

PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST

Form N-Q

August 29, 2006

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: June 30, 2006

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 6/30/06 (unaudited)

Principal Amount (\$)		Value
	TAX-EXEMPT OBLIGATIONS - 141.7% of Net Assets	
	Alaska - 1.2%	
3,875,000	(a)Alaska State Housing Finance Corp., RIB, 10.069%, \$	4,370,884
	Arizona - 5.6%	
5,000,000	Casa Grande Industrial Development Authority, Hos \$	5,489,750
3,130,000	Coconino County Arizona Pollution Control Corp. R	
3,074,411		
1,615,000	Coconino County Arizona Pollution Control Corp. R	1,638,660
3,140,000	(a)Downtown Phoenix Hotel Corp., RIB, 6.806%, 7/1/40	3,169,202
1,000,000	Pima County Industrial Development Authority, 6.3	1,023,820
1,570,000	Pima County Industrial Development Authority, 6.7	1,628,467
1,000,000	+Pima County Industrial Development Authority, 7.5	
1,196,770		
2,000,000	San Luis Facility Development Corp., 7.25%, 5/1/2	2,004,620
	\$	19,225,700
	California - 6.6%	
2,680,000	Golden State Tobacco Securitization Corp., 6.75%, \$	2,999,536
9,520,000	(a)University of California, RIB, 6.972%, 5/15/38 (1	10,045,694
9,455,000	Valley Health System Hospital Revenue, 6.875%, 5	9,466,724
	\$	22,511,954
	Colorado - 1.8%	
2,850,000	Denver Health & Hospital Authority Healthcare Rev \$	2,973,946
3,650,000	Northwest Parkway Public Highway Authority, 7.125	
3,378,951		
	\$	6,352,897
	Connecticut - 0.7%	
3,000,000	Bridgeport Connecticut Senior Living Facilities R \$	2,516,790
	District of Columbia - 2.1%	
2,700,000	District of Columbia Tobacco Settlement Financing \$	3,035,340
4,000,000	District of Columbia Tobacco Settlement Financing	4,339,720
	\$	7,375,060
	Florida - 5.8%	
1,000,000	Greater Orlando Aviation Authority, 6.5%, 11/15/3 \$	1,039,670
4,500,000	Hillsborough County Florida Industrial Development Authority	
Pollution		
	Control Revenue, 5.5%, 10/1/23	4,603,185
2,000,000	Hillsborough County Florida Industrial Development Authority	
Pollution		
	Control Revenue, 6.75%, 7/1/29	2,025,740
500,000	Miami Beach Health Facilities Authority, 5.375%,	493,245
1,500,000	Miami Beach Health Facilities Authority, 6.7%, 11	1,633,905
10,000,000	Miami-Dade County Aviation Revenue, 5.0%, 10/1/37	10,101,000
	\$	19,896,745
	Georgia - 2.7%	
4,000,000	(a)Atlanta Georgia Water and Wastewater Revenue, RIB \$	4,088,040
2,500,000	Brunswick & Glynn County Development Authority Re	2,449,525
1,065,000	Effingham County Industrial Development Authority	
1,117,473		
1,650,000	Savannah Georgia Economic Development Authority R	1,712,964
	\$	9,368,002

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	Guam - 1.6%		
5,000,000	Northern Mariana Islands, 6.75%, 10/1/33	\$	5,531,750
	Idaho - 2.4%		
2,000,000	Power County Industrial Development Corp., 6.45%,	\$	2,126,880
5,920,000	Power County Pollution Control Revenue, 5.625% 10		6,032,835
		\$	8,159,715
	Illinois - 4.3%		
4,000,000	Centerpoint Intermodal Center, 8.0%, 6/15/23 (144	\$	4,013,400
1,000,000	Illinois Finance Authority Revenue, 6.0%, 11/15/2		
1,002,210			
3,000,000	Illinois Finance Authority Revenue, 6.0%, 11/15/3		2,972,400
1,645,000	Illinois Health Facilities Authority Revenue, 5.5		
1,515,094			
1,400,000	Illinois Health Facilities Authority Revenue, 6.7		1,399,944
2,400,000	Illinois Health Facilities Authority Revenue, 6.7		2,370,480
1,500,000	Illinois Health Facilities Authority Revenue, 6.9		1,627,290
		\$	14,900,818
	Indiana - 5.5%		
1,200,000	Indiana State Development Finance Authority Pollu	\$	1,226,652
10,000,000	Indiana State Development Finance Authority Reven		10,297,700
5,000,000	Jasper County Industrial Economic Development Rev		4,923,700
2,315,000	Vincennes Industrial Economic Development Revenue		2,301,365
		\$	18,749,417
	Kentucky - 1.4%		
500,000	Kentucky Economic Development Finance Authority H	\$	506,240
4,400,000	Kentucky Economic Development Finance Authority H		4,431,152
		\$	4,937,392
	Louisiana - 3.1%		
750,000	Opelousas Louisiana General Hospital Authority Re	\$	750,555
9,415,000	Tobacco Settlement Financing Corp., 5.875%, 5/15/		9,847,808
		\$	10,598,363
	Maryland - 0.4%		
1,500,000	Maryland Health & Higher Educational Facilities A	\$	1,509,210
	Massachusetts - 7.6%		
1,000,000	Lynn Massachusetts Water & Sewer Commission Gener	\$	1,014,820
5,000,000	Massachusetts Bay Transportation Authority Revenu		5,219,250
2,195,000	Massachusetts Health & Educational Facilities Aut		2,127,460
1,000,000	Massachusetts Health & Educational Facilities Aut		1,042,410
3,520,000	(a)Massachusetts State College Building Authority Pr		3,656,330
1,740,000	Massachusetts State Development Finance Agency, 5		1,599,391
2,920,000	Massachusetts State Development Finance Agency, 6		2,947,390
4,710,000	Massachusetts State Development Finance Agency, 7		4,874,238
3,475,000	(a)Massachusetts State Housing Finance Agency, RIB,		3,475,730
		\$	25,957,019
	Michigan - 4.4%		
3,000,000	+Delta County Michigan Economic Development Corp.,	\$	3,340,410
3,000,000	Macomb County Hospital Finance Authority Revenue,		3,152,520
4,130,000	Michigan State Hospital Finance Authority Revenue		3,948,858
1,000,000	Michigan State Strategic Fund Solid Waste Dispos		1,026,450
3,000,000	(b)Wayne Charter County Michigan Special Airport Fac		1,653,330
3,405,000	(b)Wayne Charter County Michigan Special Airport Fac		1,895,325
		\$	15,016,893
	Minnesota - 1.0%		
4,800,000	(b)Minneapolis/St. Paul Metropolitan Airports, 7.0%,	\$	3,368,256
	Missouri - 1.0%		
1,500,000	St. Louis Industrial Development Authority Revenu	\$	1,445,280
2,000,000	St. Louis Industrial Development Authority Revenu		1,927,340
		\$	3,372,620

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	Montana - 0.3%		
1,000,000	Two Rivers Authority, Inc., Project Revenue, 7.37 %	\$	965,860
	Nevada - 2.4%		
2,425,000	Clark County Industrial Development Revenue, 5.5%	\$	2,366,727
2,500,000	Clark County Industrial Development Revenue, 5.9%		2,500,350
1,600,000	Nevada State Department of Business & Industry, 7		1,659,104
1,000,000	Nevada State Department of Business & Industry, 7		1,040,640
500,000	Nevada State Department of Business & Industry, 7		518,265
		\$	8,085,086
	New Hampshire - 1.5%		
1,000,000	New Hampshire Health & Educational Facilities Aut	\$	1,020,510
1,125,000	New Hampshire Health & Educational Facilities Aut		1,143,067
3,000,000	+New Hampshire Higher Educational & Health Facilit		3,145,020
		\$	5,308,597
	New Jersey - 9.0%		
13,000,000	New Jersey Economic Development Authority Revenue	\$	13,298,220
2,500,000	New Jersey Health Care Facilities Financing Autho		2,537,850
1,420,000	New Jersey Health Care Facilities Financing Autho		1,421,789
2,495,000	(aNew Jersey State Turnpike Authority, RIB, 8.581%,		3,385,840
1,000,000	Tobacco Settlement Financing Corp., 6.25%, 6/1/43		1,078,370
3,250,000	Tobacco Settlement Financing Corp., 6.75%, 6/1/39		3,627,325
5,000,000	Tobacco Settlement Financing Corp., 7.0%, 6/1/41		5,669,200
		\$	31,018,594
	New York - 11.0%		
3,000,000	Dutchess County Industrial Development Agency Rev	\$	3,244,650
5,000,000	Nassau County New York Industrial Development Age		5,063,400
6,980,000	New York City Industrial Development Agency, 5.25		6,570,623
2,000,000	New York City Industrial Development Agency, 5.37		2,044,620
2,000,000	New York City Industrial Development Agency, 6.9%		2,000,640
3,950,000	New York City Industrial Development Agency, 7.62		4,438,971
2,700,000	New York City Industrial Development Agency, 7.8%		2,764,422
5,000,000	New York State Environmental Facilities Corp., 5.		5,091,000
4,500,000	Suffolk County New York Industrial Development Ag		4,458,420
2,000,000	Yonkers Industrial Development Agency Civic Facil		1,981,880
		\$	37,658,626
	North Carolina - 5.5%		
11,350,000	Charlotte North Carolina Special Facilities Reven	\$	11,137,074
7,140,000	Charlotte North Carolina Special Facilities Reven		7,642,585
		\$	18,779,659
	Ohio - 2.7%		
3,900,000	Belmont County Health System Revenue, 5.7%, 1/1/1	\$	3,786,783
1,000,000	Belmont County Health System Revenue, 5.8%, 1/1/1		950,890
5,000,000	Cleveland Airport Special Revenue, 5.375%, 9/15/2		4,576,950
		\$	9,314,623
	Oklahoma - 1.1%		
2,345,000	Jackson County Memorial Hospital Authority Revenu	\$	2,357,171
1,500,000	Tulsa Municipal Airport Transportation Revenue, 7		1,499,745
		\$	3,856,916
	Oregon - 4.2%		
5,900,000	Klamath Falls Electric Revenue, 5.75%, 1/1/13 (14	\$	5,252,062
8,000,000	Klamath Falls Electric Revenue, 6.0%, 1/1/25 (144		6,510,080
2,500,000	Western Generation Agency Cogeneration Project Re		2,508,425
		\$	14,270,567
	Pennsylvania - 6.7%		
3,000,000	Allegheny County Hospital Development Authority R	\$	3,551,070
500,000	Allegheny County Hospital Development Authority R		590,805
1,000,000	Clarion County Hospital Authority Revenue, 5.625%		1,004,240
3,735,000	Columbia County Hospital Authority Revenue, 5.85%		3,341,966
1,250,000	Hazleton Health Services Authority Hospital Reven		1,229,400
3,360,000	Montgomery County Higher Education & Health Autho		3,429,888
1,430,000	Pennsylvania Economic Development Financing Autho		1,370,240

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1,805,000	Pennsylvania Economic Development Financing Autho	1,799,874
2,330,000	Pennsylvania Economic Development Financing Autho	2,323,919
2,005,000	Scranton-Lackawanna Health & Welfare Authority Re	1,993,090
2,245,000	Scranton-Lackawanna Health & Welfare Authority Re	2,231,687
		\$ 22,866,179
	Rhode Island - 4.0%	
4,485,000	Central Falls Rhode Island Detention Facilities R \$	4,919,372
8,285,000	Tobacco Settlement Financing Corp., 6.25%, 6/1/42	8,680,029
		\$ 13,599,401
	South Carolina - 5.8%	
1,500,000	Connector 2000 Association, Inc., Toll Road Reven \$	1,310,970
1,600,000	Loris Community Hospital District, 5.625%, 1/1/29	1,623,776
7,140,000	+South Carolina Jobs Economic Development Authorit	8,090,905
860,000	South Carolina Jobs Economic Development Authorit	949,191
3,000,000	South Carolina Jobs Economic Development Authorit	3,262,620
4,400,000	Tobacco Settlement Revenue Management, 6.375%, 5/	4,845,676
		\$ 20,083,138
	Tennessee - 2.5%	
1,000,000	Johnson City Health & Educational Facilities Boar \$	1,148,320
7,000,000	Knox County Health Educational & Housing Faciliti	7,363,230
		\$
8,511,550		
	Texas - 18.2%	
11,300,000	Alliance Airport Authority Special Facilities Rev \$	11,297,966
8,650,000	Brazos River Authority Pollution Control Revenue,	9,664,039
13,885,000	Dallas-Fort Worth International Airport Revenue,	13,477,614
10,000,000	Houston Texas Airport System Revenue, 6.75%, 7/1/	10,629,100
845,000	Lubbock Health Facilities Development Corp., 6.5%	856,255
2,000,000	Lubbock Health Facilities Development Corp., 6.62	2,024,760
7,750,000	Matagorda County Navigation District Number 1 Rev	7,966,147
1,885,000	Panhandle Texas Regional Housing Finance, 8.125%,	1,593,428
5,000,000	Tomball Hospital Authority, 6.0%, 7/1/25	5,143,600
		\$ 62,652,909
	Virginia - 0.5%	
1,555,000	+Pocahontas Parkway Association of Virginia Toll R \$	1,623,871
	Washington - 6.5%	
10,000,000	Port Seattle Washington Special Facilities Revenu \$	10,058,900
5,500,000	(bPort Seattle Washington Special Facilities Revenu	3,469,785
1,390,000	Tobacco Settlement Authority Revenue, 6.5%, 6/1/2	1,510,624
6,960,000	(aWashington State Economic Development Finance Aut	
7,129,198		
		\$ 22,168,507
	Wisconsin - 0.6%	
1,000,000	Wisconsin State Health & Educational Facilities A \$	1,015,590
1,000,000	Wisconsin State Health & Educational Facilities A	1,009,840
		\$ 2,025,430
	TOTAL TAX-EXEMPT OBLIGATIONS	
	(Cost \$450,612,780)	\$ 486,508,998
Shares	TAX-EXEMPT MONEY MARKET MUTUAL	
	FUND - 0.0% of Net Assets	
838	BlackRock Provident Institutional Municipal Fund \$	838
	TOTAL TAX-EXEMPT MONEY MARKET MUTUAL FUND	
	(Cost \$838)	\$ 838
	TOTAL INVESTMENTS IN SECURITIES - 141.7%	
	(Cost \$450,613,618) (c) (d)	\$ 486,509,836
	OTHER ASSETS AND LIABILITIES - 2.0%	\$ 6,979,473

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PREFERRED SHARES AT REDEMPTION VALUE, INCLUDING  
 DIVIDENDS PAYABLE - (43.7)% \$ (150,069,964)  
 NET ASSETS APPLICABLE TO COMMON SHAREOWNERS - 100 \$ 343,419,345

(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, 2006, the value of these securities amounted to \$59,068,020, or 17.2% 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 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 was the rate at June 30, 2006.

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

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

Insured	12.4%
General Obligation	1.1
Revenue Bonds:	
Health Revenue	24.8
Airport Revenue	16.5
Development Revenue	9.0
Tobacco Revenue	9.4
Pollution Control Revenue	7.0
Transportation Revenue	6.8
Facilities Revenue	5.7
Power Revenue	2.9
Education Revenue	1.2
Water Revenue	1.1
Housing Revenue	1.1
Utilities Revenue	0.8
Other	0.2
	100.0%

(d) At June 30, 2006, the net unrealized gain on investments based on cost for federal income tax purposes of \$447,959,186 was as follows:

Aggregate gross unrealized gain for all investments in which there is an excess of value over tax cost 50,307,358

Aggregate gross unrealized loss for all investments in which there is an excess of tax cost over value (11,756,708)  
 Net unrealized gain 38,550,650

For financial reporting purposes net unrealized gain on investments was \$35,896,218 and cost of investments aggregated \$450,613,618.

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### 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.

The registrant's principal executive officer and principal financial officer, however, voluntarily are reporting the following information:

In August of 2006 the registrant's investment adviser enhanced its internal procedures for reporting performance information required to be included in prospectuses. Those enhancements involved additional internal controls over the appropriateness of performance data generated for this purpose. Such enhancements were made following an internal review which identified prospectuses relating to certain classes of shares of a limited number of registrants where, inadvertently, performance information not reflecting the deduction of applicable sales charges was included. Those prospectuses were revised, and the revised prospectuses were distributed to shareholders.

### 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]

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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 August 30, 2006

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 30, 2006

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

Date August 30, 2006

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