

PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST  
Form N-Q  
March 01, 2007

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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, 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 12/31/06 (unaudited)

Principal Amount		Value
	TAX-EXEMPT OBLIGATIONS - 134.8% of Net Assets	
	Alaska - 1.2%	
3,875,000	(a)Alaska State Housing Finance Corp., RIB,	4,406,456
	Arizona - 4.1%	
5,000,000	Casa Grande Industrial Development Autho	5,551,450
3,000,000	(a)Downtown Phoenix Hotel Corp., RIB, 5.30	4,432,360
1,000,000	Pima County Industrial Development Autho	1,057,230
1,560,000	Pima County Industrial Development Autho	1,652,804
1,000,000	+Pima County Industrial Development Autho	1,215,590
2,000,000	San Luis Facility Development Corp., 7.22	2,035,800
		14,945,234
	California - 6.5%	
2,680,000	Golden State Tobacco Securitization Corp	3,068,386
9,520,000	(a)University of California, RIB, 5.706%	5,118,042
9,320,000	Valley Health System Hospital Revenue,	69,334,353
		23,720,781
	Colorado - 1.9%	
2,850,000	Denver Health & Hospital Authority Healt	3,044,398
3,520,000	Northwest Parkway Public Highway Authori	3,690,122
		6,734,520
	District of Columbia - 2.1%	
2,700,000	District of Columbia Tobacco Settlement	3,241,512
4,000,000	District of Columbia Tobacco Settlement	4,390,680
		7,632,192
	Florida - 5.6%	
1,000,000	Greater Orlando Aviation Authority, 6.5%	1,059,540
4,500,000	Hillsborough County Florida Industrial Development Authority	
	Pollution Control Revenue, 5.5%, 10/1/23	4,695,255
2,000,000	Hillsborough County Florida Industrial Development Authority	
	Pollution Control Revenue, 6.75%, 7/1/29	2,054,100
500,000	Miami Beach Health Facilities Authority,	507,915
1,500,000	Miami Beach Health Facilities Authority,	1,649,940
10,000,000	Miami-Dade County Aviation Revenue, 5.0%	10,475,700
		20,442,450
	Georgia - 2.1%	
4,000,000	(a)Atlanta Georgia Water and Wastewater Rev	4,631,520
1,065,000	Effingham County Industrial Development	1,129,667
1,650,000	Savannah Georgia Economic Development Au	1,816,601
		7,577,788
	Guam - 1.5%	
5,000,000	Northern Mariana Islands, 6.75%, 10/1/33	5,596,150
	Idaho - 2.3%	
2,000,000	Power County Industrial Development Corp	2,127,820
5,920,000	Power County Pollution Control Revenue,	6,085,168
		8,212,988
	Illinois - 6.1%	

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4,000,000	Centerpoint Intermodal Center, 8.0%, 6/14,	115,240
1,000,000	Illinois Finance Authority Revenue, 5.1%	1,019,760
1,100,000	Illinois Finance Authority Revenue, 5.5%	1,127,027
1,850,000	Illinois Finance Authority Revenue, 5.75%	1,926,923
1,000,000	Illinois Finance Authority Revenue, 6.0%	1,056,370
3,000,000	Illinois Finance Authority Revenue, 6.0%	3,140,880
1,645,000	Illinois Health Facilities Authority Rev1,	661,680
1,400,000	Illinois Health Facilities Authority Rev1,	400,350
2,400,000	Illinois Health Facilities Authority Rev2,	400,096
1,500,000	Illinois Health Facilities Authority Rev1,	661,790
2,700,000	Southwestern Illinois Development Author2,	740,527
		22,250,643
	Indiana - 4.9%	
10,000,000	Indiana State Development Finance Author10,	377,300
5,000,000	Jasper County Industrial Economic Develo5,	056,000
2,315,000	Vincennes Industrial Economic Developmen2,	332,802
		17,766,102
	Kentucky - 1.4%	
500,000	Kentucky Economic Development Finance Au508,	325
4,400,000	Kentucky Economic Development Finance Au4,	476,296
		4,984,621
	Louisiana - 3.0%	
750,000	Opelousas Louisiana General Hospital Aut799,	125
9,415,000	Tobacco Settlement Financing Corp., 5.87%	10,087,984
		10,887,109
	Maryland - 0.5%	
710,000	Maryland Health & Higher Educational Fac708,	253
1,250,000	Maryland Health & Higher Educational Fac1,	233,350
		1,941,603
	Massachusetts - 9.0%	
1,000,000	Lynn Massachusetts Water & Sewer Commiss1,	056,820
5,000,000	Massachusetts Bay Transportation Authori5,	674,800
5,000,000	Massachusetts Bay Transportation Authori5,	858,000
2,195,000	Massachusetts Health & Educational Facil2,	217,828
1,000,000	Massachusetts Health & Educational Faci11,	081,220
3,520,000	(a)Massachusetts State College Building Aut4,	176,586
900,000	Massachusetts State Development Finance 892,	917
2,920,000	Massachusetts State Development Finance 2,	985,846
4,710,000	Massachusetts State Development Finance 4,	922,751
3,335,000	(a)Massachusetts State Housing Finance Agen3,	571,218
		32,437,986
	Michigan - 5.1%	
1,650,000	Crescent Academy Project, 5.75%, 12/1/361,	635,942
3,000,000	+Delta County Michigan Economic Developme3,	369,180
3,000,000	Macomb County Hospital Finance Authority3,	185,040
4,130,000	Michigan State Hospital Finance Authorit4,	103,031
1,000,000	Michigan State Strategic Fund Solid Wast1,	023,140
3,000,000	(b)Wayne Charter County Michigan Special Ai2,	353,680
3,405,000	(b)Wayne Charter County Michigan Special Ai2,	774,360
		18,444,373
	Missouri - 0.9%	
1,500,000	St. Louis Industrial Development Authori1,	444,665
1,840,000	St. Louis Industrial Development Authori1,	771,589
		3,216,254
	Montana - 0.7%	
2,445,000	(c)Hardin Increment Industrial Infrastructu1,	606,585
1,000,000	Two Rivers Authority, Inc., Project Reve1,	029,870
		2,636,455
	Nevada - 2.2%	
2,425,000	Clark County Industrial Development Reve2,	424,806
2,500,000	Clark County Industrial Development Reve2,	501,050
1,600,000	Nevada State Department of Business & In1,	701,264

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1,000,000	Nevada State Department of Business & In	1,066,700
370,000	Nevada State Department of Business & In	394,679
		8,088,499
	New Hampshire - 1.5%	
1,000,000	New Hampshire Health & Educational Facill	1,054,460
1,125,000	New Hampshire Health & Educational Facill	1,188,934
3,000,000	+New Hampshire Higher Educational & Healt	3,125,670
		5,369,064
	New Jersey - 8.9%	
13,000,000	New Jersey Economic Development Authorit	13,413,660
2,500,000	New Jersey Health Care Facilities Financ	2,617,150
1,420,000	New Jersey Health Care Facilities Financ	1,422,215
2,495,000	(aNew Jersey State Turnpike Authority, RIB	4,152,179
1,000,000	Tobacco Settlement Financing Corp., 6.25	1,117,050
3,250,000	Tobacco Settlement Financing Corp., 6.75	3,723,168
5,000,000	Tobacco Settlement Financing Corp., 7.0%	5,797,750
		32,243,172
	New York - 10.6%	
3,000,000	Dutchess County Industrial Development A3	3,342,030
5,000,000	Nassau County New York Industrial Develo	5,201,300
6,980,000	New York City Industrial Development Age	6,891,075
2,000,000	New York City Industrial Development Age	2,098,500
2,000,000	New York City Industrial Development Age	2,021,200
3,950,000	New York City Industrial Development Age	4,434,981
2,600,000	New York City Industrial Development Age	2,633,176
5,000,000	New York State Environmental Facilities	5,250,200
4,500,000	Suffolk County New York Industrial Devel	4,657,095
2,000,000	Yonkers Industrial Development Agency Ci	2,011,660
		38,541,217
	North Carolina - 5.9%	
11,350,000	Charlotte North Carolina Special Facilit	11,473,147
7,140,000	Charlotte North Carolina Special Facilit	7,630,232
2,000,000	North Carolina Capital Facilities Financ	2,111,580
		21,214,959
	Ohio - 2.7%	
3,800,000	Belmont County Health System Revenue, 5.3	3,745,090
1,000,000	Belmont County Health System Revenue, 5.	977,760
5,000,000	Cleveland Airport Special Revenue, 5.37	5,046,050
		9,768,900
	Oklahoma - 1.0%	
2,045,000	Jackson County Memorial Hospital Authori	2,055,900
1,500,000	Tulsa Municipal Airport Transportation R1	1,505,280
		3,561,180
	Pennsylvania - 7.1%	
3,000,000	Allegheny County Hospital Development Au	3,572,250
500,000	Allegheny County Hospital Development Au	594,385
1,000,000	Clarion County Hospital Authority Revenu	1,015,960
3,600,000	Columbia County Hospital Authority Reven	3,359,304
3,200,000	Delaware County Industrial Development A2	2,595,040
1,250,000	Hazleton Health Services Authority Hospil	1,253,575
3,360,000	Montgomery County Higher Education & Hea	3,430,661
1,430,000	Pennsylvania Economic Development Financ	1,413,512
1,805,000	Pennsylvania Economic Development Financ	1,811,534
2,330,000	Pennsylvania Economic Development Financ	2,339,064
2,005,000	Scranton-Lackawanna Health & Welfare Aut	2,055,987
2,245,000	Scranton-Lackawanna Health & Welfare Aut	2,302,090
		25,743,362
	Rhode Island - 3.9%	
4,485,000	Central Falls Rhode Island Detention Fac	5,041,319
8,285,000	Tobacco Settlement Financing Corp., 6.25	8,944,403
		13,985,722
	South Carolina - 5.8%	

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1,500,000	Connector 2000 Association, Inc., Toll R	1,339,680
1,600,000	Loris Community Hospital District, 5.6251,	655,232
7,140,000	+South Carolina Jobs Economic Development	8,229,421
860,000	+South Carolina Jobs Economic Development	985,818
3,000,000	+South Carolina Jobs Economic Development	3,451,230
4,400,000	Tobacco Settlement Revenue Management,	65,156,096
		20,817,477
	Tennessee - 2.4%	
1,000,000	Johnson City Health & Educational Facilil	1,167,270
7,000,000	Knox County Health Educational & Housing	7,553,280
		8,720,550
	Texas - 16.8%	
11,300,000	Alliance Airport Authority Special Facill	11,526,000
8,650,000	Brazos River Authority Pollution Control	9,720,610
7,350,000	Gulf Coast Industrial Development Author	7,578,806
10,000,000	Houston Texas Airport System Revenue, 6.10,	10,757,300
1,000,000	IAH Public Facility Corp., 6.0%, 5/1/16	998,210
1,000,000	IAH Public Facility Corp., 6.0%, 5/1/21	975,250
1,350,000	IAH Public Facility Corp., 6.125%, 5/1/21,	310,904
845,000	Lubbock Health Facilities Development Co	884,952
2,000,000	Lubbock Health Facilities Development Co	2,100,980
7,750,000	Matagorda County Navigation District Num	7,983,740
1,885,000	(b)Panhandle Texas Regional Housing Finance	188,538
5,000,000	Tomball Hospital Authority, 6.0%, 7/1/25	5,208,500
1,500,000	Willacy County Local Government Corp.,	61,524,225
		60,758,015
	Utah - 0.4%	
1,600,000	Spanish Fork Charter School Revenue, 5.71,	601,552
	Virginia - 0.4%	
1,555,000	+Pocahontas Parkway Association of Virgin	1,626,266
	Washington - 5.7%	
5,000,000	Port Seattle Washington Special Faciliti	5,183,600
5,500,000	(b)Port Seattle Washington Special Faciliti	5,460,015
1,385,000	Tobacco Settlement Authority Revenue, 6.1,	525,467
6,960,000	(a)Washington State Economic Development	Fi8,404,757
		20,573,839
	Wisconsin - 0.6%	
1,000,000	Wisconsin State Health & Educational Faci	1,056,450
	Revenue, 6.125%, 4/1/24	
1,000,000	Wisconsin State Health & Educational Facili	ties Authority
	Revenue, 6.25%, 4/1/34	1,059,160
		2,115,610
	TOTAL TAX-EXEMPT OBLIGATIONS	
	(Cost \$435,391,184)	488,563,089
	MUNICIPAL COLLATERALIZED DEBT OBLIGATION - 3.6% of Net Assets	
13,000,000	Non-Profit Preferred Funding Trust I, Se	12,974,650
	TOTAL MUNICIPAL COLLATERALIZED DEBT OBLIGATION	
	(Cost \$13,000,000)	12,974,650
Shares	TAX-EXEMPT MONEY MARKET MUTUAL FUND - 0.0% of Net Assets	
4,386	BlackRock Provident Institutional Munici	4,386
	TOTAL TAX-EXEMPT MONEY MARKET MUTUAL FUND	
	(Cost \$4,386)	4,386
	TOTAL INVESTMENTS IN SECURITIES - 138.4%	
	(Cost \$448,395,570) (d) (e)	501,542,125
	OTHER ASSETS AND LIABILITIES - 3.0%	10,927,744

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PREFERRED SHARES AT REDEMPTION VALUE,  
 INCLUDING DIVIDENDS PAYABLE - (41.4)% (150,090,489)  
 NET ASSETS APPLICABLE TO COMMON SHAREOWNERS 362,379,380

(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, 2006, the value of these securities amounted to \$49,265,588, or 13.6% 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 is the rate at December 31, 2006.

(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 December 31, 2006.

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

Insured	13.0	%
General Obligation	3.7	
Revenue Bonds:		
Health Revenue	24.9	
Airport Revenue	13.6	
Development Revenue	11.3	
Tobacco Revenue	9.4	
Transportation Revenue	8.0	
Facilities Revenue	5.8	
Pollution Control Revenue	5.6	
Education Revenue	1.5	
Other Revenue	1.4	
Water Revenue	1.0	
Housing Revenue	0.8	
Power Revenue	0.0	
	100.0	%

(e) At December 31, 2006, the net unrealized gain on investments based on cost for federal income tax purposes of \$445,623,386 was as follows:

Aggregate gross unrealized gain for all investments in which there is an excess of value over tax cost \$ 58,495,195

Aggregate gross unrealized loss for all investments in which there is an excess of tax cost over value (2,576,456)  
 Net unrealized gain \$ 55,918,739

For financial reporting purposes net unrealized gain on

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investments was \$53,146,555  
and cost of investments aggregated \$448,395,570.

### 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 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

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Date March 1, 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 March 1, 2007

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

Date March 1, 2007

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