

PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST

Form N-Q

August 28, 2007

OMB APPROVAL

OMB Number: 3235-0578

Expires: April 30, 2010

Estimated average burden  
hours per response.....

10.5

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: June 30, 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 6/30/07 (unaudited)

Principal Amount		Value
	TAX-EXEMPT OBLIGATIONS - 135.0% of Net Assets	
	Alaska - 1.2%	
3,875,000	(a) Alaska State Housing Finance Corp., RIB, 10.596%, 6\$	4,264,748
	Arizona - 4.1%	
5,000,000	Casa Grande Industrial Development Authority, Hospi\$	5,488,450
3,000,000	(a) Downtown Phoenix Hotel Corp., RIB, 7.305%, 7/1/40 (1	3,206,820
1,000,000	Pima County Industrial Development Authority, 6.3%,	1,064,590
1,551,000	Pima County Industrial Development Authority, 6.75%,	1,648,418
1,000,000	+ Pima County Industrial Development Authority, 7.5%,	1,181,850
2,000,000	San Luis Facility Development Corp., 7.25%, 5/1/27	2,014,800
		\$14,604,928
	California - 6.3%	
2,680,000	+ Golden State Tobacco Securitization Corp., 6.75%, 6\$	3,068,144
9,520,000	(a) University of California, RIB, 7.481%, 5/15/38 (144A10,	10,361,187
9,015,000	Valley Health System Hospital Revenue, 6.875%, 5/15/	9,027,982
		\$22,457,313
	Colorado - 1.9%	
2,850,000	Denver Health & Hospital Authority Healthcare Reven\$	3,071,644
3,520,000	Northwest Parkway Public Highway Authority, 7.125%,	3,750,560
		\$ 6,822,204
	District of Columbia - 2.1%	
2,700,000	District of Columbia Tobacco Settlement Financing C\$	3,194,694
4,000,000	District of Columbia Tobacco Settlement Financing Co	4,350,360
		\$ 7,545,054
	Florida - 5.6%	
1,000,000	Greater Orlando Aviation Authority, 6.5%, 11/15/36	\$ 1,048,830
4,500,000	Hillsborough County Florida Industrial Development Authority	
Pollution	Control Revenue, 5.5%, 10/1/23	4,669,830
1,980,000	Hillsborough County Florida Industrial Development Authority	
Pollution	Control Revenue, 6.75%, 7/1/29	2,015,640
500,000	Miami Beach Health Facilities Authority, 5.375%, 11/	502,110
1,500,000	Miami Beach Health Facilities Authority, 6.7%, 11/15	1,615,785
10,000,000	Miami-Dade County Aviation Revenue, 5.0%, 10/1/37	10,225,100
		\$20,077,295
	Georgia - 2.0%	
4,000,000	(a) Atlanta Georgia Water and Wastewater Revenue, RIB,	\$ 4,290,040
1,065,000	Effingham County Industrial Development Authority, 6	1,117,462
1,650,000	Savannah Georgia Economic Development Authority Reve	1,787,297
		\$ 7,194,799
	Guam - 2.4%	
3,000,000	Northern Mariana Islands, 5.0%, 6/1/30	\$ 2,931,840
5,000,000	Northern Mariana Islands, 6.75%, 10/1/33	5,609,900
		\$ 8,541,740
	Idaho - 2.3%	
2,000,000	Power County Industrial Development Corp., 6.45%, 8\$	2,107,940
5,920,000	Power County Pollution Control Revenue, 5.625% 10/1/	6,052,312
		\$ 8,160,252
	Illinois - 5.9%	

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4,000,000	Centerpoint Intermodal Center, 8.0%, 6/15/23 (144A)	\$ 4,080,160
1,100,000	Illinois Finance Authority Revenue, 5.5%, 5/15/26	1,111,957
1,850,000	Illinois Finance Authority Revenue, 5.75%, 5/15/38	1,891,125
1,000,000	Illinois Finance Authority Revenue, 6.0%, 11/15/27	1,042,880
3,000,000	Illinois Finance Authority Revenue, 6.0%, 11/15/39	3,112,980
1,645,000	Illinois Health Facilities Authority Revenue, 5.5%,	1,645,543
1,265,000	Illinois Health Facilities Authority Revenue, 6.7%,	1,265,202
2,400,000	Illinois Health Facilities Authority Revenue, 6.75%,	2,399,856
1,500,000	Illinois Health Facilities Authority Revenue, 6.9%,	1,643,340
2,700,000	Southwestern Illinois Development Authority Revenue,	2,715,363
		\$20,908,406
	Indiana - 4.9%	
10,000,000	Indiana State Development Finance Authority Revenue	\$10,287,300
5,000,000	Jasper County Industrial Economic Development Revenue	5,036,500
2,245,000	Vincennes Industrial Economic Development Revenue,	6 2,254,002
		\$17,577,802
	Kentucky - 1.4%	
500,000	Kentucky Economic Development Finance Authority Hos	\$ 505,645
4,400,000	Kentucky Economic Development Finance Authority Hosp	4,437,312
		\$ 4,942,957
	Louisiana - 3.0%	
750,000	Opelousas Louisiana General Hospital Authority Reve	\$ 778,733
9,415,000	Tobacco Settlement Financing Corp., 5.875%, 5/15/39	9,984,137
		\$10,762,870
	Maryland - 0.6%	
710,000	Maryland Health & Higher Educational Facilities Aut	\$ 710,000
1,250,000	Maryland Health & Higher Educational Facilities Auth	1,250,000
		\$ 1,960,000
	Massachusetts - 7.0%	
5,000,000	Massachusetts Bay Transportation Authority Revenue,	\$ 5,523,550
2,195,000	Massachusetts Health & Educational Facilities Author	2,216,994
1,000,000	+ Massachusetts Health & Educational Facilities Author	1,107,790
3,520,000	(a) Massachusetts State College Building Authority Proje	3,832,858
900,000	Massachusetts State Development Finance Agency, 5.25	880,488
2,920,000	Massachusetts State Development Finance Agency, 6.0%	2,964,618
4,625,000	Massachusetts State Development Finance Agency, 7.1%	4,800,426
3,335,000	(a) Massachusetts State Housing Finance Agency, RIB, 8.2	3,538,902
		\$24,865,626
	Michigan - 4.5%	
1,650,000	Crescent Academy Project, 5.75%, 12/1/36	\$ 1,671,978
3,000,000	+ Delta County Michigan Economic Development Corp., 6.	3,286,140
3,000,000	Macomb County Hospital Finance Authority Revenue, 5.	3,155,010
4,130,000	Michigan State Hospital Finance Authority Revenue, 5	4,056,114
1,000,000	Michigan State Strategic Fund Solid Waste Disposal R	1,017,780
3,000,000	(b) Wayne Charter County Michigan Special Airport Facili	2,945,820
3,405,000	Wayne Charter County Special Airport Facilities Reve	0
		\$16,132,842
	Missouri - 2.8%	
1,850,000	Kansas City Industrial Development Authority Revenu	\$ 1,828,262
1,500,000	St. Louis Industrial Development Authority Revenue,	1,515,660
6,640,000	St. Louis Industrial Development Authority Revenue,	6,718,485
		\$10,062,407
	Montana - 0.7%	
2,445,000	(c) Hardin Increment Industrial Infrastructure Developm	\$ 1,582,355
1,000,000	Two Rivers Authority, Inc., Project Revenue, 7.375%	1,022,360
		\$ 2,604,715
	Nevada - 2.1%	
2,425,000	Clark County Industrial Development Revenue, 5.5%,	\$ 2,366,679
2,500,000	Clark County Industrial Development Revenue, 5.9%,	1 2,500,775
1,600,000	Nevada State Department of Business & Industry, 7.25	1,667,600
1,000,000	Nevada State Department of Business & Industry, 7.37	1,045,110
70,000	Nevada State Department of Business & Industry, 7.37	73,124

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		\$ 7,653,288
	New Hampshire - 1.5%	
1,000,000	New Hampshire Health & Educational Facilities Autho	\$ 1,037,440
1,125,000	New Hampshire Health & Educational Facilities Author	1,167,503
3,000,000	+ New Hampshire Higher Educational & Health Facilities	3,090,570
		\$ 5,295,513
	New Jersey - 8.4%	
13,000,000	New Jersey Economic Development Authority Revenue,	\$13,401,960
2,500,000	New Jersey Health Care Facilities Financing Authorit	2,555,250
2,495,000	(a) New Jersey State Turnpike Authority, RIB, 9.442%, 1/	3,574,786
1,000,000	+ Tobacco Settlement Financing Corp., 6.25%, 6/1/43	1,117,010
3,250,000	+ Tobacco Settlement Financing Corp., 6.75%, 6/1/39	3,715,173
5,000,000	+ Tobacco Settlement Financing Corp., 7.0%, 6/1/41	5,778,100
		\$30,142,279
	New York - 10.6%	
3,000,000	Dutchess County Industrial Development Agency Reven	\$ 3,301,260
5,000,000	Nassau County New York Industrial Development Agency	5,106,850
6,980,000	New York City Industrial Development Agency, 5.25%,	6,824,486
2,000,000	New York City Industrial Development Agency, 5.375%,	2,066,780
2,000,000	New York City Industrial Development Agency, 6.9%, 8	2,010,020
3,950,000	New York City Industrial Development Agency, 7.625%,	4,341,840
2,500,000	New York City Industrial Development Agency, 7.8%, 1	2,531,775
5,000,000	New York State Environmental Facilities Corp., 5.0%,	5,132,000
4,500,000	Suffolk County New York Industrial Development Agenc	4,532,040
2,000,000	Yonkers Industrial Development Agency Civic Faciliti	2,004,560
		\$37,851,611
	North Carolina - 5.3%	
11,350,000	Charlotte North Carolina Special Facilities Revenue	\$11,335,018
7,140,000	Charlotte North Carolina Special Facilities Revenue,	7,567,258
		\$18,902,276
	Ohio - 2.1%	
3,800,000	Belmont County Health System Revenue, 5.7%, 1/1/13	\$ 3,724,608
1,000,000	Belmont County Health System Revenue, 5.8%, 1/1/18	969,450
3,000,000	Cleveland Airport Special Revenue, 5.375%, 9/15/27	2,955,750
		\$7,649,808
	Oklahoma - 1.6%	
2,045,000	Jackson County Memorial Hospital Authority Revenue,	\$ 2,055,695
2,220,000	Tulsa Municipal Airport Transportation Revenue, 6.25	2,219,734
1,500,000	Tulsa Municipal Airport Transportation Revenue, 7.35	1,502,565
		\$ 5,777,994
	Pennsylvania - 8.2%	
4,000,000	Allegheny County Hospital Development Authority Rev	\$ 3,958,320
3,000,000	Allegheny County Hospital Development Authority Reve	3,540,030
500,000	Allegheny County Hospital Development Authority Reve	590,005
1,000,000	Clarion County Hospital Authority Revenue, 5.625%, 7	1,013,250
3,600,000	Columbia County Hospital Authority Revenue, 5.85%, 6	3,311,208
3,200,000	Delaware County Industrial Development Authority Rev	2,573,440
1,155,000	Hazleton Health Services Authority Hospital Revenue,	1,172,683
3,360,000	Montgomery County Higher Education & Health Authorit	3,396,590
1,430,000	Pennsylvania Economic Development Financing Authorit	1,401,271
1,805,000	Pennsylvania Economic Development Financing Authorit	1,807,491
2,330,000	Pennsylvania Economic Development Financing Authorit	2,333,635
2,005,000	Scranton-Lackawanna Health & Welfare Authority Reven	2,046,203
2,245,000	Scranton-Lackawanna Health & Welfare Authority Reven	2,291,112
		\$29,435,238
	Rhode Island - 3.9%	
4,485,000	Central Falls Rhode Island Detention Facilities Rev	\$ 4,978,529
8,285,000	Tobacco Settlement Financing Corp., 6.25%, 6/1/42	8,918,388
		\$13,896,917
	South Carolina - 5.7%	
1,500,000	Connector 2000 Association, Inc., Toll Road Revenue	\$ 1,365,210
1,600,000	Loris Community Hospital District, 5.625%, 1/1/29	1,634,368

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7,140,000	+ South Carolina Jobs Economic Development Authority R	8,003,012
860,000	+ South Carolina Jobs Economic Development Authority R	961,738
3,000,000	+ South Carolina Jobs Economic Development Authority R	3,412,380
4,400,000	Tobacco Settlement Revenue Management, 6.375%, 5/15/	5,084,728
		\$20,461,436
	Tennessee - 2.3%	
1,000,000	Johnson City Health & Educational Facilities Board \$	1,140,130
7,000,000	Knox County Health Educational & Housing Facilities	7,165,620
		\$ 8,305,750
	Texas - 14.9%	
8,650,000	Brazos River Authority Pollution Control Revenue, 6\$	9,368,036
4,000,000	Brazos River Authority Pollution Control Revenue, 7.	4,547,080
7,350,000	Gulf Coast Industrial Development Authority, 7.0%, 1	7,820,988
10,000,000	Houston Texas Airport System Revenue, 6.75%, 7/1/29	10,610,100
1,000,000	IAH Public Facility Corp., 6.0%, 5/1/16	992,140
1,000,000	IAH Public Facility Corp., 6.0%, 5/1/21	979,590
1,350,000	IAH Public Facility Corp., 6.125%, 5/1/26	1,337,512
845,000	Lubbock Health Facilities Development Corp., 6.5%, 7	880,304
2,000,000	Lubbock Health Facilities Development Corp., 6.625%,	2,092,860
7,750,000	Matagorda County Navigation District Number 1 Revenu	7,932,900
5,000,000	Tomball Hospital Authority, 6.0%, 7/1/25	5,142,450
1,500,000	Willacy County Local Government Corp., 6.0%, 3/1/09	1,509,285
		\$53,213,245
	Utah - 0.5%	
1,600,000	Spanish Fork Charter School Revenue, 5.7%, 11/15/36\$	1,621,216
	Virginia - 0.5%	
1,555,000	+ Pocahontas Parkway Association of Virginia Toll Roa\$	1,610,451
	Washington - 7.3%	
5,000,000	Port Seattle Washington Special Facilities Revenue,\$	5,097,650
5,500,000	(b)Port Seattle Washington Special Facilities Revenue,	6,599,120
1,355,000	Tobacco Settlement Authority Revenue, 6.5%, 6/1/26	1,484,213
6,960,000	(a)Washington State Economic Development Finance Author	7,548,677
5,000,000	Washington State Housing Finance Commission Nonprofi	5,119,750
		\$25,849,410
	Wisconsin - 1.4%	
3,000,000	Aztalan Wisconsin Exempt Facilities Revenue, 7.50%,\$	2,966,130
1,000,000	Wisconsin State Health & Educational Facilities Auth	1,044,510
1,000,000	Wisconsin State Health & Educational Facilities Auth	1,048,230
		\$ 5,058,870
	TOTAL TAX-EXEMPT OBLIGATIONS	
	(Cost \$437,665,918)	\$482,211,260
	MUNICIPAL COLLATERALIZED DEBT OBLIGATION - 3.6% of Net Assets	
13,000,000	Non-Profit Preferred Funding Trust I, Series E, 12.\$	12,994,410
	TOTAL MUNICIPAL COLLATERALIZED DEBT OBLIGATION	
	(Cost \$13,000,000)	\$12,994,410
	Shares	
70,513	COMMON STOCK - 0.5% of Net Assets	
	Northwest Airlines Corp.	\$ 1,565,389
	TOTAL COMMON STOCK	
	(Cost \$3,210,349)	\$ 1,565,389
	TAX-EXEMPT MONEY MARKET MUTUAL FUND - 0.2% of Net Assets	
827,442	BlackRock Liquidity Funds MuniFund Porfolio	\$ 827,442
	TOTAL TAX-EXEMPT MONEY MARKET MUTUAL FUND	
	(Cost \$827,442)	\$ 827,442

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TOTAL INVESTMENTS IN SECURITIES - 139.3%  
 (Cost \$454,703,710) (d) (e) \$497,598,501  
 OTHER ASSETS AND LIABILITIES - 2.7% \$ 9,781,514  
 PREFERRED SHARES AT REDEMPTION VALUE, INCLUDING DIV\$ (150,084,146)  
 NET ASSETS APPLICABLE TO COMMON SHAREOWNERS - 100.0% \$357,295,869

(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 June 30, 2007, the value of these securities amounted to \$62,206,656, or 17.4% of total net assets applicable to common shareowners.

RIB Residual Interest Bonds.

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

+ 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 June 30, 2007.

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

(c) Debt obligation initially issued at one coupon which converts to a higher coupon at a specific date. The rate shown is the rate at June 30, 2007.

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

Insured	12.1%
General Obligation	5.2
Revenue Bonds:	
Health Revenue	25.0
Development Revenue	11.9
Airport Revenue	11.4
Tobacco Revenue	9.4
Facilities Revenue	6.8
Pollution Control Revenue	6.5
Transportation Revenue	6.0
Other Revenue	1.6
Housing Revenue	1.7
Education Revenue	1.1
Water Revenue	1.0
Power Revenue	0.3
	100.0%

(e) At June 30, 2007, the net unrealized gain on investments based on cost for federal income tax purposes of \$451,535,356 was as follows:  
 Aggregate gross unrealized gain for all investments in which

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there is an excess of value over tax cost	\$49,562,990
Aggregate gross unrealized loss for all investments in which there is an excess of tax cost over value	(3,499,845)
Net unrealized gain	\$46,063,145

For financial reporting purposes net unrealized gain on  
investments was \$42,894,791  
and cost of investments aggregated \$454,703,710.

### 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

[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

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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 August 29, 2007

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 August 29, 2007

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

Date August 29, 2007

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