

PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST

Form N-Q

August 28, 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 811-21409

Pioneer 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: June 30, 2014

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  
NQ | June 30, 2014

Ticker Symbol: MAV

Schedule of Investments | 6/30/14 (unaudited)

Principal Amount USD (\$)	S&P/Moody's Ratings	Value
	TAX EXEMPT OBLIGATIONS - 134.8% of Net Assets	
	Alabama - 1.7%	
2,500,000	NR/B3Alabama Industrial Development Authority Solid Waste Disposal Revenue, 6.45%, 12/1/23	\$ 2,507,500
2,500,000	NR/NRHuntsville-Redstone Village Special Care Facilities Financing Authority Nursing Home Revenue, 5.5%, 1/1/43	2,399,400
		\$ 4,906,900
	Arizona - 1.0%	
2,640,000(a)	NR/NR	\$ 2,954,583

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	Pima County Industrial Development Authority, 7.0%, 1/1/38	
32,000	NR/Baa3Pima County Industrial Development Authority Education Revenue, 6.75%, 7/1/31	32,102 \$ 2,986,685
6,990,000	CCC/NRCalifornia - 15.0% California County Tobacco Securitization Agency Revenue, 5.25%, 6/1/46	\$ 4,887,757
1,550,000	NR/NRCalifornia Enterprise Development Authority Recovery Zone Facility Revenue, 8.5%, 4/1/31	1,701,497
5,000,000	NR/Baa3California Pollution Control Financing Authority, 5.0%, 7/1/37 (144A)	5,099,000
3,000,000	BB+/NRCalifornia School Finance Authority, 7.375%, 10/1/43	3,300,870
2,425,000	A/Aa3California State General Obligation Various Purpose, 5.75%, 4/1/31	2,850,903
1,875,000	NR/NRCalifornia Statewide Communities Development Authority, 5.875%, 11/1/43	1,929,094
757,342(b)(c)	NR/NRCalifornia Statewide Communities Development Authority Environmental Facilities Revenue, 9.0%, 12/1/38	8
20,000,000(d)	NR/NRInland Empire Tobacco Securitization Authority Revenue, 0.0%, 6/1/36	3,989,000
3,140,000(e)	AA/WRLehman Municipal Trust Receipts Revenue, RIB, 0.0%, 9/20/28 (144A)	4,142,445
8,575,000(e)	AA/NRLehman Municipal Trust Receipts, General Obligation, 13.049%, 7/28/31	10,170,550
1,500,000	A-/NRMadera Irrigation Financing Authority Water Revenue, 6.25%, 1/1/31	1,712,910
1,500,000	A-/NRMadera Irrigation Financing Authority Water Revenue, 6.5%, 1/1/40	1,721,040
2,500,000	A-/A2San Jose California Airport Revenue, RIB, 5.0%, 3/1/37	2,585,625 \$ 44,090,699
	Colorado - 0.8%	

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1,500,000	B+/NR	Colorado Educational & Cultural Facilities Authority, 8.0%, 9/1/43	\$ 1,527,975
1,000,000	NR/NR	Kremmling Memorial Hospital District Certificate of Participation, 7.125%, 12/1/45	840,560
		Connecticut - 0.4%	\$ 2,368,535
1,000,000	NR/NR	Hamden Connecticut Facility Revenue, 7.75%, 1/1/43	\$ 1,046,730
2,700,000	BBB/Baa1	District of Columbia - 3.3% District of Columbia Tobacco Settlement Financing Corp., 6.5%, 5/15/33	\$ 2,970,702
6,825,000	BBB/Baa1	District of Columbia Tobacco Settlement Financing Corp., 6.75%, 5/15/40	6,779,682
		Florida - 2.8%	\$ 9,750,384
1,500,000	NR/NR	Alachua County Health Facilities Authority Revenue, 8.125%, 11/15/41	\$ 1,727,595
1,500,000	NR/NR	Alachua County Health Facilities Authority Revenue, 8.125%, 11/15/46	1,724,445
500,000	NR/B1	Capital Trust Agency Revenue Bonds, 7.75%, 1/1/41	515,490
1,000,000(a)	NR/WR	Hillsborough County Industrial Development Authority Revenue, 8.0%, 8/15/32	1,332,850
Principal Amount USD (\$)	S&P/Moody's Ratings		Value
2,500,000	A/A2	Florida - (continued) Miami-Dade County Florida Aviation Revenue, 5.5%, 10/1/41	\$ 2,776,525
		Georgia - 5.4%	\$ 8,076,905
5,210,000(e)	AA/WR	Atlanta Georgia Water and Wastewater Revenue, RIB, 0.0%, 11/1/43 (144A)	\$ 5,392,037
4,920,000	B+/B2	Clayton County Development Authority Revenue, 9.0%, 6/1/35	5,183,663
900,000	NR/NR	DeKalb County Georgia Hospital Authority Revenue,	955,530

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	6.0%, 9/1/30	
750,000	NR/NRDeKalb County Georgia Hospital Authority Revenue, 6.125%, 9/1/40	788,775
3,100,000	AA/Aa2Private Colleges & Universities Authority Revenue, 5.0%, 10/1/43	3,464,684
		\$ 15,784,689
	Guam - 0.4%	
1,000,000	B+/NRGuam Government of Department Education Certificates of Participation, 6.625%, 12/1/30	\$ 1,106,150
	Idaho - 1.2%	
2,000,000	A-/Baa1Power County Industrial Development Corp. Revenue, 6.45%, 8/1/32	\$ 2,003,120
1,500,000	A-/Baa1Power County Pollution Control Revenue, 5.625%, 10/1/14	1,515,120
		\$ 3,518,240
	Illinois - 6.3%	
1,000,000	NR/A3City of Country Club Hills, General Obligation, 5.0%, 12/1/31	\$ 1,016,050
45,000	NR/NRIllinois Finance Authority Revenue, 7.0%, 11/15/17	43,609
1,605,000	AA/A3Illinois Finance Authority Revenue, 6.0%, 8/15/25	1,644,114
70,000	NR/NRIllinois Finance Authority Revenue, 7.0%, 11/15/27	63,507
280,000	BBB+/NRIllinois Finance Authority Revenue, 6.0%, 8/15/38	300,938
1,450,000	A+/A1Illinois Finance Authority Revenue, 5.5%, 4/1/39	1,541,901
2,000,000	AA+/Aa2Illinois Finance Authority Revenue, 6.0%, 8/15/39	2,319,040
3,000,000	NR/NRIllinois Finance Authority Revenue, 8.125%, 2/15/40	3,102,360
6,000,000	NR/NRIllinois Finance Authority Revenue, 8.25%, 5/15/45	3,990,000
2,500,000	NR/NRIllinois Finance Authority Revenue, 8.25%, 2/15/46	2,592,525
365,400(d)	NR/NRIllinois Finance Authority Revenue, 0.0%, 11/15/52	32,096
417,400(e)	NR/NRIllinois Finance Authority Revenue, 4.0%, 11/15/52	270,534
1,985,000	NR/NRSouthwestern Illinois Development Authority	1,598,937

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	Revenue, 5.625%, 11/1/26	\$ 18,515,611
	Indiana - 0.9%	
250,000	NR/NRCity of Carmel Indiana Nursing Home Revenue, 7.0%, 11/15/32	\$ 267,605
750,000	NR/NRCity of Carmel Indiana Nursing Home Revenue, 7.125%, 11/15/42	799,252
500,000	NR/NRCity of Carmel Indiana Nursing Home Revenue, 7.125%, 11/15/47	531,155
1,585,000	NR/NRVincennes Industrial Economic Development Revenue, 6.25%, 1/1/24	974,506 \$ 2,572,518
	Kansas - 0.4%	
1,000,000	NR/A2Kansas Development Finance Authority Revenue, 5.0%, 5/15/35	\$ 1,049,270
	Louisiana - 5.9%	
7,000,000	BB+/Ba1Jefferson Parish Hospital Service District No. 2, 6.375%, 7/1/41	\$ 7,582,120

Pioneer Municipal High Income Advantage Trust INQ 16/30/2014

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## Schedule of Investments | 6/30/14 (unaudited) (continued)

Principal Amount USD (\$)	S&P/Moody's Ratings		Value
		Louisiana - (continued)	
2,500,000	BBB/Baa3	Louisiana Local Government Environmental Facilities & Community Development Authority Revenue, 6.75%, 11/1/32	\$ 2,786,125
6,000,000	NR/Baa1	Louisiana Public Facilities Authority Revenue, 5.5%, 5/15/47	6,286,740
750,000	BBB-/NR	Opelousas Louisiana General Hospital Authority Revenue, 5.75%, 10/1/23	753,210 \$ 17,408,195
		Maine - 1.9%	
1,500,000	NR/Ba1	Maine Health & Higher Educational Facilities Authority Revenue, 7.5%, 7/1/32	\$ 1,738,470
3,500,000	AA-/Aa3	Maine Turnpike Authority Revenue, 5.0%, 7/1/42	3,843,175 \$ 5,581,645
		Maryland - 3.6%	
1,250,000	NR/Baa3	Maryland Health & Higher Educational Facilities Authority Revenue, 5.75%, 7/1/38	\$ 1,287,975
4,500,000	A-/A2	Maryland Health & Higher Educational Facilities Authority Revenue, 5.0%, 7/1/43	4,777,110
2,245,000	NR/NR	Maryland Health & Higher Educational Facilities Authority Revenue, 6.75%, 7/1/44	2,360,011
2,000,000	NR/NR	Maryland Health & Higher Educational Facilities Authority Revenue, 6.25%, 1/1/45	2,202,520 \$ 10,627,616
		Massachusetts - 5.6%	
1,720,000	NR/NR	Massachusetts Development Finance Agency Revenue, 7.1%, 7/1/32	\$ 1,720,585

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2,200,000	AA/Aa2	Massachusetts Development Finance Agency Revenue, 5.0%, 7/1/39	2,449,370
8,000,000	A/WR	Massachusetts Development Finance Agency Revenue, 5.75%, 1/1/42	9,725,120
2,000,000	AAA/Aaa	Massachusetts Health & Educational Facilities Authority Revenue, 5.5%, 7/1/32	2,658,440
3,420,000(b)(c)	NR/NR	Massachusetts Health & Educational Facilities Authority Revenue, 6.5%, 1/15/38	9,165
			\$ 16,562,680
		Michigan - 3.6%	
2,000,000	NR/Ba1	Flint Michigan Hospital Building Authority Revenue, 7.375%, 7/1/35	\$ 2,163,020
2,235,000	BB+/NR	Kent Hospital Finance Authority Revenue, 6.25%, 7/1/40	2,322,925
675,000	NR/NR	Michigan Public Educational Facilities Authority Revenue, 7.0%, 10/1/36	671,888
5,000,000	AA+/Aa1	Michigan State University Revenue, 5.0%, 8/15/41	5,552,450
			\$ 10,710,283
		Minnesota - 1.3%	
3,500,000	NR/NR	Port Authority of the City of Bloomington, Minnesota Recovery Zone Facility Revenue, 9.0%, 12/1/35	\$ 3,755,360
		Missouri - 0.0%	
1,500,000(b)(c)	NR/WR	St. Louis Industrial Development Authority Revenue, 7.2%, 12/15/28	\$ 15
6,640,000(b)(c)	NR/WR	St. Louis Industrial Development Authority Revenue, 7.25%, 12/15/35	66
			\$ 81
		Montana - 0.7%	
2,445,000(d)	NR/NR	Hardin Increment Industrial Infrastructure Development Revenue, 0.0%, 9/1/31	\$ 1,929,936
1,000,000(b)(c)	NR/NR	Two Rivers Authority Inc., Project Revenue, 7.375%, 11/1/27	79,450
			\$ 2,009,386
		Nevada - 2.3%	



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	2,000,000	A+/A1	Nevada Highway Revenue, 5.0%, 2/1/43	\$ 2,136,380
	4,500,000	A-/A3	Reno Nevada Hospital Revenue, 5.25%, 6/1/41	4,637,115 \$ 6,773,495
	1,125,000(a)	NR/NR	New Hampshire - 0.4% New Hampshire Health & Education Facilities Authority Revenue, 5.875%, 7/1/34	\$ 1,188,810
Principal Amount USD (\$)		S&P/Moody's Ratings		Value
	7,500,000	B/B2	New Jersey - 9.0% New Jersey Economic Development Authority Revenue, 5.75%, 9/15/27	\$ 7,889,775
	3,500,000	NR/NR	New Jersey Health Care Facilities Financing Authority, 7.25%, 7/1/27	3,501,435
	3,500,000(e)	AA/WR	New Jersey State Turnpike Authority Transportation Revenue, RIB, 13.774%, 7/1/23 (144A)	5,666,465
	15,375,000(d)	AA+/Aa1	New Jersey Transportation Trust Fund Authority Revenue, 0.0%, 12/15/27	9,278,351 \$ 26,336,026
	7,000,000	BB/B1	New York - 6.8% New York City Industrial Development Agency Revenue, 5.25%, 12/1/32	\$ 6,928,810
	3,950,000	BB/B1	New York City Industrial Development Agency Revenue, 7.625%, 12/1/32	3,970,580
	5,000,000	AAA/Aaa	New York State Dormitory Authority Revenue, 5.0%, 10/1/41	5,529,650
	2,000,000	NR/Ba1	New York State Dormitory Authority Revenue, 6.125%, 12/1/29	2,105,940
	1,400,463	BBB/A3	Westchester County Healthcare Corp. Revenue, 5.0%, 11/1/44	1,486,395 \$ 20,021,375
	5,010,000	NR/NR	North Carolina - 2.6% Charlotte North Carolina Special Facilities Revenue, 7.75%, 2/1/28	\$ 5,044,820

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2,575,000	NR/NR	Charlotte Special Facilities Revenue, 5.6%, 7/1/27	2,587,669 \$ 7,632,489
		Ohio - 1.5%	
5,000,000	B-/B3	Buckeye Tobacco Settlement Financing Authority Revenue, 6.5%, 6/1/47	\$ 4,259,150
		Oklahoma - 1.8%	
3,000,000(e)	NR/WR	Tulsa Airports Improvement Trust, 7.75%, 6/1/35	\$ 3,064,680
2,220,000	NR/WR	Tulsa Airports Improvement Trust Revenue, 6.25%, 6/1/20	2,227,859 \$ 5,292,539
		Oregon - 0.7%	
2,000,000	BBB+/NR	Oregon State Facilities Authority Revenue, 5.25%, 10/1/40	\$ 2,081,920
		Pennsylvania - 10.4%	
1,965,000	B-/NR	Pennsylvania Economic Development Financing Authority, 8.0%, 5/1/29	\$ 2,319,899
5,000,000	B-/Caa2	Pennsylvania Economic Development Financing Authority Solid Waste Disposal Revenue, 6.0%, 6/1/31	5,007,250
5,000,000	A-/A3	Pennsylvania Turnpike Commission, 5.3%, 12/1/41	5,348,400
1,000,000	BB-/NR	Philadelphia Authority for Industrial Development Revenue, 6.5%, 6/15/33 (144A)	1,017,200
3,000,000	BB-/NR	Philadelphia Authority for Industrial Development Revenue, 6.75%, 6/15/43 (144A)	3,054,180
8,500,000	NR/NR	Philadelphia Authority for Industrial Development Revenue, 8.2%, 12/1/43	8,956,365
5,000,000	BB+/Ba2	Philadelphia Hospitals & Higher Education Facilities Authority Revenue, 5.0%, 7/1/34	4,763,050 \$ 30,466,344
		Puerto Rico - 0.9%	
3,000,000	BB+/Ba2	Commonwealth of Puerto Rico, General Obligation, 8.0%, 7/1/35	\$ 2,640,030

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		Rhode Island - 3.7%	
1,355,000(c)	NR/NR	Central Falls Rhode Island Detention Facility Corp. Revenue, 7.25%, 7/15/35	\$ 816,605
1,500,000	NR/NR	Rhode Island Health & Educational Building Corp. Revenue, 8.375%, 1/1/46	1,714,620
8,285,000	BB/Baa1	Tobacco Settlement Financing Corp. Revenue, 6.25%, 6/1/42	8,259,482
			\$ 10,790,707
Principal Amount USD (\$)	S&P/Moody's Ratings		Value
		South Carolina - 2.0%	
4,400,000(a)(f)	BBB/WR	Tobacco Settlement Revenue Management Authority, 6.375%, 5/15/30	\$ 5,926,756
		Tennessee - 3.0%	
5,000,000	BBB+/Baa1	Johnson City Health & Educational Facilities Board Hospital Revenue, 6.5%, 7/1/38	\$ 5,707,000
3,000,000	BBB+/NR	Sullivan County Health, Educational & Housing Facilities Board Revenue, 5.25%, 9/1/36	3,113,070
			\$ 8,820,070
		Texas - 16.5%	
1,000,000	BB/NR	Arlington Higher Education Finance Corp. Revenue, 7.0%, 3/1/34	\$ 1,030,290
1,500,000	BB/NR	Arlington Higher Education Finance Corp. Revenue, 7.125%, 3/1/44	1,542,495
2,500,000	BB+/Baa3	Central Texas Regional Mobility Authority Revenue, 6.75%, 1/1/41	2,861,025
2,663,453(b)(c)	NR/NR	Gulf Coast Industrial Development Authority Revenue, 7.0%, 12/1/36	27
3,000,000	NR/A3	Houston Higher Education Finance Corp. Revenue, 5.0%, 9/1/38	3,172,860
315,000	NR/NR	IAH Public Facility Corp., Facilities Revenue, Series 2006, 6.0%, 5/1/16	220,393

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1,000,000	NR/NRIAH Public Facility Corp., Facilities Revenue, Series 2006, 6.0%, 5/1/21	649,660
1,350,000	NR/NRIAH Public Facility Corp., Facilities Revenue, Series 2006, 6.125%, 5/1/26	809,541
3,000,000(c)(g)	NR/NRJefferson County Industrial Development Corp., Revenue, 8.25%, 7/1/32	2,955,000
2,000,000	NR/NRLubbock Health Facilities Development Corp., Nursing Home Revenue, 6.625%, 7/1/36	2,062,080
9,750,000	BBB+/A3North Texas Tollway Authority Transportation Revenue, 5.75%, 1/1/33	10,761,562
1,500,000	NR/NRRed River Health Facilities Development Corp. Revenue, 8.0%, 11/15/41	1,756,425
2,000,000	AAA/AaaRichardson Independent School District Revenue, 5.0%, 2/15/38	2,254,940
4,000,000	NR/NRSanger Industrial Development Corp., Revenue, 8.0%, 7/1/38	4,306,040
1,000,000	NR/NRTarrant County Cultural Education Facilities Finance Corp., Revenue, 8.125%, 11/15/39	974,230
750,000	NR/NRTarrant County Cultural Education Facilities Finance Corp., Revenue, 8.25%, 11/15/44	735,975
1,000,000(b)(c)	NR/NRTexas Midwest Public Facility Corp., Revenue, 9.0%, 10/1/30	421,180
3,000,000	BBB-/Baa3Texas Private Activity Bond Surface Transportation Corp., 7.0%, 12/31/38	3,659,160
2,500,000	NR/NRTravis County Health Facilities Development Corp. Revenue, 7.125%, 1/1/46	2,655,800
5,000,000	AAA/NRTyler Independent School District, 5.0%, 2/15/38	5,637,350
	Virginia - 2.7%	\$ 48,466,033
5,000,000	AA+/Aa1Virginia Public School Authority Revenue, 4.0%, 8/1/25	\$ 5,619,050
2,000,000	BBB+/Baa1Washington County Industrial Development Authority	2,325,040

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		Revenue, 7.75%, 7/1/38		
				\$ 7,944,090
		Washington - 4.0%		
	2,000,000	BBB/Baa2 Washington State Health Care Facilities Authority Revenue, 6.125%, 8/15/37		\$ 2,104,960
	1,500,000	NR/Baa3 Washington State Health Care Facilities Authority Revenue, 5.5%, 12/1/39		1,619,175
2,000,000	BBB/Baa2	Washington State Health Care Facilities Authority Revenue, 6.25%, 8/15/42	2,108,600	
1,100,000	NR/NR	Washington State Housing Finance Commission Revenue, 6.75%, 10/1/47	1,152,261	
5,000,000	NR/NR	Washington State Housing Finance Committee Nonprofit Revenue, 5.625%, 1/1/27	4,828,200	
				\$ 11,813,196
Principal Amount USD (\$)	S&P/Moody's Ratings		Value	
		West Virginia - 0.9%		
	2,000,000(c)	NR/NR City of Philippi WV, 7.75%, 10/1/44		\$ 1,990,380
	740,000	NR/NR West Virginia Hospital Finance Authority Hospital Revenue, 9.125%, 10/1/41	780,389	\$ 2,770,769
		Wisconsin - 3.4%		
	5,000,000	NR/NR Wisconsin Public Finance Authority Continuing Care Retirement Community Revenue, 8.25%, 6/1/46		\$ 5,847,350
	1,500,000	A+/A1 Wisconsin State Health & Educational Facilities Authority Revenue, 6.625%, 2/15/39	1,747,215	
	680,000	NR/NR Wisconsin State Public Finance Authority Revenue, 8.375%, 6/1/20	682,101	
	1,500,000	NR/NR Wisconsin State Public Finance Authority Revenue, 8.625%, 6/1/47	1,785,885	
				\$ 10,062,551
		TOTAL TAX EXEMPT OBLIGATIONS		

	(Cost \$374,383,033)	\$ 395,714,912
	MUNICIPAL COLLATERALIZED DEBT OBLIGATIONS - 1.1% of Net Assets	
13,000,000(c)(e)	NR/NR Non-Profit Preferred Funding Trust I, 0.0%, 9/15/37 (144A)	\$ 3,134,170
	TOTAL MUNICIPAL COLLATERALIZED DEBT OBLIGATIONS (Cost \$13,000,000)	\$ 3,134,170
	TAX EXEMPT MONEY MARKET MUTUAL FUND - 7.5% of Net Assets	
22,000,000	NR/NR BlackRock Liquidity Funds MuniFund Portfolio, 0.0%,	\$ 22,000,000
	TOTAL TAX EXEMPT MONEY MARKET MUTUAL FUND (Cost \$22,000,000)	\$ 22,000,000
	TOTAL INVESTMENTS IN SECURITIES - 143.4% (Cost - \$409,383,033) (h)(i)	\$ 420,849,082
	OTHER ASSETS AND LIABILITIES -7.7%	\$ 22,646,461
	PREFERRED SHARES AT REDEMPTION VALUE, INCLUDING DIVIDENDS PAYABLE - (51.1%)	\$ (149,999,959)
	NET ASSETS APPLICABLE TO COMMON SHAREOWNERS -100.0%	\$ 293,495,584

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 June 30, 2014, the value of these securities amounted to \$27,505,497, or 9.4% of total net assets applicable to

RIB common shareowners.  
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, 2014.

- (a) 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.
- (b) Security is in default and is non income producing.
- (c) Indicates a security that has been deemed as illiquid. As of June 30, 2014 the aggregate cost of illiquid securities in the Trust's portfolio was \$31,264,846. As of that date, the aggregate value of illiquid securities in the Trust's portfolio of \$9,406,066 represented 3.2% of total net assets applicable to common shareowners.
- (d) Security issued with a zero coupon. Income is recognized through accretion of discount.
- (e) The interest rate is subject to change periodically. The interest is shown is the rate at June 30, 2014.
- (f) Escrow to maturity.
- (g) Security is valued using fair value methods (other than prices supplied by independent pricing services).

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

Insured:	
FSA	3.8%
FSA-CR	2.5
AMBAC GO OF INSTN	2.4
BHAC-CR MBIA	2.3
PSF-GTD	2.0
ST AID WITHHLDG	1.4
GO OF INSTN	0.7
AMBAC	0.6
ASSURED GTY	0.4
NATL-RE	0.2
Revenue Bonds:	
Health Revenue	19.7
Other Revenue	15.5
Development Revenue	15.2
Education Revenue	13.1
Facilities Revenue	10.3
Transportation Revenue	10.2
Tobacco Revenue	9.5
Airport Revenue	4.3
Pollution Control Revenue	2.2

100.0%

(i) At June 30, 2014, the net unrealized appreciation on investments based on cost for federal tax purposes of \$405,240,598 was as follows:

Aggregate gross unrealized appreciation for all investments in which there is an excess of value over tax cost	\$ 38,607,265
Aggregate gross unrealized depreciation for all investments in which there is an excess of tax cost over value	(22,998,781)
Net unrealized appreciation	\$ 15,608,484

For financial reporting purposes net unrealized appreciation on investments was \$ 11,466,049 and cost of investments aggregated \$409,383,033.

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 or broker dealers) as Level 3.

The following is a summary of the inputs used as of June 30, 2014, in valuing the Trust's investments.

	Level 1	Level 2	Level 3	Total
Tax Exempt Obligations		\$ – \$392,759,912	\$2,955,000	\$ 395,714,912
Municipal Collateralized Debt Obligations	–	3,134,170	–	3,134,170
Tax Exempt Money Market Mutual Fund	22,000,000	–	–	22,000,000
Total Investments in Securities	\$ 22,000,000	\$ 395,894,082	\$ 2,955,000	\$ 420,849,082

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

Balance as of	Realized gain	Change in	Purchases	Sales	Accrued	Transfers in to	Transfers out of	Balance as of
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	3/31/14	(loss)	Unrealized appreciation (depreciation)			discounts/ premiums	Level 3*	Level 3*	6/30/14
Tax exempt obligations	\$2,955,000	\$-	\$ (1,119 )	\$-	\$-	\$ 1,119	\$-	\$-	\$2,955,000
Total	\$2,955,000	\$-	\$ (1,119 )	\$-	\$-	\$ 1,119	\$-	\$-	\$2,955,000

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

Net change in unrealized appreciation of Level 3 investments still held and considered Level 3 at 06/30/14: \$(1,119).

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

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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.

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SIGNATURES

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[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/ Mark Goodwin

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Mark Goodwin, Executive Vice President

Date August 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/ Mark Goodwin

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Mark Goodwin, Executive Vice President

Date August 28, 2014

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

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Mark Bradley, Treasurer

Date August 28, 2014

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