PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST
Form N-Q
March 01, 2010

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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, 2009

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 30b1-5under 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.

ITEM 1. Schedule of Investments.

Pioneer Municipal High Income Advantage Trust
SCHEDULE OF INVESTMENTS 12/31/09 (unaudited)

Principal Amount			Value
	TAX-EXEMPT OBLIGATIONS - 143.3% of Net Assets		
	Alabama - 0.7%		
2,500,000	Huntsville-Redstone Village Special Care Fa	$	1,833,225
	Arizona - 3.4%		
5,000,000	Casa Grande Industrial Development Authorit	$	4,687,600
1,531,000	Pima County Industrial Development Authorit		1,393,455
2,640,000	Pima County Industrial Development Authorit		2,289,250
1,000,000	San Luis Facility Development Corp., 7.25%,		911,640
		$	9,281,945
	California - 12.1%		
3,140,000	California State University Revenue, RIB, 1	$	3,175,576
2,425,000	California State Various Purpose, 5.75%, 4/		2,449,008
8,575,000	California State Various Purpose, RIB, 10.6		7,384,790
803,175	California Statewide Communities Developmen		160,635
2,680,000	Golden State Tobacco Securitization Corp.,		3,145,194
2,500,000	San Jose California Airport Revenue, 5.0%,		2,324,575
10,500,000	University of California, RIB, 10.994%, 5/1		10,363,290
7,670,000	Valley Health System Hospital Revenue, 6.87		4,216,199
		$	33,219,267
	Colorado - 1.1%		
2,850,000	Denver Health & Hospital Authority Healthca	$	3,130,725
	Connecticut - 2.8%		
7,750,000	Connecticut State Development Authority Rev	$	7,570,587
	District of Columbia - 3.4%		
2,700,000	District of Columbia Tobacco Settlement Fin	$	2,623,995
6,825,000	District of Columbia Tobacco Settlement Fin		6,780,637
		$	9,404,632
	Florida - 3.8%		
4,500,000	Hillsborough County Industrial Development Authority Pollution Control Revenue, 5.5%, 10/1/23	$	4,547,565
1,980,000	Hillsborough County Industrial Development Authority Pollution Control Revenue, 6.75%, 7/1/29		1,806,532
1,000,000	Hillsborough County Industrial Development		1,105,300
500,000	Miami Beach Health Facilities Authority, 5.		404,810
2,500,000	Miami-Dade County Florida Aviation Revenue,		2,537,475
		$	10,401,682
	Georgia - 4.1%		
5,210,000	Atlanta Georgia Water and Wastewater Revenu	$	5,160,870
1,000,000	Clayton County Development Authority Specia		996,500
1,065,000	Effingham County Industrial Development Aut		1,048,013
3,360,000	Fulton County Residential Care Facilities,		2,515,397
1,650,000	Savannah Georgia Economic Development Autho		1,620,960
		$	11,341,740
	Guam - 1.9%		
4,500,000	Northern Mariana Islands, 6.75%, 10/1/33	$	5,300,955
	Idaho - 1.8%		

2,000,000	Power County Industrial Development Corp.,	$	1,990,440
3,000,000	Power County Pollution Control Revenue, 5.6		2,969,610
		$	4,960,050
	Illinois - 6.8%		
3,000,000	Centerpoint Intermodal Center, 7.5%, 6/15/2	$	2,997,330
3,000,000	City of Chicago Illinois, 5.0%, 1/1/28		3,077,520
2,000,000	City of Chicago Illinois, 5.5%, 12/1/30		1,310,000
1,450,000	Illinois Finance Authority Revenue, 5.5%, 4		1,418,912
2,000,000	Illinois Finance Authority Revenue, 6.0%, 8		2,085,900
1,000,000	Illinois Finance Authority Revenue, 6.0%, 1		832,100
2,000,000	Illinois Finance Authority Revenue, 6.0%, 8		2,167,060
2,500,000	Illinois Finance Authority Revenue, 6.125%,		2,237,500
1,500,000	Illinois Health Facilities Authority Revenu		660,750
2,615,000	Southwestern Illinois Development Authority		1,837,561
		$	18,624,633
	Indiana - 5.7%		
10,000,000	Indiana State Development Finance Authority	$	9,761,100
5,000,000	Jasper County Industrial Economic Developme		4,317,400
1,995,000	Vincennes Industrial Economic Development R		1,641,745
		$	15,720,245
	Kentucky - 1.6%		
500,000	Kentucky Economic Development Finance Autho	$	499,975
4,400,000	Kentucky Economic Development Finance Autho		3,801,732
		$	4,301,707
	Louisiana - 6.3%		
2,500,000	Louisiana Local Government Environmental Fa	$	2,538,675
6,000,000	Louisiana Public Facilities Authority Reven		5,449,860
750,000	Opelousas Louisiana General Hospital Author		755,490
9,415,000	Tobacco Settlement Financing Corp., 5.875%,		8,658,693
		$	17,402,718
	Maryland - 0.4%		
460,000	Maryland Health & Higher Educational Facili	$	372,076
1,250,000	Maryland Health & Higher Educational Facili		865,275
		$	1,237,351
	Massachusetts - 6.5%		
830,000	Massachusetts Development Finance Agency, 5	$	717,892
2,500,000	Massachusetts Development Finance Agency, 5		2,485,500
1,955,000	Massachusetts Development Finance Agency, 7		1,520,677
2,195,000	Massachusetts Health & Educational Faciliti		1,872,203
1,000,000	Massachusetts Health & Educational Faciliti		1,138,120
10,760,000	Massachusetts Housing Finance Agency, 5.35%		10,124,084
		$	17,858,476
	Michigan - 3.7%		
1,500,000	Delta County Michigan Economic Development	$	1,672,980
3,000,000	Macomb County Hospital Finance Authority Re		3,522,840
745,000	Michigan Public Educational Facilities Auth		639,322
4,130,000	Michigan State Hospital Finance Authority R		3,545,811
1,000,000	Michigan State Strategic Fund Solid Waste D		807,060
		$	10,188,013
	Missouri - 1.5%		
1,850,000	Kansas City Industrial Development Authorit	$	1,442,760
1,500,000	St. Louis Industrial Development Authority		509,640
6,640,000	St. Louis Industrial Development Authority		2,255,143
		$	4,207,543
	Montana - 0.5%		
2,445,000	Hardin Increment Industrial Infrastructure	$	1,226,632
1,000,000	Two Rivers Authority, Inc., Project Revenue		154,090
		$	1,380,722
	Nevada - 2.3%		
1,500,000	Henderson Nevada Health Care Facilities Rev	$	1,541,010
1,600,000	Nevada State Department of Business & Indus		80,000
1,000,000	Nevada State Department of Business & Indus		50,000

1,320,000	Nevada State Department of Business & Indus		66,000
5,000,000	Reno Nevada Hospital Revenue, 5.25%, 6/1/41		4,491,700
		$	6,228,710
	New Hampshire - 0.4%		
1,125,000	New Hampshire Health & Educational Faciliti	$	1,049,805
	New Jersey - 12.1%		
2,500,000	Burlington County New Jersey Bridge Commiss	$	2,101,800
13,000,000	New Jersey Economic Development Authority R		11,208,080
3,500,000	New Jersey State Turnpike Authority, RIB, 1		4,909,065
10,375,000	New Jersey Transportation Trust Fund Author		4,127,382
1,000,000	Tobacco Settlement Financing Corp., 6.25%,		1,168,180
3,250,000	Tobacco Settlement Financing Corp., 6.75%,		3,850,795
5,000,000	Tobacco Settlement Financing Corp., 7.0%, 6		5,964,150
		$	33,329,452
	New York - 6.5%		
1,900,000	Dutchess County Industrial Development Agen	$	1,858,238
1,000,000	Nassau County New York Industrial Developme		889,500
5,000,000	New York City Industrial Development Agency		3,349,400
3,950,000	New York City Industrial Development Agency		3,599,635
5,000,000	New York State Environmental Facilities Cor		5,124,900
3,000,000	Ulster County New York Industrial Developme		2,692,200
500,000	Ulster County New York Industrial Developme		396,985
		$	17,910,858
	North Carolina - 1.9%		
6,000,000	Charlotte North Carolina Special Facilities	$	5,136,900
	Ohio - 1.9%		
2,375,000	Belmont County Health System Revenue, 5.7%,	$	2,210,983
1,000,000	Belmont County Health System Revenue, 5.8%,		806,640
3,000,000	Cleveland Airport Special Revenue, 5.375%,		2,256,090
		$	5,273,713
	Oklahoma - 2.8%		
1,500,000	Jackson County Memorial Hospital Authority	$	1,500,780
2,220,000	Tulsa Municipal Airport Trust Revenue, 6.25		1,877,698
1,500,000	Tulsa Municipal Airport Trust Revenue, 7.35		1,482,585
3,000,000	Tulsa Municipal Airport Trust Revenue, 7.75		2,938,860
		$	7,799,923
	Pennsylvania - 10.0%		
3,000,000	Allegheny County Hospital Development Autho	$	3,291,270
500,000	Allegheny County Hospital Development Autho		548,545
1,000,000	Clarion County Hospital Authority Revenue,		1,001,010
3,600,000	Columbia County Hospital Authority Revenue,		3,175,560
945,000	Hazleton Health Services Authority Hospital		897,211
1,405,000	Montgomery County Higher Education & Health		1,410,030
1,430,000	Pennsylvania Economic Development Financing		1,270,555
1,805,000	Pennsylvania Economic Development Financing		1,789,585
2,330,000	Pennsylvania Economic Development Financing		2,266,671
5,000,000	Pennsylvania Economic Development Financing		3,913,500
5,000,000	Philadelphia Hospitals & Higher Education F		3,807,650
2,005,000	Scranton-Lackawanna Health & Welfare Author		1,961,973
2,245,000	Scranton-Lackawanna Health & Welfare Author		2,167,660
		$	27,501,220
	Rhode Island - 3.2%		
1,385,000	Central Falls Rhode Island Detention Facili	$	1,179,078
8,285,000	Tobacco Settlement Financing Corp., 6.25%,		7,690,965
		$	8,870,043
	South Carolina - 6.8%		
1,500,000	Connector 2000 Association, Inc., Toll Road	$	360,120
7,140,000	South Carolina Jobs Economic Development Au		8,332,380
860,000	South Carolina Jobs Economic Development Au		1,011,188
3,000,000	South Carolina Jobs Economic Development Au		3,216,000

4,400,000	Tobacco Settlement Revenue Management, 6.37		5,688,452
		$	18,608,140
	Tennessee - 3.8%		
1,000,000	Johnson City Health & Educational Facilitie	$	1,132,060
7,000,000	Knox County Health Educational & Housing Fa		7,346,710
2,400,000	Sullivan County Health Educational and Hous		2,006,208
		$	10,484,978
	Texas - 17.5%		
8,650,000	Brazos River Authority Pollution Control Re	$	4,600,330
2,827,399	Gulf Coast Industrial Development Authority		565,480
10,000,000	Houston Texas Airport System Special Facili		9,315,100
960,000	IAH Public Facility Corp., Project Revenue		878,736
1,000,000	IAH Public Facility Corp., Project Revenue		823,410
1,350,000	IAH Public Facility Corp., Project Revenue		1,057,023
2,750,000	Lower Colorado River Authority, 5.0%, 5/15/		2,776,153
845,000	Lubbock Health Facilities Development Corp.		756,233
2,000,000	Lubbock Health Facilities Development Corp.		1,748,980
7,750,000	Matagorda County Navigation District Number		7,435,505
9,750,000	North Texas Tollway Authority Revenue, 5.75		9,994,725
1,711,000	Panhandle Regional Housing Finance Corp. Mu		1,803,291
1,000,000	Richardson Hospital Authority Revenue, 6.0%		865,990
1,000,000	Texas Midwest Public Facility Corp. Revenue		1,032,020
4,700,000	Tomball Hospital Authority, 6.0%, 7/1/25		4,463,825
		$	48,116,801
	Utah - 0.5%		
1,600,000	Spanish Fork Charter School Revenue, 5.7%,	$	1,255,248
	Virginia - 0.8%		
2,000,000	Washington County Industrial Development Au	$	2,282,520
	Washington - 3.3%		
1,195,000	Tobacco Settlement Authority Revenue, 6.5%,	$	1,201,871
2,000,000	Washington State Health Care Facilities Aut		2,010,100
2,000,000	Washington State Health Care Facilities Aut		2,017,900
5,000,000	Washington State Housing Finance Commission		3,778,850
		$	9,008,721
	Wisconsin - 1.4%		
2,900,000	Aztalan Wisconsin Exempt Facilities Revenue	$	404,550
1,000,000	Wisconsin State Health & Educational Facili		999,410
1,000,000	Wisconsin State Health & Educational Facili		948,580
1,500,000	Wisconsin State Health & Educational Facili		1,612,980
		$	3,965,520
	TOTAL TAX-EXEMPT OBLIGATIONS		
	(Cost $400,789,360)	$	394,188,768
	MUNICIPAL COLLATERALIZED DEBT OBLIGATION - 3.6% of Net Assets		
13,000,000	Non-Profit Preferred Funding Trust I, Serie	$	9,807,330
	TOTAL MUNICIPAL COLLATERALIZED DEBT OBLIGATION		
	(Cost $13,000,000)	$	9,807,330
Shares	COMMON STOCK - 0.5% of Net Assets		
109,625	Delta Airlines, Inc.	$	1,247,533
	TOTAL COMMON STOCK		
	(Cost $3,210,349)	$	1,247,533
	TAX-EXEMPT MONEY MARKET MUTUAL FUND - 2.9% of Net Assets		
8,000,000	BlackRock Liquidity Funds MuniFund Portfoli	$	8,000,000
	TOTAL TAX-EXEMPT MONEY MARKET MUTUAL FUND		
	(Cost $8,000,000)	$	8,000,000
	TOTAL INVESTMENTS IN SECURITIES - 150.3%		
	(Cost $424,999,709) (h)(i)	$	413,243,631

OTHER ASSETS AND LIABILITIES 4.3%	$ 11,752,009
PREFERRED SHARES AT REDEMPTION VALUE, INCLUDING DIVIDENDS PAYABLE - (54.6)%	$ (150,007,899)
NET ASSETS APPLICABLE TO COMMON SHAREOWNERS	$ 274,987,741

(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, 2009, the value of these securities amounted to $36,132,569, or 13.1% 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 rate shown is the coupon rate at December 31, 2009.

(b) The interest rate is subject to change periodically. The interest rate shown is the rate at December 31, 2009.

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

(d) Debt obligation initially issued at one coupon which converts to a higher coupon at a specific date. The rate shown is the coupon rate at December 31, 2009.

(e) Escrow to maturity.

(f) Indicates a security that has been deemed illiquid. The aggregate cost of illiquid securities is $13,000,000. The aggregate value is $8,953,490, or 3.9% of the total net assets applied to common shareowners.

(g) Non-income producing.

(i) At December 31, 2009, the net unrealized loss on investments based on cost for federal income tax purposes of $420,011,921 was as follows:

Aggregate gross unrealized gain for all investments in which there is an excess of value over tax cost	$33,945,811
Aggregate gross unrealized loss for all investments in which there is an excess of tax cost over value	(40,714,101)
Net unrealized loss	($6,768,290)

For financial reporting purposes net unrealized loss on investments was $11,756,078 and cost of investments aggregated $424,999,709.

Various inputs are used in determining the value of the Trust's investments. These inputs are summarized in the three broad levels listed below.
Highest priority is given to Level 1 inputs and lowest priority

is given to Level 3.

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)

The following is a summary of the inputs used as of December 31, 2009, in valuing the Trust's assets:

	Level 1	Level 2	Level 3	Total
Tax exempt obligations	$0	$394,188,768	$0	$394,188,768
Municipal collateralized d	0	9,807,330	0	9,807,330
Common stock	1,247,533	0	0	1,247,533
Tax-exempt money market	8,000,000	0	0	8,000,000
Total	$9,247,533	$403,996,098	$0	$413,243,631

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 CFR270.30a-3(b))) and Rule 13a-15(b) or 15d-15(b) under the Exchange Act (17 CFR240.13a-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 CFR270.30a-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

Date March 1, 2010

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 March1 , 2010

By (Signature and Title)* /s/ Mark Bradley
Mark Bradley, Treasurer

Date March 1, 2010

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