,239,525 |
| 3,500,000 | NR/NRNew Jersey Health Care Facilities Financing Authority, 7.25%, 7/1/27 | 3,499,405 |
| 3,500,000 | AA-/WRNew Jersey State Turnpike Authority Transportation Revenue, RIB, 13.755%, 7/1/23 (144A) | 4,780,090 |
| 15,375,000(b) | AA+/Aa1New Jersey Transportation Trust Fund Authority Revenue, 0.0%, 12/15/27 | 7,919,201 \$ 32,458,981 |
| | New York - 8.4% | |
| 1,630,000 | NR/NRDutchess County Industrial Development Agency, 7.5%, 3/1/29 | \$ 1,656,357 |
| 7,000,000 | BB/B2New York City Industrial Development Agency Revenue, 5.25%, 12/1/32 | 6,608,980 |
| 3,950,000 | BB/B2New York City Industrial Development Agency Revenue, 7.625%, 12/1/32 | 3,988,947 |
| 5,000,000 | AAA/AaaNew York State Dormitory Authority Revenue, 5.0%, 10/1/41 | 5,361,400 |
| 2,000,000 | NR/Ba1New York State Dormitory Authority Revenue, 6.125%, | 2,141,420 |

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| Principal Amount USD (\$) | S&P/Moody's Rating (unaudited) | Value |
|------------------------------|--|----------------------------|
| 5,000,000 | AAA/Aaa 12/1/29 New York State Environmental Facilities Corp. Water Revenue, 5.0%, 6/15/33 | 5,015,500 \$ 24,772,604 |
| 5,010,000 | NR/NR North Carolina - 2.5% Charlotte North Carolina Special Facilities Revenue, 7.75%, 2/1/28 | \$ 5,015,160 |
| 2,575,000 | NR/NR Charlotte Special Facilities Revenue, 5.6%, 7/1/27 | 2,408,861 \$ 7,424,021 |
| 1,500,000 | NR/NR Ohio - 1.9% Adams County Hospital Facilities Revenue, 6.5%, 9/1/36 | \$ 1,225,185 |
| 5,000,000 | B-/B3 Buckeye Tobacco Settlement Financing Authority Revenue, 6.5%, 6/1/47 | 4,404,300 \$ 5,629,485 |
| 2,220,000 | NR/WR Oklahoma - 1.9% Tulsa Airports Improvement Trust, 6.25%, 6/1/20 | \$ 2,225,550 |
| 3,000,000(c) | NR/WR Tulsa Airports Improvement Trust, 7.75%, 6/1/35 | 3,212,040 \$ 5,437,590 |
| 2,000,000 | A-/NR Oregon - 0.7% Oregon State Facilities Authority Revenue, 5.25%, 10/1/40 | \$ 2,059,400 |
| 5,000,000 | B-/Caa2 Pennsylvania - 5.8% Pennsylvania Economic Development Financing Authority Solid Waste Disposal Revenue, 6.0%, 6/1/31 | \$ 4,988,850 |
| 5,000,000 | A-/A3 Pennsylvania Turnpike Commission, 5.3%, 12/1/41 | 5,192,050 |
| 1,000,000 | BB-/NR Philadelphia Authority for Industrial Development, 6.5%, 6/15/33 (144A) | 1,007,750 |
| 1,000,000 | BB-/NR Philadelphia Authority for Industrial Development, 6.75%, 6/15/43 (144A) | 1,009,060 |
| 5,000,000 | BB+/Ba1 | 4,676,050 |

| | | | |
|-----------------|--------------|---|----------------------------|
| | | Philadelphia Hospitals & Higher Education Facilities Authority Revenue, 5.0%, 7/1/34 | \$ 16,873,760 |
| 5,000,000 | AA-/Aa3 | Puerto Rico - 1.7% Puerto Rico Sales Tax Financing Corp., 5.25%, 8/1/57 | \$ 5,019,250 |
| 1,385,000(e) | NR/NR | Rhode Island - 3.7% Central Falls Rhode Island Detention Facility Corp., Revenue, 7.25%, 7/15/35 | \$ 1,101,269 |
| 1,500,000 | NR/NRR | Rhode Island Health & Educational Building Corp., Revenue, 8.375%, 1/1/46 | 1,682,970 |
| 8,285,000 | BB/Ba1 | Tobacco Settlement Financing Corp. Revenue, 6.25%, 6/1/42 | 8,202,150 \$ 10,986,389 |
| – | 8,000,000(d) | South Carolina - 4.7% BBB+/Baa1 South Carolina Jobs Economic Development Authority Revenue, 6.375%, 8/1/34 | \$ 8,042,535 |
| 4,400,000(f) | BBB/WR | Tobacco Settlement Revenue Management Authority, 6.375%, 5/15/30 | 5,672,436 \$ 13,714,971 |
| 5,000,000 | BBB+/Baa1 | Tennessee - 2.9% Johnson City Health & Educational Facilities Board Hospital Revenue, 6.5%, 7/1/38 | \$ 5,510,150 |
| 3,000,000 | BBB+/NR | Sullivan County Health, Educational & Housing Facilities Board Revenue, 5.25%, 9/1/36 | 3,083,550 \$ 8,593,700 |
| 2,500,000 | BB+/Baa3 | Texas - 16.3% Central Texas Regional Mobility Authority Revenue, 6.75%, 1/1/41 | \$ 2,731,850 |
| 2,663,453(a)(e) | NR/NR | Gulf Coast Industrial Development Authority Revenue, 7.0%, 12/1/36 | 24,504 |
| 10,000,000 | B/B2 | Houston Texas Airport System Special Facilities Revenue, 6.75%, 7/1/29 | 10,004,400 |
| 460,000 | NR/NRI | AH Public Facility Corp., Facilities Revenue, Series | 340,685 |

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| | | 2006, 6.0%, 5/1/16 | |
| 1,000,000 | | NR/NRIAH Public Facility Corp., Facilities Revenue, Series 2006, 6.0%, 5/1/21 | 718,300 |
| 1,350,000 | | NR/NRIAH Public Facility Corp., Facilities Revenue, Series 2006, 6.125%, 5/1/26 | 953,613 |
| 3,000,000 | | NR/NRJefferson County Industrial Development Corp., Revenue, 8.25%, 7/1/32 | 3,143,400 |
| 845,000 | | NR/NRLubbock Health Facilities Development Corp., Nursing Home Revenue, 6.5%, 7/1/26 | 871,051 |
| 2,000,000 | | NR/NRLubbock Health Facilities Development Corp., Nursing Home Revenue, 6.625%, 7/1/36 | 2,034,700 |
| Principal Amount USD (\$) | S&P/Moody's Rating (unaudited) | | Value |
| | | Texas - (continued) | |
| 9,750,000 | BBB+/A3 | North Texas Tollway Authority Transportation Revenue, 5.75%, 1/1/33 | \$10,577,873 |
| 1,711,000 | NR/Aa1 | Panhandle Regional Housing Finance Corp., Multifamily Housing Revenue, 6.6%, 7/20/31 | 1,781,527 |
| 1,500,000 | NR/NR | Red River Health Facilities Development Corp., Revenue, 8.0%, 11/15/41 | 1,643,460 |
| 1,000,000 | A+/A1 | Richardson Hospital Authority Revenue, 6.0%, 12/1/34 | 1,016,660 |
| 2,000,000 | AAA/Aaa | Richardson Independent School District Revenue, 5.0%, 2/15/38 | 2,163,440 |
| 4,000,000 | NR/NR | Sanger Industrial Development Corp., 8.0%, 7/1/38 | 4,078,200 |
| 1,000,000 | NR/NR | Tarrant County Cultural Education Facilities Finance Corp., Revenue, 8.125%, 11/15/39 | 1,077,180 |
| 1,500,000 | NR/NR | Tarrant County Cultural Education Facilities Finance Corp., Revenue, 8.25%, 11/15/44 | 1,618,125 |
| 1,000,000(a)(e) | NR/NR | | 520,670 |

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| | | Texas Midwest Public Facility Corp. Revenue, 9.0%, 10/1/30 | |
| 2,500,000 | NR/NR | Travis County Health Facilities Development Corp., Revenue, 7.125%, 1/1/46 | 2,525,600 \$ 47,825,238 |
| | | Virginia - 0.8% | |
| 2,000,000 | BBB+/Baa1 | Washington County Industrial Development Authority Revenue, 7.75%, 7/1/38 | \$ 2,320,340 |
| | | Washington - 4.3% | |
| 1,025,000 | BBB/A3 | Tobacco Settlement Authority Revenue, 6.5%, 6/1/26 | \$ 1,036,255 |
| 1,500,000 | NR/Baa3 | Washington State Health Care Facilities Authority Revenue, 5.5%, 12/1/39 | 1,521,825 |
| 2,000,000 | BBB/Baa2 | Washington State Health Care Facilities Authority Revenue, 6.125%, 8/15/37 | 2,099,620 |
| 2,000,000 | BBB/Baa2 | Washington State Health Care Facilities Authority Revenue, 6.25%, 8/15/42 | 2,103,540 |
| 1,100,000 | NR/NR | Washington State Housing Finance Commission Revenue, 6.75%, 10/1/47 | 1,006,874 |
| 5,000,000 | NR/NR | Washington State Housing Finance Committee Nonprofit Revenue, 5.625%, 1/1/27 | 4,761,450 \$ 12,529,564 |
| | | West Virginia - 1.0% | |
| 750,000 | NR/NR | West Virginia Hospital Finance Authority Hospital Revenue Bonds, 9.125%, 10/1/41 | \$ 921,240 |
| 2,000,000 | NR/NR | West Virginia Municipal Building Community College Facilities Revenue, 7.75%, 10/1/44 | 1,942,500 \$ 2,863,740 |
| | | Wisconsin - 3.3% | |
| 2,900,000(g) | NR/NR | Aztalan Township, 7.5%, 5/1/18 | \$ - |
| (h) 2,500,000 | NR/NR | Wisconsin Public Finance Authority Continuing Care Retirement Community Revenue, 8.25%, 6/1/46 | 2,835,750 |
| 1,000,000(d) | NR/NR | Wisconsin State Health & Educational Facilities Authority Revenue, | 1,042,910 |

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|--------------|---|----------------|
| | 6.125%, 4/1/24 | |
| 1,000,000(d) | NR/NRWisconsin State Health & Educational Facilities Authority Revenue, 6.25%, 4/1/34 | 1,043,850 |
| 1,500,000 | A+/A1Wisconsin State Health & Educational Facilities Authority Revenue, 6.625%, 2/15/39 | 1,654,530 |
| 1,500,000 | NR/NRWisconsin State Public Finance Authority Revenue, 8.375%, 6/1/20 | 1,507,170 |
| 1,500,000 | NR/NRWisconsin State Public Finance Authority Revenue, 8.625%, 6/1/47 | 1,589,220 |
| | | \$ 9,673,430 |
| | TOTAL TAX EXEMPT OBLIGATIONS | |
| | (Cost \$414,478,138) | \$ 430,562,873 |

| Principal Amount USD (\$) | S&P/Moody's Rating (unaudited) | Value |
|---------------------------|--------------------------------|-------|
|---------------------------|--------------------------------|-------|

| | | |
|------------------|--|--------------|
| | MUNICIPAL COLLATERALIZED DEBT OBLIGATION - 2.5% of Net Assets | |
| 13,000,000(c)(e) | NR/NRNon-Profit Preferred Funding Trust I, 6.75%, 9/15/37 (144A) | \$ 7,301,060 |

| | | |
|--|---|--------------|
| | TOTAL MUNICIPAL COLLATERALIZED DEBT OBLIGATION | |
| | (Cost \$13,000,000) | \$ 7,301,060 |

| | | |
|--|--|------------------|
| | TOTAL INVESTMENTS IN SECURITIES - 149.3% | |
| | (Cost - \$427,478,138) (i)(j) | \$ 437,863,933 |
| | OTHER ASSETS AND LIABILITIES -1.8% | \$ 5,449,920 |
| | PREFERRED SHARES AT REDEMPTION VALUE, INCLUDING DIVIDENDS PAYABLE - (51.1)% | \$ (150,003,949) |
| | NET ASSETS APPLICABLE TO | \$ 293,309,904 |

COMMON SHAREOWNERS
-100.0%

| | |
|--------|--|
| NR | Security not rated by S&P or Moody's. |
| WR | Rating withdrawn by either S&P or Moody's. |
| (144A) | Security is exempt from registration under Rule 144A of the Securities Act of 1933. Such securities may be resold normally to qualified institutional buyers in a transaction exempt from registration. At June 30, 2013, the value of these securities amounted to \$33,509,231, or 11.4% 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 June 30, 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 June 30, 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 June 30, 2013 the aggregate cost of illiquid securities in the Trust's portfolio was \$27,052,163. As of that date, the aggregate value of illiquid securities in the Trust's portfolio of \$11,780,333 represented 4.0% of total net assets applicable to common shareowners.
 - (f) Escrow to maturity.
 - (g) Security is valued using fair value methods (other than prices supplied by independent pricing services).
 - (h) The company is scheduled for approval of a reorganization plan.
-

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

| | |
|---------------------------|--------|
| Insured | |
| FSA | 3.1% |
| FSA-CR | 2.2 |
| AMBAC GO OF INSTN | 2.1 |
| BHAC-CR MBIA | 1.8 |
| AMBAC | 0.6 |
| GO OF INSTN | 0.6 |
| PSF-GTD | 0.5 |
| ASSURED GTY | 0.4 |
| GNMA COLL | 0.4 |
| NATL-RE | 0.2 |
| Revenue Bonds: | |
| Health Revenue | 21.4 |
| Facilities Revenue | 13.6 |
| Development Revenue | 13.3 |
| Tobacco Revenue | 9.2 |
| Other Revenue | 7.3 |
| Education Revenue | 6.8 |
| Transportation Revenue | 5.9 |
| Airport Revenue | 5.5 |
| Water Revenue | 3.0 |
| Pollution Control Revenue | 2.1 |
| Utilities Revenue | 0.0* |
| | 100.0% |

* Amount is less than 0.1%.

(j) At June 30, 2013, the net unrealized gain on investments based on cost for federal tax purposes of \$427,478,138 was as follows:

| | |
|--|---------------|
| Aggregate gross unrealized gain for all investments in which there is an excess of value over tax cost | \$ 34,646,319 |
| Aggregate gross unrealized loss for all investments in which there is an excess of tax cost over value | (24,260,524) |
| Net unrealized gain | \$ 10,385,795 |

For financial reporting purposes net unrealized gain on investments was \$ 10,385,795 and cost of investments aggregated \$427,478,138.

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 June 30, 2013, in valuing the Trust's investments.

| | Level 1 | Level 2 | Level 3 | Total |
|---|---------|----------------|---------|--------------------|
| Tax Exempt Obligations: Municipal Collateralized Debt Obligation: | \$ - | \$430,562,873 | | \$- \$430,562,873 |
| | - | 7,301,060 | - | 7,301,060 |
| Total | \$ - | \$ 437,863,933 | | \$ - \$437,863,933 |

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

| | Balance as of 3/31/13 | Change in Realized gain (loss) | Unrealized appreciation (depreciation) | Purchases | Sales | Accrued discounts/ premiums | Transfers in to Level 3* | Transfers out of Level 3* | Balance as of 6/30/13 |
|-------|-----------------------------|---|--|-----------|-------|-----------------------------------|--------------------------------|---------------------------------|-----------------------------|
| Total | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |

* Transfers are calculated on the end of period value

** Includes security valued at \$0.

During the three months ended June 30, 2013, there were no transfers between Levels 1, 2, and 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. (a) 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)). 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/ John F. Cogan, Jr. John F. Cogan, Jr, President Date August 29, 2013 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 August 29, 2013 By (Signature and Title)* /s/ Mark Bradley Mark Bradley, Treasurer Date August 29, 2013 * Print the name and title of each signing officer under his or her signature.