

PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST

Form N-Q

February 28, 2008

OMB APPROVAL

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

FORM N-Q

CERTIFIED SHAREHOLDER REPORT OF REGISTERED  
MANAGEMENT INVESTMENT COMPANIES

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, 2007

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 270.30b-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.

Pioneer Municipal High Income Advantage Trust  
SCHEDULE OF INVESTMENTS 12/31/07 (unaudited)

Principal Amount (\$)		Value
TAX-EXEMPT OBLIGATIONS - 137.8% of Net Assets		
Alaska - 1.3%		
3,875,000	(a) Alaska State Housing Finance Corp., RIB, 9.78%,	\$ 4,190,076
Arizona - 4.2%		
5,000,000	Casa Grande Industrial Development Authority, H	\$ 5,324,250
3,000,000	(a) Downtown Phoenix Hotel Corp., RIB, 6.253%, 7/1/	3,054,870
1,000,000	Pima County Industrial Development Authority, 6	1,018,090
1,551,000	Pima County Industrial Development Authority, 6	1,593,621
1,000,000+	Pima County Industrial Development Authority, 7	1,209,410
2,000,000	San Luis Facility Development Corp., 7.25%, 5/1	1,911,480
	\$	14,111,721
California - 7.7%		
2,680,000+	Golden State Tobacco Securitization Corp., 6.75	\$ 3,097,973
5,000,000	San Jose California Airport Revenue, 5.0%, 3/1/	5,163,000
9,520,000	(a) University of California, RIB, 6.601%, 5/15/38	10,525,788
9,015,000	Valley Health System Hospital Revenue, 6.875%,	6,882,051
	\$	25,668,812
Colorado - 2.1%		
2,850,000+	Denver Health & Hospital Authority Healthcare R	\$ 3,129,357
3,520,000+	Northwest Parkway Public Highway Authority, 7.1	3,969,539
	\$	7,098,896
District of Columbia - 2.1%		
2,700,000	District of Columbia Tobacco Settlement Financi	\$ 2,743,605
4,000,000	District of Columbia Tobacco Settlement Financi	4,085,800
	\$	6,829,405
Florida - 5.9%		
1,000,000	Greater Orlando Aviation Authority, 6.5%, 11/15	\$ 942,970
4,500,000	Hillsborough County Florida Industrial Development Authority	
Pollution	Control Revenue, 5.5%, 10/1/23	4,565,250
1,980,000	Hillsborough County Florida Industrial Development Authority	
Pollution	Control Revenue, 6.75%, 7/1/29	1,983,663
500,000	Miami Beach Health Facilities Authority, 5.375%	447,995
1,500,000	Miami Beach Health Facilities Authority, 6.7%,	1,547,475
10,000,000	Miami-Dade County Aviation Revenue, 5.0%, 10/1/	10,148,000
	\$	19,635,353
Georgia - 2.1%		
4,000,000	(a) Atlanta Georgia Water and Wastewater Revenue, R	\$ 4,319,320
1,065,000	Effingham County Industrial Development Authori	1,027,746
1,650,000	Savannah Georgia Economic Development Authority	1,683,842
	\$	7,030,908
Guam - 2.5%		
3,000,000	Northern Mariana Islands, 5.0%, 6/1/30	\$ 2,680,200
4,600,000+	Northern Mariana Islands, 6.75%, 10/1/33	5,368,660
400,000	Northern Mariana Islands, 6.75%, 10/1/33	422,504
	\$	8,471,364
Idaho - 2.4%		
2,000,000	Power County Industrial Development Corp., 6.45	\$ 2,043,460
5,920,000	Power County Pollution Control Revenue, 5.625%	5,994,592

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		\$	8,038,052
	Illinois - 5.8%		
4,000,000	Centerpoint Intermodal Center, 8.0%, 6/15/23 (1	\$	3,870,040
1,100,000	Illinois Finance Authority Revenue, 5.5%, 5/15/		1,001,583
1,850,000	Illinois Finance Authority Revenue, 5.75%, 5/15		1,679,393
1,000,000	Illinois Finance Authority Revenue, 6.0%, 11/15		956,360
3,000,000	Illinois Finance Authority Revenue, 6.0%, 11/15		2,814,270
1,645,000	Illinois Health Facilities Authority Revenue, 5		1,545,165
1,265,000	Illinois Health Facilities Authority Revenue, 6		1,265,721
2,400,000	Illinois Health Facilities Authority Revenue, 6		2,401,368
1,500,000	Illinois Health Facilities Authority Revenue, 6		1,321,095
2,700,000	Southwestern Illinois Development Authority Rev		2,576,178
		\$	19,431,173
	Indiana - 4.9%		
10,000,000	Indiana State Development Finance Authority Rev	\$	10,072,600
5,000,000	Jasper County Industrial Economic Development R		4,330,150
2,170,000	Vincennes Industrial Economic Development Reven		2,070,744
		\$	16,473,494
	Kentucky - 1.4%		
500,000	Kentucky Economic Development Finance Authority	\$	496,320
4,400,000	Kentucky Economic Development Finance Authority		4,252,292
		\$	4,748,612
	Louisiana - 2.9%		
750,000	Opelousas Louisiana General Hospital Authority	\$	774,023
9,415,000	Tobacco Settlement Financing Corp., 5.875%, 5/1		9,043,578
		\$	9,817,601
	Maryland - 0.5%		
710,000	Maryland Health & Higher Educational Facilities	\$	633,490
1,250,000	Maryland Health & Higher Educational Facilities		1,084,125
		\$	1,717,615
	Massachusetts - 7.3%		
5,000,000	Massachusetts Bay Transportation Authority Reve	\$	5,618,600
2,195,000	Massachusetts Health & Educational Facilities A		2,090,123
1,000,000+	Massachusetts Health & Educational Facilities A		1,133,030
3,520,000(a)	Massachusetts State College Building Authority		3,867,389
900,000	Massachusetts State Development Finance Agency,		853,146
2,920,000	Massachusetts State Development Finance Agency,		2,878,770
4,625,000	Massachusetts State Development Finance Agency,		4,688,039
3,335,000(a)	Massachusetts State Housing Finance Agency, RIB		3,342,003
		\$	24,471,100
	Michigan - 3.7%		
1,650,000	Crescent Academy Project Full Term Certificates	\$	1,445,054
1,500,000+	Delta County Michigan Economic Development Corp		1,673,625
3,000,000	Macomb County Hospital Finance Authority Revenu		2,942,940
4,130,000	Michigan State Hospital Finance Authority Reven		3,754,583
1,000,000	Michigan State Strategic Fund Solid Waste Dispo		1,009,540
1,470,000	Star International Academy Full Term Certificat		1,407,584
3,405,000	Wayne Charter County Special Airport Facilities		-
		\$	12,233,326
	Missouri - 2.9%		
1,850,000	Kansas City Industrial Development Authority Re	\$	1,738,852
1,500,000	St. Louis Industrial Development Authority Reve		1,484,100
6,640,000	St. Louis Industrial Development Authority Reve		6,544,318
		\$	9,767,270
	Montana - 0.7%		
2,445,000(b)	Hardin Increment Industrial Infrastructure Deve	\$	1,657,808
1,000,000	Two Rivers Authority, Inc., Project Revenue, 7.		790,830
		\$	2,448,638
	Nevada - 1.4%		
2,425,000	Clark County Industrial Development Revenue, 5.	\$	2,183,810
1,600,000	Nevada State Department of Business & Industry,		1,513,152

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1,000,000	Nevada State Department of Business & Industry,	937,640
70,000	Nevada State Department of Business & Industry,	64,548
		\$ 4,699,150
	New Hampshire - 1.5%	
1,000,000	New Hampshire Health & Educational Facilities A	\$ 896,500
1,125,000	New Hampshire Health & Educational Facilities A	1,119,758
3,000,000+	New Hampshire Higher Educational & Health Facil	3,060,000
		\$ 5,076,258
	New Jersey - 9.4%	
2,500,000	Burlington County New Jersey Bridge Commission	\$ 2,305,275
13,000,000	New Jersey Economic Development Authority Reven	12,151,360
2,500,000	New Jersey Health Care Facilities Financing Aut	2,424,125
2,495,000 (a)	New Jersey State Turnpike Authority, RIB, 9.521	3,774,062
1,000,000+	Tobacco Settlement Financing Corp., 6.25%, 6/1/	1,137,860
3,250,000+	Tobacco Settlement Financing Corp., 6.75%, 6/1/	3,777,735
5,000,000+	Tobacco Settlement Financing Corp., 7.0%, 6/1/4	5,870,500
		\$ 31,440,917
	New York - 11.1%	
3,000,000	Dutchess County Industrial Development Agency R	\$ 3,181,680
5,000,000	Nassau County New York Industrial Development A	5,018,450
1,000,000	Nassau County New York Industrial Development A	1,000,000
6,980,000	New York City Industrial Development Agency, 5.	5,812,735
2,000,000	New York City Industrial Development Agency, 5.	1,933,800
2,000,000	New York City Industrial Development Agency, 6.	2,001,500
3,950,000	New York City Industrial Development Agency, 7.	4,149,277
2,400,000	New York City Industrial Development Agency, 7.	2,405,424
5,000,000	New York State Environmental Facilities Corp.,	5,148,900
4,500,000	Suffolk County New York Industrial Development	3,792,915
500,000	Ulster County New York Industrial Development A	468,475
2,000,000	Yonkers Industrial Development Agency Civic Fac	1,995,340
		\$ 36,908,496
	North Carolina - 5.2%	
11,350,000	Charlotte North Carolina Special Facilities Rev	\$ 10,144,743
7,140,000	Charlotte North Carolina Special Facilities Rev	7,336,921
		\$ 17,481,664
	Ohio - 2.2%	
3,800,000	Belmont County Health System Revenue, 5.7%, 1/1	\$ 3,762,646
1,000,000	Belmont County Health System Revenue, 5.8%, 1/1	954,050
3,000,000	Cleveland Airport Special Revenue, 5.375%, 9/15	2,601,300
		\$ 7,317,996
	Oklahoma - 1.7%	
1,875,000	Jackson County Memorial Hospital Authority Reve	\$ 1,883,588
2,220,000	Tulsa Municipal Airport Transportation Revenue,	2,149,204
1,500,000	Tulsa Municipal Airport Transportation Revenue,	1,500,840
		\$ 5,533,632
	Pennsylvania - 8.8%	
3,000,000+	Allegheny County Hospital Development Authority	\$ 3,539,280
500,000 +	Allegheny County Hospital Development Authority	589,880
1,000,000	Clarion County Hospital Authority Revenue, 5.62	1,001,250
3,600,000	Columbia County Hospital Authority Revenue, 5.8	3,207,204
3,110,000 (c)	Delaware County Industrial Development Authorit	2,352,124
1,155,000	Hazleton Health Services Authority Hospital Rev	1,161,803
3,360,000	Montgomery County Higher Education & Health Aut	3,393,667
1,430,000	Pennsylvania Economic Development Financing Aut	1,375,774
1,805,000	Pennsylvania Economic Development Financing Aut	1,796,047
2,330,000	Pennsylvania Economic Development Financing Aut	2,316,276
5,000,000	Philadelphia Hospitals & Higher Education Facil	4,425,000
2,005,000	Scranton-Lackawanna Health & Welfare Authority	2,015,807
2,245,000	Scranton-Lackawanna Health & Welfare Authority	2,257,101
		\$ 29,431,213
	Rhode Island - 3.9%	
4,485,000	Central Falls Rhode Island Detention Facilities	\$ 4,800,699

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8,285,000	Tobacco Settlement Financing Corp., 6.25%, 6/1/	8,306,541
		\$ 13,107,240
	South Carolina - 5.9%	
1,500,000	Connector 2000 Association, Inc., Toll Road Rev	\$ 1,213,560
1,600,000	Loris Community Hospital District, 5.625%, 1/1/	1,601,520
7,140,000+	South Carolina Jobs Economic Development Author	8,199,933
860,000 +	South Carolina Jobs Economic Development Author	985,319
3,000,000+	South Carolina Jobs Economic Development Author	3,430,950
4,400,000	Tobacco Settlement Revenue Management, 6.375%,	4,407,392
		\$ 19,838,674
	Tennessee - 2.5%	
1,000,000+	Johnson City Health & Educational Facilities Bo	\$ 1,193,660
7,000,000	Knox County Health Educational & Housing Facili	7,152,600
		\$ 8,346,260
	Texas - 14.9%	
8,650,000	Brazos River Authority Pollution Control Revenu	\$ 8,313,861
4,000,000	Brazos River Authority Pollution Control Revenu	4,137,080
7,350,000	Gulf Coast Industrial Development Authority, 7.	7,055,485
10,000,000	Houston Texas Airport System Special Facilities	10,103,900
1,000,000	IAH Public Facility Corp., Project Revenue Bond	973,110
1,000,000	IAH Public Facility Corp., Project Revenue Bond	952,330
1,350,000	IAH Public Facility Corp., Project Revenue Bond	1,268,595
845,000	Lubbock Health Facilities Development Corp., 6.	847,374
2,000,000	Lubbock Health Facilities Development Corp., 6.	2,010,480
7,750,000	Matagorda County Navigation District Number 1 R	7,576,167
5,000,000	Tomball Hospital Authority, 6.0%, 7/1/25	5,069,100
1,500,000(d)	Willacy County Local Government Corp., 6.0%, 3/	1,527,195
		\$ 49,834,677
	Utah - 0.5%	
1,600,000	Spanish Fork Charter School Revenue, 5.7%, 11/1	\$ 1,485,696
	Washington - 7.0%	
5,500,000	Port Seattle Washington Special Facilities Reve	\$ 5,617,590
1,345,000	Tobacco Settlement Authority Revenue, 6.5%, 6/1	1,388,780
6,960,000(a)	Washington State Economic Development Finance A	7,689,965
2,000,000	Washington State Health Care Facilities Authori	1,953,120
2,000,000	Washington State Health Care Facilities Authori	1,952,800
5,000,000	Washington State Housing Finance Commission Non	4,692,250
		\$ 23,294,505
	Wisconsin - 1.4%	
3,000,000	Aztalan Wisconsin Exempt Facilities Revenue, 7.	\$ 2,715,690
1,000,000	Wisconsin State Health & Educational Facilities	1,003,740
1,000,000	Wisconsin State Health & Educational Facilities	964,930
		\$ 4,684,360
	TOTAL TAX-EXEMPT OBLIGATIONS	
	(Cost \$439,847,066)	\$ 460,664,154
	MUNICIPAL COLLATERALIZED DEBT OBLIGATION - 3.8% of Net Assets	
13,000,000	Non-Profit Preferred Funding Trust I, Series E,	\$ 12,637,690
	TOTAL MUNICIPAL COLLATERALIZED DEBT OBLIGATION	
	(Cost \$13,000,000)	\$ 12,637,690
Shares	COMMON STOCK - 0.3% of Net Assets	
80,678	Northwest Airlines Corp.	\$ 1,170,638
	TOTAL COMMON STOCK	
	(Cost \$3,210,349)	\$ 1,170,638
	TAX-EXEMPT MONEY MARKET	
	MUTUAL FUND - 0.0% of Net Assets	

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45,820	BlackRock Liquidity Funds MuniFund Portfolio	\$	45,820
	TOTAL TAX-EXEMPT MONEY MARKET MUTUAL FUND (Cost \$45,820)	\$	45,820
	TOTAL INVESTMENTS IN SECURITIES - 141.9% (Cost \$456,103,235) (e) (f)	\$	474,518,302
	OTHER ASSETS AND LIABILITIES - 3.0%	\$	9,824,103
	PREFERRED SHARES AT REDEMPTION VALUE, INCLUDING DIVIDENDS PAYABLE - (44.9)%	\$	(150,009,450)
	NET ASSETS APPLICABLE TO COMMON SHAREOWNERS - 100.0%	\$	334,332,955

(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, 2007, the value of these securities amounted to \$47,390,455, or 14.2% of total net assets applicable to common shareowners.

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 rate at December 31, 2007.

(b) 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, 2007.

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

(d) Escrow to maturity.

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

Insured	12.5%
General Obligation	5.3
Revenue Bonds:	
Health Revenue	26.6
Development Revenue	11.3
Airport Revenue	10.3
Tobacco Revenue	9.3
Facilities Revenue	6.7
Transportation Revenue	6.1
Pollution Control Revenue	6.1
Housing Revenue	1.7
Other Revenue	1.4
Education Revenue	1.3
Water Revenue	1.1
Power Revenue	0.3
	100.0%

(f) At December 31, 2007, the net unrealized gain on

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investments based on cost for federal income tax purposes of \$452,460,201 was as follows:

Aggregate gross unrealized gain for all investments in which there is an excess of value over tax c	\$	32,158,575
Aggregate gross unrealized loss for all investments in which there is an excess of tax cost over va		(10,100,474)
Net unrealized gain	\$	22,058,101

For financial reporting purposes net unrealized gain on investments was \$18,415,067 and cost of investments aggregated \$456,103,235.

### ITEM 2. CONTROLS AND PROCEDURES.

(a) Disclose the conclusions of the registrant's principal executive officer or officers and principal financial officer or officers, or persons performing similar functions, about 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 their 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 under the Act (17 CFR 270.30a-2).

Filed herewith.

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/ John F. Cogan, Jr.  
John F. Cogan, Jr, President

Date February 29, 2008

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, 2008

By (Signature and Title)\* /s/ Vincent Nave  
Vincent Nave, Treasurer

Date February 29, 2008

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