

PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST

Form N-Q

February 26, 2014

OMB APPROVAL

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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 811-21823

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.

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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 Advantage Trust

| December 31, 2013

Ticker Symbol: MAV

Principal Amount USD (\$)	S&P/Moody's Ratings		Value
		TAX EXEMPT OBLIGATIONS - 150.8% of Net Assets	
		Alabama - 1.7%	
2,500,000	NR/B2	Alabama Industrial Development Authority Solid Waste Disposal Revenue, 6.45%, 12/1/23	\$ 2,498,925
2,500,000	NR/NR	Huntsville-Redstone Village Special Care Facilities Financing Authority Nursing Home Revenue, 5.5%, 1/1/43	1,990,675 \$ 4,489,600
		Arizona - 2.8%	
5,000,000	NR/NR	Casa Grande Industrial Development Authority	\$ 4,072,600

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

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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

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

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365,400(b)	NR/NRIllinois Finance Authority Revenue, 0.0%, 11/15/52	37,536
417,400(c)	NR/NRIllinois Finance Authority Revenue, 4.0%, 11/15/52	211,271
1,450,000	A+/A1Illinois Finance Authority Revenue, 5.5%, 4/1/39	1,473,620
1,605,000	AA-/A3Illinois Finance Authority Revenue, 6.0%, 8/15/25	1,642,525
280,000	BBB+/NRIllinois Finance Authority Revenue, 6.0%, 8/15/38	287,174
2,000,000	AA+/Aa2Illinois Finance Authority Revenue, 6.0%, 8/15/39	2,222,780
2,500,000	NR/NRIllinois Finance Authority Revenue, 6.125%, 11/15/25	2,444,200
45,000	NR/NRIllinois Finance Authority Revenue, 7.0%, 11/15/17	43,182
160,000	NR/NRIllinois Finance Authority Revenue, 7.0%, 11/15/27	142,139
6,000,000	NR/NRIllinois Finance Authority Revenue, 8.25%, 5/15/45	5,142,780
2,500,000	NR/NRIllinois Finance Authority Revenue, 8.25%, 2/15/46	2,402,825
Principal Amount USD (\$)	S&P/Moody's Ratings	Value
	Illinois - (continued)	
2,025,000	NR/NRSouthwestern Illinois Development Authority Revenue, 5.625%, 11/1/26	\$ 1,575,409 \$ 18,625,621
	Indiana - 1.0%	
250,000	NR/NRCity of Carmel Indiana Nursing Home Revenue, 7.0%, 11/15/32	\$ 246,372
750,000	NR/NRCity of Carmel Indiana Nursing Home Revenue, 7.125%, 11/15/42	733,403
500,000	NR/NRCity of Carmel Indiana Nursing Home Revenue, 7.125%, 11/15/47	485,355
250,000	NR/Baa3East Chicago Indiana Exempt Facilities Revenue, 7.0%, 1/1/14	250,000
1,585,000	NR/NRVincennes Industrial Economic s Revenue, 6.25%, 1/1/24	927,273 \$ 2,642,403
	Kansas - 0.4%	
1,000,000	NR/A2	\$ 1,003,210

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

		Massachusetts Development Finance Agency Revenue, RIB, 5.75%, 1/1/42	
2,195,000	BBB-/Baa3	Massachusetts Health & Educational Facilities Authority Revenue, 5.375%, 7/15/28	2,195,066
2,000,000	AAA/Aaa	Massachusetts Health & Educational Facilities Authority Revenue, 5.5%, 7/1/32	2,430,840
3,420,000(a)	NR/NR	Massachusetts Health & Educational Facilities Authority Revenue, 6.5%, 1/15/38	10,294
10,760,000	AA-/Aa3	Massachusetts Housing Finance Agency Revenue, 5.35%, 12/1/45	10,514,887 \$ 25,526,115
2,000,000	NR/Ba1	Michigan - 3.8% Flint Michigan Hospital Building Authority Revenue, 7.375%, 7/1/35	\$ 2,142,900
2,235,000	BB+/NR	Kent Hospital Finance Authority Revenue, 6.25%, 7/1/40	2,270,693
675,000	NR/NR	Michigan Public Educational Facilities Authority Revenue, 7.0%, 10/1/36	644,679
Principal Amount USD (\$)	S&P/Moody's Ratings		Value
5,000,000	AA/Aa1	Michigan - (continued) Michigan State University Revenue, 5.0%, 8/15/41	\$ 5,138,150 \$ 10,196,422
3,500,000	NR/NR	Minnesota - 1.4% Port Authority of the City of Bloomington, Minnesota Recovery Zone Facility Revenue, 9.0%, 12/1/35	\$ 3,794,805
1,500,000(a)(e)	NR/Ca	Missouri - 0.9% St. Louis Industrial Development Authority Revenue, 7.2%, 12/15/28	\$ 462,960
6,640,000(a)(e)	NR/Ca	St. Louis Industrial Development Authority Revenue, 7.25%, 12/15/35	2,049,370

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		Montana - 0.8%	\$ 2,512,330
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

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		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/Baa1	New York State Dormitory Authority Revenue, 6.125%, 12/1/29	1,976,880
			\$ 18,749,354
5,010,000	NR/NR	North Carolina - 2.8% 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
1,500,000	NR/NR	Ohio - 1.9% 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
3,000,000(c)	NR/WR	Oklahoma - 2.0% 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
2,000,000	BBB+/NR	Oregon - 0.7% Oregon State Facilities Authority Revenue, 5.25%, 10/1/40	\$ 1,932,920
1,965,000	B-/NR	Pennsylvania - 11.1% 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

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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% 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% BBB/WRTobacco Settlement Revenue Management Authority, 6.375%, 5/15/30	\$ 5,530,492
5,000,000	Tennessee - 3.1% 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% 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

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

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

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