

PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST

Form N-Q

February 29, 2012

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 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: December 31, 2011

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.

Principal Amount USD \$	S&P / Moody's Ratings	Value
TAX-EXEMPT OBLIGATIONS — 141.5% OF NET ASSETS		
ALABAMA — 1.4%		
2,500,000	B-/B2	Alabama Industrial Development Authority Revenue, 6.45%, 12/1/23 \$ 2,210,475
2,500,000	NR/NR	Huntsville-Redstone Village Special Care Facilities Financing Authority, 5.5%, 1/1/43 1,901,325
\$ 4,111,800		
ARIZONA — 3.4%		
5,000,000	NR/NR	Casa Grande Industrial Development Authority Hospital Revenue, 7.625%, 12/1/29 \$ 5,003,300
2,640,000	NR/NR	Pima County Industrial Development Authority, 7.0%, 1/1/38 2,484,214
1,492,000	NR/Baa3	Pima County Industrial Development Authority, 6.75%, 7/1/31 1,465,845
1,000,000	NR/NR	San Luis Facility Development Corp., 7.25%, 5/1/27 905,270
\$ 9,858,629		
CALIFORNIA — 13.7%		
1,000,000	NR/NR	California Enterprise Development Authority Recovery Zone Facility Revenue, 8.5%, 4/1/31 \$ 1,046,070
3,140,000(a)	AA+/NR	California State University Revenue, RIB, 11.087%, 9/20/28 (144A) 3,525,372
2,425,000	A-/A1	California State Various Purpose, 5.75%, 4/1/31 2,717,261
8,575,000(a)	AA+/NR	California State Various Purpose, RIB, 11.031%, 7/28/31 (144A) 9,250,453
3,000,000	BB+/NR	3,062,760

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		California Statewide Communities Development Authority, 7.25%, 10/1/38 (144A)	
757,342(b)	NR/NR	California Statewide Communities Development Authority, 9.0%, 12/1/38	7,339
2,680,000†	AA+/Aaa	Golden State Tobacco Securitization Corp., 6.75%, 6/1/39	2,919,136
1,500,000	A-/NR	Madera Irrigation Financing Authority Water Revenue, 6.5%, 1/1/40	1,612,125
1,500,000	A-/NR	Madera Irrigation Financing Authority Water Revenue, 6.25%, 1/1/31	1,599,000
2,500,000	A-/A2	San Jose California Airport Revenue, 5.0%, 3/1/37	2,511,125
10,500,000(a)	AA+/NR	University of California, RIB, 11.304%, 5/15/32	11,255,580
			\$ 39,506,221
1,000,000	NR/NR	COLORADO — 0.4% Kremmling Memorial Hospital District, 7.125%, 12/1/45	\$ 1,022,750
7,750,000	NR/NR	CONNECTICUT — 3.1% Connecticut State Development Authority Revenue, 5.75%, 11/1/37	\$ 7,772,475
1,000,000	NR/NR	Hamden Connecticut Facility Revenue, 7.75%, 1/1/43	1,046,610
			\$ 8,819,085
2,700,000	BBB/Baa1	DISTRICT OF COLUMBIA — 3.4% District of Columbia Tobacco Settlement Financing Corp., 6.5%, 5/15/33	\$ 2,844,396
6,825,000	BBB/Baa1	District of Columbia Tobacco Settlement Financing Corp., 6.75%, 5/15/40	6,841,243
			\$ 9,685,639
1,500,000	NR/NR	FLORIDA — 5.0% Alachua County Health Facilities Authority Revenue, 8.125%, 11/15/41	\$ 1,499,445
1,500,000	NR/NR	Alachua County Health Facilities Authority Revenue, 8.125%, 11/15/46	1,499,430
1,000,000	NR/Ba3	Capital Trust Agency Revenue Bonds, 7.75%, 1/1/41	1,037,050

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1,000,000	NR/NR	Florida Development Finance Corp., Educational Facilities Revenue, 7.75%, 6/15/42	1,001,110
2,000,000	NR/NR	Florida Development Finance Corp., Educational Facilities Revenue, 7.625%, 6/15/41	2,059,840
1,000,000	NR/NR	Florida Development Finance Corp., Educational Facilities Revenue, 6.0%, 9/15/40	951,400
1,980,000	NR/NR	Hillsborough County Industrial Development Authority Revenue, 6.75%, 7/1/29	1,901,236
1,000,000†	NR/NR	Hillsborough County Industrial Development Authority Revenue, 8.0%, 8/15/32	1,448,230
500,000	NR/NR	Miami Beach Health Facilities Authority, 5.375%, 11/15/28	489,925
2,500,000	A-/A2	Miami-Dade County Florida Aviation Revenue, 5.5%, 10/1/41	2,649,000
			\$ 14,536,666
		GEORGIA — 4.8%	
5,210,000(a)	NR/Aa3	Atlanta Georgia Water and Wastewater Revenue, RIB, 11.087%, 1/30/13 (144A)	\$ 5,491,809
1,000,000	CCC+/NR	Clayton County Development Authority Special Facilities Revenue, 9.0%, 6/1/35	1,077,080
900,000	NR/NR	DeKalb County Georgia Hospital Authority Revenue, 6.0%, 9/1/30	947,736
750,000	NR/NR	DeKalb County Georgia Hospital Authority Revenue, 6.125%, 9/1/40	771,495
1,065,000	NR/Baa3	Effingham County Industrial Development Authority, 6.5%, 6/1/31	1,068,685
3,360,000	NR/NR	Fulton County Residential Care Facilities, 7.0%, 7/1/29	2,910,633
1,650,000	NR/NR	Savannah Georgia Economic Development Authority Revenue, 7.4%, 1/1/34	1,586,112
			\$ 13,853,550
		GUAM — 2.0%	
1,000,000	B/NR	Guam Government of Department Education Certificates of Participation, 6.625%, 12/1/30	\$ 1,029,550
4,400,000†	AA+/NR	Northern Mariana Islands, 6.75%, 10/1/33	4,888,312

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			\$	5,917,862
		IDAHO — 1.2%		
2,000,000	BBB+/Baa1	Power County Industrial Development Corp., 6.45%, 8/1/32	\$	2,001,820
1,500,000	BBB+/Baa1	Power County Pollution Control Revenue, 5.625%, 10/1/14		1,500,165
			\$	3,501,985
		ILLINOIS — 6.8%		
1,450,000	A+/A1	Illinois Finance Authority Revenue, 5.5%, 4/1/39	\$	1,492,645
2,000,000	AA-/Aa3	Illinois Finance Authority Revenue, 6.0%, 8/15/25		2,115,640
1,000,000(b)	NR/NR	Illinois Finance Authority Revenue, 6.0%, 11/15/27		519,870
280,000	BBB+/NR	Illinois Finance Authority Revenue, 6.0%, 8/15/38		287,577
2,000,000	AA+/Aa2	Illinois Finance Authority Revenue, 6.0%, 8/15/39		2,217,560
2,500,000	NR/NR	Illinois Finance Authority Revenue, 6.125%, 11/15/25		2,287,250
6,000,000	NR/NR	Illinois Finance Authority Revenue, 8.25%, 5/15/45		5,985,540
2,500,000	NR/NR	Illinois Finance Authority Revenue, 8.25%, 2/15/46		2,520,875
1,500,000(b)	NR/NR	Illinois Health Facilities Authority Revenue, 6.9%, 11/15/33		524,835
2,310,000	NR/NR	Southwestern Illinois Development Authority Revenue, 5.625%, 11/1/26		1,715,937
			\$	19,667,729
		INDIANA — 2.2%		
250,000	NR/Baa3	East Chicago Indiana Exempt Facilities Revenue, 7.0%, 1/1/14	\$	244,310
5,000,000	NR/Baa3	Jasper County Industrial Economic Development Revenue, 5.6%, 4/1/29		4,999,550
1,900,000	NR/NR	Vincennes Industrial Economic Development Revenue, 6.25%, 1/1/24		1,142,033
			\$	6,385,893
		KANSAS — 0.3%		
1,000,000	NR/A2	Kansas Development Finance Authority, 5.0%, 5/15/35	\$	1,010,390
		KENTUCKY — 1.4%		
4,390,000	BB/NR	Kentucky Economic Development Finance Authority	\$	4,104,518

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		Hospital System Revenue, 5.875%, 10/1/22	
		LOUISIANA — 7.1%	
5,000,000	BBB-/Baa2	Jefferson Parish Hospital Service Revenue, 6.375%, 7/1/41	\$ 5,130,650
2,500,000	BBB-/Baa3	Louisiana Local Government Environmental Facilities Development Authority Revenue, 6.75%, 11/1/32	2,639,300
6,000,000	NR/Baa1	Louisiana Public Facilities Authority Revenue, 5.5%, 5/15/47	6,018,120
750,000	BBB-/NR	Opelousas Louisiana General Hospital Authority Revenue, 5.75%, 10/1/23	771,293
5,915,000	A-/A3	Tobacco Settlement Financing Corp., 5.875%, 5/15/39	5,917,011
			\$ 20,476,374
		MAINE — 0.6%	
1,500,000	NR/Baa3	Maine Health & Higher Educational Facilities Authority Revenue, 7.5%, 7/1/32	\$ 1,663,470
		MARYLAND — 1.6%	
460,000	NR/NR	Maryland Health & Higher Educational Facilities Authority Revenue, 5.25%, 1/1/27	\$ 392,435
1,250,000	NR/NR	Maryland Health & Higher Educational Facilities Authority Revenue, 5.3%, 1/1/37	946,963
1,250,000	NR/Baa3	Maryland Health & Higher Educational Facilities Authority Revenue, 5.75%, 7/1/38	1,166,512
2,000,000	NR/NR	Maryland Health & Higher Educational Facilities Authority Revenue, 6.25%, 1/1/45	2,125,820
			\$ 4,631,730
		MASSACHUSETTS — 8.7%	
675,000	BB/NR	Massachusetts Development Finance Agency, 5.25%, 10/1/18	\$ 662,175
1,885,000	NR/NR	Massachusetts Development Finance Agency, 7.1%, 7/1/32	1,648,904
8,000,000	A/NR	Massachusetts Development Finance Agency, 5.75%, 1/1/42	9,173,760
1,000,000	NR/Caa1	Massachusetts Health & Educational Facilities Authority Revenue, 6.0%, 10/1/23	769,280
2,195,000	BBB-/Baa3	Massachusetts Health & Educational Facilities Authority Revenue, 5.375%, 7/15/28	2,126,033

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3,420,000(b)	NR/NR	Massachusetts Health & Educational Facilities Authority Revenue, 6.5%, 1/15/38	34,200
10,760,000	AA-/Aa3	Massachusetts Housing Finance Agency, 5.35%, 12/1/45	10,769,361
			\$ 25,183,713
		MICHIGAN — 1.7%	
2,000,000	NR/Ba1	Flint Michigan Hospital Building Authority Revenue, 7.375%, 7/1/35	\$ 2,071,640
2,235,000	BB+/NR	Kent Hospital Finance Authority Revenue, Metropolitan Hospital PJ-Series A, 6.25%, 7/1/40	2,201,386
725,000	NR/NR	Michigan Public Educational Facilities Authority Revenue, 7.0%, 10/1/36	675,156
			\$ 4,948,182
		MINNESOTA — 0.4%	
1,000,000	NR/NR	Port Authority of the City of Bloomington, Minnesota Recovery Zone Facility Revenue, 9.0%, 12/1/35	\$ 1,033,680
		MISSOURI — 1.2%	
1,000,000	NR/NR	Kansas City Tax Increment Financing Commission Tax Increment Revenue, 6.5%, 6/1/25	\$ 1,014,840
1,500,000(b)(c)	NR/Ca	St. Louis Industrial Development Authority Revenue, 7.2%, 12/15/28	449,985
6,640,000(b)(c)	NR/Ca	St. Louis Industrial Development Authority Revenue, 7.25%, 12/15/35	1,991,934
			\$ 3,456,759
		MONTANA — 0.7%	
2,445,000(d)	NR/NR	Hardin Increment Industrial Infrastructure Development Revenue, 0.0%, 9/1/31	\$ 1,774,116
1,000,000(b)(c)	NR/NR	Two Rivers Authority, Inc., Project Revenue, 7.375%, 11/1/27	139,810
			\$ 1,913,926
		NEVADA — 1.5%	
1,320,000(b)(c)	NR/NR	Director of the State of Nevada State Department of Business & Industry, 7.375%, 1/1/40	\$ 1,584
1,600,000(b)(c)	NR/NR	Nevada State Department of Business & Industry, 7.25%,	1,920

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		1/1/23	
1,000,000(b)(c)	NR/NR	Nevada State Department of Business & Industry, 7.375%, 1/1/30	1,200
4,500,000	A-/A3	Reno Nevada Hospital Revenue, 5.25%, 6/1/41	4,433,490
			\$ 4,438,194
1,125,000	NR/NR	NEW HAMPSHIRE — 0.4% New Hampshire Health & Educational Facilities Authority Revenue, 5.875%, 7/1/34	\$ 1,132,234
2,500,000	NR/NR	NEW JERSEY — 13.1% Burlington County New Jersey Bridge Commission Revenue, 5.625%, 1/1/38	\$ 2,288,500
13,000,000	B/B3	New Jersey Economic Development Authority Revenue, 6.25%, 9/15/29	12,532,520
3,500,000(a)	NR/Aa3	New Jersey State Turnpike Authority, RIB, 8.746%, 7/1/23 (144A)	5,381,355
15,375,000	AA+/Aa1	New Jersey Transportation Trust Fund Authority Revenue, 0.01%, 12/15/27	7,546,050
3,250,000†	AA+/Aaa	Tobacco Settlement Financing Corp., 6.75%, 6/1/39	3,548,642
5,000,000†	AA+/Aaa	Tobacco Settlement Financing Corp., 7.0%, 6/1/41	5,476,400
1,000,000†	AA+/Aaa	Tobacco Settlement Financing Corp., 6.25%, 6/1/43	1,084,810
			\$ 37,858,277
1,730,000	NR/NR	NEW YORK — 10.2% Dutchess County Industrial Development Agency, 7.5%, 3/1/29	\$ 1,726,090
3,000,000	NR/NR	Nassau County New York Industrial Development Agency Revenue, 6.7%, 1/1/43	2,301,990
5,000,000	BB-/B1	New York City Industrial Development Agency, 5.25%, 12/1/32	3,952,050
3,950,000	BB-/B1	New York City Industrial Development Agency, 7.625%, 12/1/32	3,906,945
3,000,000	NR/C	New York City Industrial Development Agency, 8.0%, 8/1/12	2,735,430
2,000,000	NR/Ba1	New York State Dormitory Authority Revenue, 6.125%,	2,015,780

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		12/1/29	
5,000,000	AAA/Aaa	New York State Dormitory Authority Revenue,, 5.0%, 10/1/41	5,609,200
5,000,000	AAA/Aaa	New York State Environmental Facilities Corp., 5.0%, 6/15/33	5,206,200
2,000,000	BB/NR	Seneca Nation Indians Capital Improvement Authority Revenue, 5.25%, 12/1/16 (144A)	1,881,460
			\$ 29,335,145
5,010,000	NR/NR	NORTH CAROLINA — 1.7% Charlotte North Carolina Special Facilities Revenue, 7.75%, 2/1/28	\$ 5,016,613
5,000,000	BB-/B3	OHIO — 1.4% Buckeye Tobacco Settlement Financing Authority, 6.5%, 6/1/47	\$ 3,939,100
2,220,000(b)	NR/NR	OKLAHOMA — 1.4% Tulsa Municipal Airport Revenue, 6.25%, 6/1/20	\$ 1,644,110
3,000,000(b)	NR/NR	Tulsa Municipal Airport Trust Revenue, 7.75%, 6/1/35	2,269,830
			\$ 3,913,940
2,000,000	A-/NR	OREGON — 0.7% Oregon State Facilities Authority Revenue, 5.25%, 10/1/40	\$ 2,067,880
3,600,000	CC/NR	PENNSYLVANIA — 5.4% Columbia County Hospital Authority Revenue, 5.85%, 6/1/24	\$ 3,413,880
710,000	BBB+/Baa3	Hazleton Health Services Authority Hospital Revenue, 6.125%, 7/1/16	711,384
1,000,000	BB/NR	Pennsylvania Economic Development Financing Authority Revenue, 5.125%, 6/1/18	947,780
5,000,000	B-/Caa2	Pennsylvania Economic Development Financing Authority Solid Waste Disposal Revenue, 6.0%, 6/1/31	3,834,600
5,000,000	BBB-/Baa3	Philadelphia Hospitals & Higher Education Facilities Authority Revenue, 5.0%, 7/1/34	4,359,150
2,245,000	B-/NR	Scranton-Lackawanna Health & Welfare Authority Revenue, 6.15%, 7/1/12	2,238,445
			\$ 15,505,239

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1,385,000(c)	NR/NR	RHODE ISLAND — 3.7% Central Falls Rhode Island Detention Facilities Revenue, 7.25%, 7/15/35	\$ 1,089,081
1,500,000	NR/NR	Rhode Island Health & Educational Building Corp Revenue, 8.375%, 1/1/46	1,556,805
8,285,000	BBB/B1	Tobacco Settlement Financing Corp., 6.25%, 6/1/42	8,064,785
			\$ 10,710,671
7,140,000†	BBB+/Baa1	SOUTH CAROLINA — 5.1% South Carolina Jobs Economic Development Authority Revenue, 6.375%, 8/1/34	\$ 7,791,954
860,000†	BBB+/Baa1	South Carolina Jobs Economic Development Authority Revenue, 6.375%, 8/1/34	940,685
4,400,000(e)	BBB/NR	Tobacco Settlement Revenue Management, 6.375%, 5/15/30	5,908,496
			\$ 14,641,135
1,000,000†	NR/A2	TENNESSEE — 5.8% Johnson City Health & Educational Facilities Board Hospital Revenue, 7.5%, 7/1/33	\$ 1,057,920
5,000,000	BBB+/Baa1	Johnson City Health & Educational Facilities Board Hospital Revenue, Mountain States Health Alliance, 6.5%, 7/1/38	5,388,700
7,000,000	NR/A1	Knox County Health Educational & Housing Facilities Board Hospital Revenue, Baptist Health System East Tennessee, 6.5%, 4/15/31	7,197,680
3,000,000	BBB+/NR	Sullivan County Health, Educational & Housing Facilities Board Hospital Revenue, 5.25%, 9/1/36	2,962,980
			\$ 16,607,280
2,400,000	BB+/Ba1	TEXAS — 13.2% Central Texas Regional Mobility Authority Revenue, 6.75%, 1/1/41	\$ 2,403,984
2,663,453(b)(c)	NR/NR	Gulf Coast Industrial Development Authority, 7.0%, 12/1/36	25,782
10,000,000	B-/B3	Houston Texas Airport System Special Facilities Revenue,	9,968,500

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		6.75%, 7/1/29	
1,000,000	NR/NR	IAH Public Facility Corp., Project Revenue Bonds, Series 2006, 6.0%, 5/1/21	862,380
1,350,000	NR/NR	IAH Public Facility Corp., Project Revenue Bonds, Series 2006, 6.125%, 5/1/26	1,116,140
725,000	NR/NR	IAH Public Facility Corp., Project Revenue Bonds, Series 2006, 6.0%, 5/1/16	686,611
510,000	AA-/Aa3	Lower Colorado River Authority, 5.0%, 5/15/31	518,721
2,240,000	AA-/Aa3	Lower Colorado River Authority, 5.0%, 5/15/31	2,248,310
2,000,000	NR/NR	Lubbock Health Facilities Development Corp., 6.625%, 7/1/36	1,889,960
845,000	NR/NR	Lubbock Health Facilities Development Corp., 6.5%, 7/1/26	820,343
9,750,000	BBB+/A3	North Texas Tollway Authority Revenue, 5.75%, 1/1/33	10,358,595
1,711,000	NR/Aaa	Panhandle Regional Housing Finance Corp. Multifamily Housing Revenue, 6.6%, 7/20/31	1,806,628
1,500,000	NR/NR	Red River Health Facilities Development Corp., Revenue, 8.0%, 11/15/41	1,504,845
1,000,000	A/Baa2	Richardson Hospital Authority Revenue, 6.0%, 12/1/34	1,013,290
1,000,000	NR/NR	Tarrant County Cultural Education Facilities Finance Corp., 8.125%, 11/15/39	1,005,490
1,500,000	NR/NR	Tarrant County Cultural Education Facilities Finance Corp., 8.25%, 11/15/44	1,512,255
1,000,000(b)(c)	D/NR	Texas Midwest Public Facility Corp., Revenue, 9.0%, 10/1/30	500,820
			\$ 38,242,654
		VIRGINIA — 0.8%	
2,000,000	BBB+/Baa1	Washington County Industrial Development Authority Revenue, 7.75%, 7/1/38	\$ 2,291,100
		WASHINGTON — 3.6%	
1,140,000	BBB/A3	Tobacco Settlement Authority Revenue, 6.5%, 6/1/26	\$ 1,166,858
2,000,000	BBB/Baa2	Washington State Health Care Facilities Authority, 6.125%, 8/15/37	2,046,040
2,000,000	BBB/Baa2	Washington State Health Care Facilities Authority, 6.25%,	2,048,280

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		8/15/42	
1,500,000	NR/Baa2	Washington State Health Care Facilities Authority, 5.5%, 12/1/39	1,464,390
5,000,000	NR/NR	Washington State Housing Finance Committee Nonprofit Revenue, 5.625%, 1/1/27	3,596,250
			\$ 10,321,818
750,000	NR/NR	WEST VIRGINIA — 0.3% West Virginia Hospital Finance Authority Hospital Revenue, 9.125%, 10/1/41	\$ 816,203
2,500,000	NR/NR	WISCONSIN — 2.1% Wisconsin Public Finance Authority Continuing Care Retirement Community Revenue, 8.25%, 6/1/46	\$ 2,592,375
1,500,000	A+/A1	Wisconsin State Health & Educational Facilities Authority Revenue, 6.625%, 2/15/39	1,636,980
1,000,000	NR/NR	Wisconsin State Health & Educational Facilities Authority Revenue, 6.125%, 4/1/24	1,001,690
1,000,000	NR/NR	Wisconsin State Health & Educational Facilities Authority Revenue, 6.25%, 4/1/34	973,540
			\$ 6,204,585
		TOTAL TAX-EXEMPT OBLIGATIONS (Cost \$393,453,743)	\$ 408,332,619
		MUNICIPAL COLLATERALIZED DEBT OBLIGATION — 3.1%	
13,000,000(c)	NR/NR	Non-Profit Preferred Funding Trust I, Series E, 12.0%, 9/15/37 (144A)	\$ 8,924,500
		TOTAL MUNICIPAL COLLATERALIZED DEBT OBLIGATION (Cost \$13,000,000)	\$ 8,924,500
Shares			Value
		COMMON STOCK - OF NET ASSETS — 0.3% TRANSPORTATION — 0.3% AIRLINES — 0.3%	
110,735(f)		Delta Air Lines, Inc.	\$ 895,846
		TOTAL COMMON STOCKS (Cost \$3,210,349)	\$ 895,846

		TAX-EXEMPT MONEY MARKET MUTUAL FUND — 2.1% OF NET ASSETS	
6,000,000	NR/NR	BlackRock Liquidity Funds	
		MuniFund Portfolio	\$ 6,000,000
		TOTAL TAX-EXEMPT MONEY MARKET MUTUAL FUND	
		(Cost \$6,000,000)	\$ 6,000,000
		TOTAL INVESTMENTS IN SECURITIES — 147.0%	
		(Cost \$415,664,092)(g)(h)	\$ 424,152,965
		OTHER ASSETS AND LIABILITIES — 5.0%	\$ 14,467,215
		PREFERRED SHARES AT REDEMPTION VALUE, INCLUDING DIVIDENDS PAYABLE — (52.0)%	\$(150,004,114)
		NET ASSETS APPLICABLE TO COMMON SHAREOWNERS — 100.0%	\$ 288,616,066

(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, 2011, the value of these securities amounted to \$37,517,709 or 13.0% of total net assets applicable to common shareowners.

NR Security not rated by S&P or Moody's

RIB Residual Interest Bonds

† 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.

(a) The interest rate is subject to change periodically and inversely based upon prevailing market rates. The interest rate shown is the coupon rate at December 31, 2011.

(b) Security is in default and is non-income producing.

(c) Indicates a security that has been deemed illiquid. The aggregate cost of illiquid securities is \$30,076,785. The aggregate fair value of \$13,126,616 represents 4.5% of the total net assets applicable to common shareowners.

(d) Debt obligation initially issued at one coupon which converts to a higher coupon at a specific date. The rate shown is the rate at December 31, 2011.

(e) Escrow to maturity.

(f) Non-income producing.

(g)

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

Insured:

FSA 8.2%

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AMBAC	2.7
BHAC-CR MBIA	1.8
AGM	1.5
Revenue Bonds:	
Health Revenue	36.9
Tobacco Revenue	10.3
Other Revenue	8.5
Development Revenue	7.8
Airport Revenue	5.9
Pollution Control Revenue	4.8
Education Revenue	3.7
Housing Revenue	2.9
Facilities Revenue	2.6
Water Revenue	2
Transportation Revenue	0.4
	100%

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

Insured:		
FSA	8.2	%
AMBAC	2.7	
BHAC-CR MBIA	1.8	
AGM	1.5	
Revenue Bonds:		
Health Revenue	36.9	
Tobacco Revenue	10.3	
Other Revenue	8.5	
Development Revenue	7.8	
Airport Revenue	5.9	
Pollution Control Revenue	4.8	
Education Revenue	3.7	
Housing Revenue	2.9	
Facilities Revenue	2.6	
Water Revenue	2	
Transportation Revenue	0.4	
	100	%

(h) At
December
31, 2011,
the net
unrealized
gain on
investments

based on
cost for
federal
income
tax
purposes
of
\$414,302,035
was as
follows:

Aggregate gross unrealized gain in which there is an excess of value over tax cost \$	39,554,529
Aggregate gross unrealized loss in which there is an excess of tax cost over value	(29,703,599)
 Net unrealized gain\$	 9,850,930

For financial reporting purposes net unrealized gain on investments was \$8,488,873 and cost of investments aggregated \$415,664,092.

Purchases and sales of securities (excluding temporary cash investments) for the period ended December 31, 2011 aggregated \$42,120,447 and \$55,310,358, respectively.

Various inputs are used in determining the value of the Trust's investments. These inputs are summarized in the three broad levels listed 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 risk, 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 are categorized as Level 3.

The following is a summary of the inputs used as of December 31, 2011, in valuing the Trust's investments:

	Level 1	Level 2	Level 3	Total
Tax-exempt obligations	\$—	\$408,332,619	\$—	\$408,332,619
Municipal collateralized debt obligation	—	8,924,500	—	8,924,500

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Common stock	895,846	—	—	895,846
Tax-exempt money market mutual fund	6,000,000	—	—	6,000,000
Total	\$6,895,846	\$417,257,119	\$—	\$424,152,965

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 February 29, 2012 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 February 29, 2012 By (Signature and Title)* /s/ Mark Bradley Mark Bradley, Treasurer Date February 29, 2012 * Print the name and title of each signing officer under his or her signature.