

PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST  
Form N-Q  
March 01, 2019

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

FORM N-Q

QUARTERLY SCHEDULE OF PORTFOLIO HOLDINGS  
OF REGISTERED MANAGEMENT INVESTMENT COMPANY

Investment Company Act file number 811-21409

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)

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, 2018

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 | December 31, 2018

**Ticker Symbol:** MAV

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Principal Amount USD (\$)	Value
	UNAFFILIATED ISSUERS
	- 155.8%
	DEBTOR IN POSSESSION
	FINANCING - 2.1% of Net
	Assets
	Building
	Materials - 2.1%
	Texas Pellets,
	Inc./German
4,432,000^	Pellets Texas \$4,432,000
	LLC, 8.0%,
	9/30/18 (144A)
	Texas Pellets,
	Inc./German
1,310,000	Pellets Texas 1,310,000
	LLC, 8.0%,
	3/29/19 (144A)
	Total Building \$5,742,000
	Materials
	TOTAL DEBTOR IN
	POSSESSION FINANCING
	(Cost \$5,742,000)
	\$5,742,000
	TAX EXEMPT
	OBLIGATIONS - 153.7% of
	Net Assets (a)
	Alabama - 0.9%
	Alabama
	Industrial
2,500,000	Development \$2,512,475
	Authority, Pine
	City Fiber Co.,
	6.45%, 12/1/23
	Total Alabama \$2,512,475
	Arizona - 2.5%
4,000,000(b)	City of Phoenix, \$4,748,680
	5.0%, 7/1/27
	City of Phoenix,
	Industrial
	Development
2,000,000	Authority, 3rd & 2,063,400
	Indian School
	Assisted Living
	Project, 5.4%,
	10/1/36
27,000	27,138

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	County of Pima, Industrial Development Authority, Arizona Charter Schools Project, Series C, 6.75%, 7/1/31	
	Total Arizona	\$6,839,218
	California - 13.6%	
6,990,000	California County Tobacco Securitization Agency, Asset-Backed, Gold County Funding Corp., 5.25%, 6/1/46	\$6,808,260
38,610,000(c)	California County Tobacco Securitization Agency, Capital Appreciation, Stanislaus County, Subordinated, Series A, 6/1/46	6,093,816
1,845,000	California Educational Facilities Authority, Stanford University, 5.25%, 4/1/40	2,407,891
1,550,000	California Enterprise Development Authority, Sunpower Corp., 8.5%, 4/1/31	1,627,020
5,000,000	California Pollution Control Financing Authority, 5.0%, 7/1/37 (144A)	5,032,700
2,975,000(d)	California School Finance Authority, Classical	3,481,166

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	Academies Project, Series A, 7.375%, 10/1/43 California Statewide Communities Development Authority, Lancer Plaza Project, 5.875%, 11/1/43 California Statewide Communities Development Authority, Microgy Holdings Project, 9.0%, 12/1/38 City of Madera, Irrigation	2,057,156
1,875,000		
757,342(e)		8
1,500,000(d)	Financing Authority, 6.25%, 1/1/31 City of Madera, Irrigation	1,568,085
1,500,000(d)	Financing Authority, 6.5%, 1/1/40 Coast Community College District, Election, Series D, 5.0%, 8/1/31 State of California,	1,571,610
2,695,000(b)	Various Purposes, 5.75%, 4/1/31 Tobacco Securitization Authority of Southern California, Series A-1, 5.125%, 6/1/46	3,235,240
2,425,000(b)		2,447,843
465,000	Total California Colorado - 0.7%	464,991
1,500,000(d)		\$36,795,786
		\$1,893,225

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	Colorado Educational & Cultural Facilities Authority, Rocky Mountain Classical Academy Project, 8.0%, 9/1/43	
	Total Colorado	\$1,893,225
	Connecticut - 3.9% Mohegan Tribal Finance Authority, 7.0%, 2/1/45 (144A)	\$2,064,996
2,035,000	State of Connecticut, Series E, 4.0%, 9/1/30	7,450,560
7,200,000(b)	Town of Hamden, Whitney Center Project, Series A, 7.75%, 1/1/43	1,025,860
1,000,000	Total Connecticut	\$10,541,416
	District of Columbia - 4.9% District of Columbia Tobacco Settlement	\$2,143,847
1,995,000	Financing Corp., Asset-Backed, 6.5%, 5/15/33 District of Columbia Tobacco Settlement	7,053,023
6,825,000	Financing Corp., Asset-Backed, 6.75%, 5/15/40 District of Columbia, Housing Product Trust Fund, Series A, 4.25%, 6/1/37 (NATL Insured)	3,979,293
3,975,000		\$13,176,163

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	Total District of Columbia Florida - 9.1%	
	Alachua County Health Facilities Authority, Terraces Bonita Springs Project, Series A, 8.125%, 11/15/41	\$1,637,415
1,500,000		
	Alachua County Health Facilities Authority, Terraces Bonita Springs Project, Series A, 8.125%, 11/15/46	1,633,215
1,500,000		
	County of Miami-Dade, Aviation Revenue, Series B, 5.5%, 10/1/41	2,568,200
2,500,000(d)		
	County of Miami-Dade, Water & Sewer System Revenue, Series A, 4.0%, 10/1/44	5,092,250
5,000,000		
	Florida's Turnpike Enterprise, Department of Transportation, Series A, 4.0%, 7/1/32	5,282,700
5,000,000		
	Hillsborough County Industrial Development Authority, Various Health Facilities, 8.0%, 8/15/32	1,047,390
1,000,000(d)		
	State of Florida, Capital Outlay, Series A, 4.0%, 6/1/38	7,436,276
7,035,000(b)		
	Total Florida Georgia - 6.4%	\$24,697,446

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5,000,000	City of Atlanta, Water & Wastewater	\$5,850,650
	Revenue, Series A, 5.0%, 11/1/34 DeKalb County Georgia Hospital Authority,	
900,000(d)	DeKalb Medical Center, Inc., Project, 6.0%, 9/1/30	958,500
	DeKalb County Georgia Hospital Authority,	
750,000(d)	DeKalb Medical Center, Inc., Project, 6.125%, 9/1/40	800,272
	Private Colleges & Universities Authority,	
8,750,000	Emory University, Series A, 5.0%, 10/1/43	9,664,813
	Total Georgia	\$17,274,235
	Guam - 0.4%	
	Guam Department of Education, Certificates of Participation,	
1,000,000	John F. Kennedy High School, Series A, 6.625%, 12/1/30	\$1,021,720
	Total Guam	\$1,021,720
Principal Amount USD (\$)		Value
	Idaho - 0.7%	
	Power County Industrial Development Corp., FMC Corp. Project, 6.45%, 8/1/32	
2,000,000	Total Idaho	\$2,007,320
	Illinois - 2.8%	



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1,000,000(b)	Chicago Board of Education, Series A, 7.0%, 12/1/46 (144A) Illinois Finance Authority, Clare	\$1,160,290
417,400(f)	Oaks Project, Series B, 4.0%, 11/15/52 Illinois Finance Authority, Clare	359,724
261,000(c)	Oaks Project, Series C-1, 11/15/52 Illinois Finance Authority, Clare	7,217
52,200	Oaks Project, Series C-2, 4.0%, 11/15/52 Illinois Finance Authority, Clare	15,203
52,200	Oaks Project, Series C-3, 11/15/52 Illinois Finance Authority,	8,821
1,450,000	Memorial Health System, 5.5%, 4/1/39 Illinois Finance Authority, Northwestern	1,461,701
2,000,000(d)	Memorial Hospital, Series A, 6.0%, 8/15/39 Illinois Finance Authority,	2,051,240
280,000(d)	Swedish Covenant, Series A, 6.0%, 8/15/38 Metropolitan Pier & Exposition Authority,	292,586
1,000,000	McCormick Place, Series B, 5.0%, 6/15/52 (ST APPROP Insured)	1,012,920

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1,210,000	Southwestern Illinois Development Authority, Village of Sauget Project, 5.625%, 11/1/26	1,140,062
	Total Illinois	\$7,509,764
250,000	Indiana - 0.9% City of Carmel, Barrington Carmel Project, Series A, 7.0%, 11/15/32	\$236,635
750,000	City of Carmel, Barrington Carmel Project, Series A, 7.125%, 11/15/42	679,748
500,000	City of Carmel, Barrington Carmel Project, Series A, 7.125%, 11/15/47	447,855
1,000,000	Indiana Finance Authority, Educational Facilities, 5.125%, 7/1/37	954,580
	Total Indiana	\$2,318,818
	Kansas - 0.4% Kansas Development Finance Authority, Hayes Medical Center, Inc., Series Q, 5.0%, 5/15/35	\$1,011,760
1,000,000(d)	Total Kansas	\$1,011,760
7,000,000	Louisiana - 2.7% Jefferson Parish Hospital Service District No. 2, East Jefferson General Hospital, 6.375%, 7/1/41	\$6,671,770

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750,000	Opelousas Louisiana General Hospital Authority, Opelousas	751,103
	General Health System Project, 5.75%, 10/1/23	
	Total Louisiana	\$7,422,873
	Maine - 2.0%	
1,500,000	Maine Health & Higher Educational Facilities Authority,	\$1,645,890
	Maine General Medical Center, 7.5%, 7/1/32	
3,500,000	Maine Turnpike Authority, Series A, 5.0%, 7/1/42	3,774,015
	Total Maine	\$5,419,905
	Maryland - 3.9%	
2,000,000(d)	Maryland Health & Higher Educational Facilities Authority,	\$2,167,420
	Charlestown Community, 6.25%, 1/1/45	
2,090,000	Maryland Health & Higher Educational Facilities Authority, City Neighbors, Series A, 6.75%, 7/1/44	2,228,672
1,250,000(d)	Maryland Health & Higher Educational Facilities Authority, Doctor's Community Hospital, 5.75%, 7/1/38	1,321,525
4,500,000	Maryland Health & Higher	4,818,060

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	Educational Facilities Authority, Maryland University Medical System, Series A, 5.0%, 7/1/43	
	Total Maryland	\$10,535,677
	Massachusetts - 9.8%	
	Massachusetts Bay	
7,000,000(c)	Transportation Authority, Series A, 7/1/28 Massachusetts Development	\$5,172,300
2,575,000(d)	Finance Agency, Broad Institute, Inc., Series A, 5.25%, 4/1/37 Massachusetts Development	2,768,897
2,200,000	Finance Agency, Partner's Healthcare System, Series M-4, 5.0%, 7/1/39 Massachusetts Development	2,365,506
8,000,000	Finance Agency, WGBH Foundation, Series A, 5.75%, 1/1/42 (AMBAC Insured) Massachusetts Health & Educational Facilities Authority, Massachusetts Institute of Technology, Series K, 5.5%, 7/1/32	10,578,640
4,325,000	Total Massachusetts Michigan - 3.0%	5,733,177
	Total	\$26,618,520

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	Flint Michigan Hospital Building Authority,	\$2,116,080
2,000,000	Hurley Medical Center, 7.375%, 7/1/35 Michigan Public Educational Facilities Authority,	560,224
560,000	Crescent Academy, 7.0%, 10/1/36 Michigan State University, Series A, 5.0%, 8/15/41	5,427,950
5,000,000	Total Michigan	\$8,104,254
	Minnesota - 2.7%	
	Bloomington Port Authority, Radisson Blu Mall of America, 9.0%, 12/1/35	\$2,173,620
2,000,000	City of Ham Lake, DaVinci Academy, Series A, 5.0%, 7/1/47	960,400
1,000,000	State of Minnesota, Series B, 4.0%, 8/1/27	4,202,070
3,755,000(b)	Total Minnesota	\$7,336,090
	Montana - 0.1%	
	City of Hardin, Tax Allocation, Rocky Mountain Power, Inc., Project, 6.25%, 9/1/31	\$317,850
2,445,000(e)	Two Rivers Authority, Inc., 7.375%, 11/1/27	42,000
1,000,000(e)	Total Montana	\$359,850
	Nevada - 0.7%	
2,000,000	County of Washoe, Fuel Tax, 5.0%,	\$2,005,140

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	2/1/43	
	Total Nevada	\$2,005,140
	New Hampshire	
	- 0.7%	
	New Hampshire	
	Health &	
	Education	
2,000,000	Facilities	\$1,950,920
	Authority Act,	
	Catholic	
	Medical Centre,	
	3.75%, 7/1/40	
	Total New	\$1,950,920
	Hampshire	
Principal		
Amount		
USD (\$)		Value
	New Jersey -	
	9.8%	
	New Jersey	
	Economic	
	Development	
7,500,000	Authority,	\$8,214,075
	Continental	
	Airlines, 5.75%,	
	9/15/27	
	New Jersey	
	Economic	
	Development	
	Authority,	
1,000,000	Marion P.	960,960
	Thomas Charter	
	School, Inc.,	
	Project, 5.375%,	
	10/1/50 (144A)	
	New Jersey State	
	Turnpike	
3,500,000(f)	Authority, RIB,	5,696,705
	10.729%, 1/1/28	
	(144A) (AGM	
	Insured)	
	New Jersey	
	Transportation	
	Trust Fund	
15,375,000(c)	Authority,	11,746,961
	12/15/27	
	(BHAC-CR	
	MBIA Insured)	
	Total New Jersey	\$26,618,701
	New York - 9.1%	

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5,000,000	New York State Dormitory Authority, Columbia University, 5.0%, 10/1/41	\$5,287,850
7,500,000	New York State Dormitory Authority, Series A, 4.0%, 7/1/37	7,862,550
7,500,000	New York State Dormitory Authority, Series C, 5.0%, 3/15/39	8,316,000
1,500,000	New York State Dormitory Authority, Trustees of Columbia University, 5.0%, 10/1/45	1,953,825
1,308,828	Westchester County Healthcare Corp., Series A, 5.0%, 11/1/44	1,393,274
500,000	Total New York North Carolina - 0.7% City of Charlotte, Airport Revenue, Series A, 5.0%, 7/1/42	\$24,813,499 \$568,870
1,250,000	City of Charlotte, Airport Revenue, Series A, 5.0%, 7/1/47	1,418,188
3,000,000(d)	Total North Carolina Ohio - 6.7% Akron Bath Copley Joint Township Hospital District, Akron General Health System, 5.0%, 1/1/31	\$1,987,058 \$3,246,660
2,500,000	Buckeye Tobacco Settlement Financing	2,371,850

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	Authority, Asset-Backed, Series A-2, 5.875%, 6/1/47 Buckeye Tobacco Settlement Financing	9,920,237
9,945,000	Authority, Asset-Backed, Series A-2, 6.5%, 6/1/47 State of Ohio, Common Schools, Series B, 5.0%, 6/15/29	2,754,950
2,500,000(b)(d)	Total Ohio Oregon - 1.2% Oregon Health & Science University, Series A, 5.0%, 7/1/42	\$18,293,697
1,000,000	Oregon State Facilities Authority, Samaritan Health Services, Series A, 5.25%, 10/1/40	\$1,133,750
2,000,000	Total Oregon Pennsylvania - 8.6% Chester County Industrial Development Authority, Collegium Charter School, Series A, 5.25%, 10/15/47	\$3,214,090
1,000,000	Pennsylvania Economic Development Financing Authority, US Airways Group, Series B, 8.0%, 5/1/29	\$1,005,920
1,965,000	Pennsylvania Economic Development	2,095,810
5,000,000		5,000,150



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	Financing Authority, USG Corp. Project, 6.0%, 6/1/31 Pennsylvania Turnpike	
1,555,000(d)	Commission, Series D, 5.3%, 12/1/41 Pennsylvania Turnpike	1,602,365
3,445,000(d)	Commission, Series D, 5.3%, 12/1/41 Philadelphia Authority for Industrial Development, Greater Philadelphia Health Action, Inc., Project, Series A, 6.625%, 6/1/50 Philadelphia Authority for Industrial Development, Nueva Esperanze, Inc., 8.2%, 12/1/43 Philadelphia Authority for Industrial Development, Performing Arts Charter School Project, 6.5%, 6/15/33 (144A) Philadelphia Authority for Industrial Development, Performing Arts Charter School Project, 6.75%, 6/15/43 (144A)	3,553,104
500,000	Philadelphia Authority for Industrial Development, Greater Philadelphia Health Action, Inc., Project, Series A, 6.625%, 6/1/50 Philadelphia Authority for Industrial Development, Nueva Esperanze, Inc., 8.2%, 12/1/43 Philadelphia Authority for Industrial Development, Performing Arts Charter School Project, 6.5%, 6/15/33 (144A) Philadelphia Authority for Industrial Development, Performing Arts Charter School Project, 6.75%, 6/15/43 (144A)	512,125
6,000,000	Philadelphia Authority for Industrial Development, Performing Arts Charter School Project, 6.5%, 6/15/33 (144A) Philadelphia Authority for Industrial Development, Performing Arts Charter School Project, 6.75%, 6/15/43 (144A)	6,551,400
1,000,000	Philadelphia Authority for Industrial Development, Performing Arts Charter School Project, 6.5%, 6/15/33 (144A) Philadelphia Authority for Industrial Development, Performing Arts Charter School Project, 6.75%, 6/15/43 (144A)	1,033,140
2,000,000	Philadelphia Authority for Industrial Development, Performing Arts Charter School Project, 6.75%, 6/15/43 (144A)	2,064,400
	Total Pennsylvania Puerto Rico - 1.3%	\$23,418,414

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6,500,000(b)(e)	Commonwealth of Puerto Rico, Series A, 8.0%, 7/1/35	\$3,493,750
	Total Puerto Rico	\$3,493,750
	Rhode Island - 1.9%	
	Central Falls Detention Facility Corp., 7.25%, 7/15/35	\$243,900
1,355,000(e)	Rhode Island Health & Educational Building Corp., Brown University, Series A, 4.0%, 9/1/37	3,152,370
3,000,000	Rhode Island Health & Educational Building Corp., Tockwatten Home Issue, 8.375%, 1/1/46	1,687,620
1,500,000(d)	Total Rhode Island	\$5,083,890
	South Carolina - 2.2%	
	Tobacco Settlement Revenue Management Authority, Series B, 6.375%, 5/15/30	\$5,852,132
4,400,000(g)	Total South Carolina	\$5,852,132
	South Dakota - 1.5%	
	South Dakota Health & Educational Facilities Authority, Sanford Health, Series B, 4.0%, 11/1/44	\$4,016,360
4,000,000	Total South Dakota	\$4,016,360
	Tennessee - 2.0%	

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	Johnson City Health & Educational Facilities Board,	\$5,336,550
5,000,000(d)	Mountain States Health Alliance, 6.5%, 7/1/38 Total Tennessee	\$5,336,550
	Texas - 16.9% Arlington Higher Education Finance Corp.,	\$1,021,070
1,000,000	Universal Academy, Series A, 7.0%, 3/1/34 Arlington Higher Education Finance Corp.,	
1,500,000	Universal	1,523,985
	Academy, Series A, 7.125%, 3/1/44 Central Texas Regional Mobility Authority, Sub	2,730,525
2,500,000(d)	Lien, 6.75%, 1/1/41 County of Harris, Series A, 5.0%, 10/1/26	2,914,275
2,500,000(b)	Goose Creek Consolidated Independent School District, Series C, 4.0%, 2/15/26 (PSF-GTD Insured)	5,418,050
5,000,000(b)	Grand Parkway Transportation Corp., Series A, 5.5%, 4/1/53 Gulf Coast Industrial Development Authority,	27
2,663,453(e)	Microgy Holdings Project, 7.0%, 12/1/36	
3,000,000		3,235,620

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	Houston Higher Education Finance Corp., St. John's School Project, Series A, 5.0%, 9/1/38 North Texas Tollway Authority, Series A, 5.0%, 1/1/30	3,767,598
3,355,000	Red River Health Facilities Development Corp., MRC	1,747,650
1,500,000(d)	Crestview, Series A, 8.0%, 11/15/41 Richardson Independent School District, School Building, 5.0%, 2/15/38 (PSF-GTD Insured)	2,192,740
2,000,000(b)	Sanger Industrial Development Corp., Texas Pellets Project, Series B, 8.0%, 7/1/38	2,672,640
6,960,000+(e)		

Principal  
Amount  
USD (\$)

Value

	Texas - (continued) Tarrant County Cultural Education Facilities Finance Corp.,	\$493,480
1,000,000(e)	Mirador Project, Series A, 4.875%, 11/15/48	
750,000(e)	Tarrant County Cultural Education Facilities Finance Corp., Mirador	370,125

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	Project, Series A, 5.0%, 11/15/55 Texas Midwest Public Facility Corp., Secure Treatment Facility	230,000
1,000,000(e)	Project, 9.0%, 10/1/30 Texas Private Activity Bond Surface Transportation Corp., NTE	3,892,329
3,365,000	Mobility Partners LLC, 7.0%, 12/31/38 Travis County Health Facilities Development Corp.,	2,749,275
2,500,000(d)	Longhorn Village Project, 7.125%, 1/1/46 Tyler Independent School District, School	5,481,850
5,000,000(b)	Building, 5.0%, 2/15/38 (PSF-GTD Insured) Total Texas Utah - 2.3%	\$45,937,687
5,000,000	County of Utah, IHC Health Services, Inc., Series B, 4.0%, 5/15/47 Salt Lake City Corp., Airport	\$5,047,950
1,000,000	Revenue, Series B, 5.0%, 7/1/36 Total Utah	1,140,140 \$6,188,090

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	Virginia - 8.5%	
2,275,000(b)	County of Arlington, 4.0%, 8/15/35	\$2,432,271
2,000,000(d)	County of Washington, Industrial Development Authority, Mountain States Health Alliance, Series C, 7.75%, 7/1/38	2,000,000
4,550,000	Tobacco Settlement Financing Corp., Series B-1, 5.0%, 6/1/47	4,339,653
5,000,000	University of Virginia, Multi Year Capital Project, Series A, 4.0%, 8/1/48	5,193,600
5,000,000	University of Virginia, Series A, 5.0%, 4/1/42	5,737,200
3,000,000	Virginia Public School Authority Revenue, 4.0%, 8/1/25 (ST AID WITHHLDG Insured)	3,288,570
	Total Virginia	\$22,991,294
	Washington - 4.3%	
3,000,000	City of Seattle, Water System Revenue, 4.0%, 8/1/32	\$3,224,880
2,500,000(b)	King County, Issaquah School District No. 411, 4.0%, 12/1/31 (SCH	2,678,700

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	BD GTY Insured) University of Washington, Series B, 5.0%, 6/1/29	2,895,325
2,500,000	Washington State Health Care Facilities Authority,	
1,500,000(d)	Kadlec Regional Medical Center, 5.5%, 12/1/39	1,600,845
	Washington State Housing Finance Commission, Mirabella Project, Series A, 6.75%, 10/1/47 (144A)	1,172,226
1,100,000	Total Washington Wisconsin - 3.9%	\$11,571,976
	Public Finance Authority, Glenridge	
5,000,000	Palmer Ranch, Series A, 8.25%, 6/1/46 (144A)	\$5,599,100
	Public Finance Authority, Roseman University Health Sciences Project, 5.875%, 4/1/45	792,165
750,000	Public Finance Authority, SearStone CCRC Project, Series A, 5.3%, 6/1/47	941,310
1,000,000	Public Finance Authority, SearStone	1,788,432
1,490,000(d)		

CCRC Project,  
 Series A,  
 8.625%, 6/1/47  
 Wisconsin  
 Health &  
 Educational  
 Facilities  
 1,500,000(d) Authority, Pro 1,508,490  
 Healthcare,  
 Inc., Group,  
 6.625%,  
 2/15/39  
 Total \$10,629,497  
 Wisconsin  
 TOTAL TAX EXEMPT  
 OBLIGATIONS  
 (Cost \$416,799,260  
 \$405,338,196)  
 TOTAL INVESTMENTS IN  
 UNAFFILIATED ISSUERS -  
 155.8%  
 (Cost \$422,541,260  
 \$411,080,196)  
 OTHER  
 ASSETS AND  
 LIABILITIES \$8,582,797  
 - 3.2%  
 VARIABLE  
 RATE  
 MUNIFUND \$(159,987,460)  
 TERM  
 PREFERRED  
 SHARES AT REDEMPTION  
 VALUE - (59.0)%  
 NET ASSETS  
 APPLICABLE \$271,136,597  
 TO  
 COMMON SHAREOWNERS  
 - 100.0%

(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 December 31, 2018, the value of these securities amounted to \$30,526,517, or 11.3% of net assets applicable to common shareowners.

RIB Residual Interest Bond is purchased in a secondary market. The interest rate is subject to change periodically and inversely based upon prevailing market rates. The interest rate shown is the rate at December 31, 2018.

AGM Assured Guarantee Corp.

AMBAC Ambac Assurance Corp.

Berkshire Hathaway Assurance Corp.



BHAC-CR

MBIA

NATL National Public Finance Guarantee Corp.

PSF-GTD Permanent School Fund Guaranteed

SCH-BD GTY School Bord Guaranty

ST AID

WITHHLDG State Aid Witholding

ST APPROP State Appropriations

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

^ Security is valued using fair value methods (other than supplied by independent pricing services).

(a) Consists of Revenue Bonds unless otherwise indicated.

(b) Represents a General Obligation Bond.

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

Prerefunded bonds have been collateralized by U.S. Treasury or U.S. Government Agency securities which are (d) held in escrow to pay interest and principal on the tax exempt issue and to retire the bonds in full at the earliest refunding date.

(e) Security is in default.

(f) The interest rate is subject to change periodically. The interest rate and/or reference index and spread shown at December 31, 2018.

(g) Escrow to maturity.

Various inputs are used in determining the value of the Trust's investments. These inputs are summarized in the three broad levels below.

Level 1 - quoted prices in active markets for identical securities.

Level 2 - other significant observable inputs (including quoted prices for similar securities, interest rates, prepayment speeds, credit risks, etc.).

Level 3 - significant unobservable inputs (including the Trust's own assumptions in determining fair value of investments).

The following is a summary of the inputs used as of December 31, 2018, in valuing the Trust's investments.

	Level	Level 2	Level 3	Total
	1			
Debtor In Possession Financing	\$ --	\$5,742,000	\$--	\$5,742,000
Tax Exempt Obligation				
Texas	--	43,265,047	2,672,640	45,937,687
All Other Tax Exempt Obligation	--	370,861,573		370,861,573
Total Investments in Securities	\$ --	\$419,868,620	\$2,672,640	\$422,541,260

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

	Tax
	Exempt
	Obligation
Balance as of 3/31/18	\$2,610,000
Realized gain (loss)	--

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Change in unrealized appreciation (depreciation)	65,012
Accrued discounts/premiums	(2,372 )
Purchases	--
Sales	--
Transfers in to Level 3*	--
Transfers out of Level 3*	--
Balance as of 12/31/18	\$2,672,640

\*Transfers are calculated on the beginning of period value. During nine months ended December 31, 2018 there were no transfers between Levels 1, 2 and 3.

Net change in unrealized appreciation (depreciation) of Level 3 investments still held and considered Level 3 at December 31, 2018: \$65,012

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ITEM 2. CONTROLS AND PROCEDURES.

(a) Disclose the conclusions of the registrant's principal executive and principal financial officers, or persons performing similar functions, regarding the effectiveness of the registrant's disclosure controls and procedures (as defined in Rule 30a-3(c) under the Act (17 CFR 270.30a-3(c))) as of a date within 90 days of the filing date of the report that includes the disclosure required by this paragraph, based on the evaluation of these controls and procedures required by Rule 30a-3(b) under the Act (17 CFR 270.30a-3(b)) and Rule 13a-15(b) or 15d-15(b) under the Exchange Act (17 CFR 240.13a-15(b) or 240.15d-15(b)).

The registrant's principal executive officer and principal financial officer have concluded that the registrant's disclosure controls and procedures are effective based on their evaluation of these controls and procedures as of a date within 90 days of the filing date of this report.

(b) Disclose any change in the registrant's internal controls over financial reporting (as defined in Rule 30a-3(d) under the Act (17 CFR 270.30a-3(d))) that occurred during the registrant's last fiscal quarter that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting.

There were no significant changes in the registrant's internal control over financial reporting that occurred during the second fiscal quarter of the period covered by this report that have materially affected, or are reasonably likely to materially affect, the registrant's internal control over financial reporting.

ITEM 3. EXHIBITS.

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

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CERTIFICATIONS

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

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

Date: [Signature] [Title]

Filed herewith.

SIGNATURES

[See General Instruction F]

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

(Registrant) Pioneer Municipal High Income Advantage Trust

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

Lisa M. Jones, President and Chief Executive Officer

Date March 1, 2019

Pursuant to the requirements of the Securities Exchange Act of 1934 and the Investment Company Act of 1940, this report has been signed below by the following persons on behalf of the registrant and in the capacities and on the dates indicated.

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

Lisa M. Jones, President and Chief Executive Officer

Date March 1, 2019

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

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

Date March 1, 2019

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