

PIONEER MUNICIPAL HIGH INCOME ADVANTAGE TRUST  
Form N-Q  
March 01, 2011

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

FORM N-Q

QUARTERLY SCHEDULE OF PORTFOLIO HOLDINGS  
OF REGISTERED MANAGEMENT INVESTMENT COMPANY

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)

Terrence J. Cullen, 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, 2010

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 270.30b1-5). 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 12/31/10 (unaudited)

| Principal Amount |  | Value      |
|------------------|--|------------|
|                  | TAX-EXEMPT OBLIGATIONS - 146.8% of Net Assets  |            |
|                  | Alabama - 0.7%                                 |            |
| 2,500,000        | Huntsville-Redstone Village Special Care Facil | 1,849,375  |
|                  | Arizona - 3.4%                                 |            |
| 5,000,000        | Casa Grande Industrial Development Authority H | 4,716,850  |
| 1,512,000        | Pima County Industrial Development Authority,  | 1,414,400  |
| 2,640,000        | Pima County Industrial Development Authority,  | 2,376,370  |
| 1,000,000        | San Luis Facility Development Corp., 7.25%, 5/ | 954,500    |
|                  |  | 9,462,120  |
|                  | California - 9.7%                              |            |
| 3,140,000        | California State University Revenue, RIB, 12.6 | 2,853,066  |
| 2,425,000        | California State Various Purpose, 5.75%, 4/1/3 | 2,445,346  |
| 8,575,000        | California State Various Purpose, RIB, 12.641% | 6,469,838  |
| 803,175          | California Statewide Communities Development A | 63,250     |
| 2,680,000        | Golden State Tobacco Securitization Corp., 6.7 | 3,023,388  |
| 2,500,000        | San Jose California Airport Revenue, 5.0%, 3/1 | 2,275,950  |
| 10,500,000       | University of California, RIB, 12.988%, 5/15/3 | 9,586,920  |
|                  |  | 26,717,758 |
|                  | Colorado - 1.4%                                |            |
| 2,850,000        | Denver Health & Hospital Authority Healthcare  | 2,994,410  |
| 1,000,000        | Kremmling Memorial Hospital District, 7.125%,  | 950,780    |
|                  |  | 3,945,190  |
|                  | Connecticut - 2.6%                             |            |
| 7,750,000        | Connecticut State Development Authority Revenu | 7,276,785  |
|                  | District of Columbia - 3.4%                    |            |
| 2,700,000        | District of Columbia Tobacco Settlement Financ | 2,662,173  |
| 6,825,000        | District of Columbia Tobacco Settlement Financ | 6,637,654  |
|                  |  | 9,299,827  |
|                  | Florida - 4.2%                                 |            |
| 1,000,000        | Florida Development Finance Corp., 6.0%, 9/15/ | 853,590    |
| 4,500,000        | Hillsborough County Industrial Development Aut | 4,573,080  |
| 1,980,000        | Hillsborough County Industrial Development Aut | 1,819,778  |
| 1,000,000        | Hillsborough County Industrial Development Aut | 1,356,690  |
| 500,000          | Miami Beach Health Facilities Authority, 5.375 | 422,325    |
| 2,500,000        | Miami-Dade County Florida Aviation Revenue, 5. | 2,425,150  |
|                  |  | 11,450,613 |
|                  | Georgia - 4.4%                                 |            |
| 5,210,000        | Atlanta Georgia Water and Wastewater Revenue,  | 4,214,109  |
| 1,000,000        | Clayton County Development Authority Special F | 1,085,800  |
| 900,000          | DeKalb County Georgia Hospital Authority Reven | 888,668    |
| 750,000          | DeKalb County Georgia Hospital Authority Reven | 730,433    |
| 1,065,000        | Effingham County Industrial Development Author | 1,003,124  |
| 3,360,000        | Fulton County Residential Care Facilities, 7.0 | 2,541,605  |
| 1,650,000        | Savannah Georgia Economic Development Authorit | 1,598,751  |
|                  |  | 12,062,490 |
|                  | Guam - 2.2%                                    |            |
| 1,000,000        | Guam Government Department Education Certifica | 971,650    |
| 4,400,000        | Northern Mariana Islands, 6.75%, 10/1/33       | 5,081,868  |
|                  |  | 6,053,518  |
|                  | Idaho - 1.8%                                   |            |
| 2,000,000        | Power County Industrial Development Corp., 6.4 | 1,970,120  |
| 3,000,000        | Power County Pollution Control Revenue, 5.625% | 2,994,600  |
|                  |  | 4,964,720  |
|                  | Illinois - 8.6%                                |            |

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|            |  |            |
|------------|--|------------|
| 3,000,000  | Centerpoint Intermodal Center, 7.5%, 6/15/23 ( | 2,999,970  |
| 2,000,000  | City of Chicago Illinois, 5.5%, 12/1/30        | 1,625,140  |
| 1,450,000  | Illinois Finance Authority Revenue, 5.5%, 4/1/ | 1,346,195  |
| 2,000,000  | Illinois Finance Authority Revenue, 6.0%, 8/15 | 2,049,180  |
| 1,000,000  | Illinois Finance Authority Revenue, 6.0%, 11/1 | 748,850    |
| 2,000,000  | Illinois Finance Authority Revenue, 6.0%, 8/15 | 2,102,820  |
| 2,500,000  | Illinois Finance Authority Revenue, 6.125%, 11 | 2,203,275  |
| 6,000,000  | Illinois Finance Authority Revenue, 8.25%, 5/1 | 5,958,360  |
| 2,500,000  | Illinois Finance Authority Revenue, 8.25%, 2/1 | 2,471,350  |
| 1,500,000  | Illinois Health Facilities Authority Revenue,  | 552,600    |
| 2,440,000  | Southwestern Illinois Development Authority Re | 1,678,793  |
|            |  | 23,736,533 |
|            | Indiana - 6.0%                                 |            |
| 250,000    | East Chicago Indiana Exempt Facilities Revenue | 239,295    |
| 10,000,000 | Indiana State Development Finance Authority Re | 10,083,200 |
| 5,000,000  | Jasper County Industrial Economic Development  | 4,502,850  |
| 1,900,000  | Vincennes Industrial Economic Development Reve | 1,631,549  |
|            |  | 16,456,894 |
|            | Kansas - 0.3%                                  |            |
| 1,000,000  | Kansas Development Finance Authority, 5.0%, 5/ | 901,050    |
|            | Kentucky - 1.4%                                |            |
| 4,400,000  | Kentucky Economic Development Finance Authorit | 3,774,496  |
|            | Louisiana - 5.1%                               |            |
| 2,500,000  | Louisiana Local Government Environmental Facil | 2,512,425  |
| 6,000,000  | Louisiana Public Facilities Authority Revenue, | 5,070,120  |
| 750,000    | Opelousas Louisiana General Hospital Authority | 751,425    |
| 5,915,000  | Tobacco Settlement Financing Corp., 5.875%, 5/ | 5,644,093  |
|            |  | 13,978,063 |
|            | Maryland - 1.5%                                |            |
| 460,000    | Maryland Health & Higher Educational Facilitie | 366,855    |
| 1,250,000  | Maryland Health & Higher Educational Facilitie | 860,038    |
| 1,250,000  | Maryland Health & Higher Educational Facilitie | 1,096,050  |
| 2,000,000  | Maryland Health & Higher Educational Facilitie | 1,937,140  |
|            |  | 4,260,083  |
|            | Massachusetts - 8.4%                           |            |
| 755,000    | Massachusetts Development Finance Agency, 5.25 | 713,090    |
| 5,000,000  | Massachusetts Development Finance Agency, 5.75 | 5,050,750  |
| 1,930,000  | Massachusetts Development Finance Agency, 7.1% | 1,735,070  |
| 2,195,000  | Massachusetts Health & Educational Facilities  | 1,903,592  |
| 1,000,000  | Massachusetts Health & Educational Facilities  | 1,093,039  |
| 3,420,000  | Massachusetts Health & Educational Facilities  | 2,868,559  |
| 10,760,000 | Massachusetts Housing Finance Agency, 5.35%, 1 | 9,727,255  |
|            |  | 23,091,355 |
|            | Michigan - 3.7%                                |            |
| 1,500,000  | Delta County Michigan Economic Development Cor | 1,606,995  |
| 500,001    | Flint Michigan Hospital Building Authority Rev | 483,650    |
| 3,000,000  | Macomb County Hospital Finance Authority Reven | 3,407,520  |
| 735,000    | Michigan Public Educational Facilities Authori | 644,419    |
| 4,130,000  | Michigan State Hospital Finance Authority Reve | 3,991,232  |
| 3,405,000  | Wayne Charter Escrow, 0.0%, 12/1/15            | 34         |
|            |  | 10,133,850 |
|            | Missouri - 1.5%                                |            |
| 1,500,000  | St. Louis Industrial Development Authority Rev | 780,660    |
| 6,640,000  | St. Louis Industrial Development Authority Rev | 3,451,472  |
|            |  | 4,232,132  |
|            | Montana - 0.6%                                 |            |
| 2,445,000  | Hardin Increment Industrial Infrastructure Dev | 1,391,181  |
| 1,000,000  | Two Rivers Authority, Inc., Project Revenue, 7 | 150,040    |
|            |  | 1,541,221  |
|            | Nevada - 2.2%                                  |            |
| 1,500,000  | Henderson Nevada Health Care Facilities Revenu | 1,526,400  |
| 1,600,000  | Nevada State Department of Business & Industry | 15         |

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|            |  |            |
|------------|--|------------|
| 1,000,000  | Nevada State Department of Business & Industry | 10         |
| 1,320,000  | Nevada State Department of Business & Industry | 13         |
| 5,000,000  | Reno Nevada Hospital Revenue, 5.25%, 6/1/41    | 4,402,550  |
|            |  | 5,928,988  |
|            | New Hampshire - 0.4%                           |            |
| 1,125,000  | New Hampshire Health & Educational Facilities  | 1,027,046  |
|            | New Jersey - 12.5%                             |            |
| 2,500,000  | Burlington County New Jersey Bridge Commission | 2,046,800  |
| 13,000,000 | New Jersey Economic Development Authority Reve | 12,105,080 |
| 3,500,000  | New Jersey State Turnpike Authority, RIB, 13.4 | 3,982,090  |
| 15,375,000 | New Jersey Transportation Trust Fund Authority | 5,614,950  |
| 1,000,000  | Tobacco Settlement Financing Corp., 6.25%, 6/1 | 1,123,170  |
| 3,250,000  | Tobacco Settlement Financing Corp., 6.75%, 6/1 | 3,688,945  |
| 5,000,000  | Tobacco Settlement Financing Corp., 7.0%, 6/1/ | 5,703,750  |
|            |  | 34,264,785 |
|            | New York - 8.1%                                |            |
| 1,800,000  | Dutchess County Industrial Development Agency, | 1,742,652  |
| 3,000,000  | Nassau County New York Industrial Development  | 2,750,760  |
| 5,000,000  | New York City Industrial Development Agency, 5 | 3,842,450  |
| 3,950,000  | New York City Industrial Development Agency, 7 | 3,976,663  |
| 2,000,000  | New York State Dormitory Authority Revenue, 6. | 1,937,900  |
| 5,000,000  | New York State Environmental Facilities Corp., | 4,926,900  |
| 3,000,000  | Ulster County New York Industrial Development  | 2,634,510  |
| 500,000    | Ulster County New York Industrial Development  | 394,865    |
|            |  | 22,206,700 |
|            | North Carolina - 1.7%                          |            |
| 5,010,000  | Charlotte North Carolina Special Facilities Re | 4,808,748  |
|            | Ohio - 2.9%                                    |            |
| 1,635,000  | Belmont County Health System Revenue, 5.7%, 1/ | 1,193,500  |
| 1,000,000  | Belmont County Health System Revenue, 5.8%, 1/ | 730,460    |
| 5,000,000  | Buckeye Tobacco Settlement Financing Authority | 3,587,550  |
| 3,000,000  | Cleveland Airport Special Revenue, 5.375%, 9/1 | 2,508,330  |
|            |  | 8,019,840  |
|            | Oklahoma - 2.9%                                |            |
| 1,295,000  | Jackson County Memorial Hospital Authority Rev | 1,295,376  |
| 2,220,000  | Tulsa Municipal Airport Trust Revenue, 6.25%,  | 2,103,494  |
| 1,500,000  | Tulsa Municipal Airport Trust Revenue, 7.35%,  | 1,493,910  |
| 3,000,000  | Tulsa Municipal Airport Trust Revenue, 7.75%,  | 3,064,380  |
|            |  | 7,957,160  |
|            | Oregon - 1.0%                                  |            |
| 3,000,000  | Oregon State Facilities Authority Revenue, 5.2 | 2,775,120  |
|            | Pennsylvania - 7.3%                            |            |
| 3,600,000  | Columbia County Hospital Authority Revenue, 5. | 3,088,764  |
| 830,000    | Hazleton Health Services Authority Hospital Re | 830,407    |
| 1,430,000  | Pennsylvania Economic Development Financing Au | 1,239,367  |
| 2,330,000  | Pennsylvania Economic Development Financing Au | 2,307,749  |
| 5,000,000  | Pennsylvania Economic Development Financing Au | 4,235,800  |
| 5,000,000  | Philadelphia Hospitals & Higher Education Faci | 4,118,400  |
| 2,005,000  | Scranton-Lackawanna Health & Welfare Authority | 1,987,436  |
| 2,245,000  | Scranton-Lackawanna Health & Welfare Authority | 2,188,269  |
|            |  | 19,996,192 |
|            | Rhode Island - 3.1%                            |            |
| 1,385,000  | Central Falls Rhode Island Detention Facilitie | 1,138,525  |
| 8,285,000  | Tobacco Settlement Financing Corp., 6.25%, 6/1 | 7,431,810  |
|            |  | 8,570,335  |
|            | South Carolina - 5.3%                          |            |
| 1,500,000  | Connector 2000 Association, Inc., Toll Road Re | 221,250    |
| 7,140,000  | South Carolina Jobs Economic Development Autho | 8,006,439  |
| 860,000    | South Carolina Jobs Economic Development Autho | 974,681    |
| 4,400,000  | Tobacco Settlement Revenue Management, 6.375%, | 5,365,800  |
|            |  | 14,568,170 |

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|   |  |              |
|---|--|--------------|
| Tennessee - 3.8%  |  |              |
| 1,000,000   | Johnson City Health & Educational Facilities B | 1,105,860    |
| 7,000,000   | Knox County Health Educational & Housing Facil | 7,353,920    |
| 2,400,000   | Sullivan County Health Educational and Housing | 2,040,816    |
|   |  | 10,500,596   |
| Texas - 18.1%   |  |              |
| 4,095,000   | Dallas-Fort Worth International Airport Facili | 4,255,196    |
| 2,827,398   | Gulf Coast Industrial Development Authority, 7 | 222,658      |
| 10,000,000  | Houston Texas Airport System Special Facilitie | 9,850,700    |
| 845,000   | IAH Public Facility Corp., Project Revenue Bon | 786,509      |
| 1,000,000   | IAH Public Facility Corp., Project Revenue Bon | 859,760      |
| 1,350,000   | IAH Public Facility Corp., Project Revenue Bon | 1,119,110    |
| 2,750,000   | Lower Colorado River Authority, 5.0%, 5/15/31  | 2,691,370    |
| 845,000   | Lubbock Health Facilities Development Corp., 6 | 798,567      |
| 2,000,000   | Lubbock Health Facilities Development Corp., 6 | 1,798,820    |
| 7,750,000   | Matagorda County Navigation District Number 1  | 7,319,565    |
| 9,750,000   | North Texas Tollway Authority Revenue, 5.75%,  | 9,351,128    |
| 1,711,000   | Panhandle Regional Housing Finance Corp. Multi | 1,759,267    |
| 1,000,000   | Richardson Hospital Authority Revenue, 6.0%, 1 | 897,390      |
| 1,000,000   | Tarrant County Cultural Education Facilities F | 1,004,100    |
| 1,500,000   | Tarrant County Cultural Education Facilities F | 1,513,335    |
| 1,000,000   | Texas Midwest Public Facility Corp. Revenue, 9 | 984,270      |
| 4,700,000   | Tomball Hospital Authority, 6.0%, 7/1/25       | 4,702,961    |
|   |  | 49,914,706   |
| Utah - 0.4%   |  |              |
| 1,600,000   | Spanish Fork Charter School Revenue, 5.7%, 11/ | 1,192,000    |
| Virginia - 0.8%   |  |              |
| 2,000,000   | Washington County Industrial Development Autho | 2,209,140    |
| Washington - 3.9%   |  |              |
| 1,155,000   | Tobacco Settlement Authority Revenue, 6.5%, 6/ | 1,168,179    |
| 2,000,000   | Washington State Health Care Facilities Author | 1,982,960    |
| 2,500,000   | Washington State Health Care Facilities Author | 2,208,125    |
| 2,000,000   | Washington State Health Care Facilities Author | 1,999,820    |
| 5,000,000   | Washington State Housing Finance Commission No | 3,469,650    |
|   |  | 10,828,734   |
| Wisconsin - 1.4%  |  |              |
| 2,900,000   | Aztalan Wisconsin Exempt Facilities Revenue, 7 | 362,500      |
| 1,000,000   | Wisconsin State Health & Educational Facilitie | 970,530      |
| 1,000,000   | Wisconsin State Health & Educational Facilitie | 928,930      |
| 1,500,000   | Wisconsin State Health & Educational Facilitie | 1,577,145    |
|   |  | 3,839,105    |
| TOTAL TAX-EXEMPT OBLIGATIONS                                  |  |              |
|   | (Cost \$411,041,321)                           | 403,795,438  |
| MUNICIPAL COLLATERALIZED DEBT OBLIGATION - 2.9% of Net Assets |  |              |
| 13,000,000  | Non-Profit Preferred Funding Trust I, Series E | 7,849,530    |
|   | TOTAL MUNICIPAL COLLATERALIZED DEBT OBLIGATION |              |
|   | (Cost \$13,000,000)                            | 7,849,530    |
| Shares  | COMMON STOCK - 0.5% of Net Assets              |              |
| 110,442   | Delta Airlines, Inc.                           | 1,391,569    |
|   | TOTAL COMMON STOCK                             |              |
|   | (Cost \$3,210,349)                             | 1,391,569    |
| TOTAL INVESTMENTS IN SECURITIES - 150.1%                      |  |              |
|   | (Cost \$427,251,670) (i) (j)                   | 413,036,537  |
|   | OTHER ASSETS AND LIABILITIES 4.4%              | 12,086,014   |
|   | PREFERRED SHARES AT REDEMPTION VALUE, INCLUDIN | -150,010,569 |
|   | NET ASSETS APPLICABLE TO COMMON SHAREOWNERS -  | 275,111,982  |

(144A) Security is exempt from registration under Rule 144A of the Securities

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Act of 1933.

Such securities may be resold normally to qualified institutional buyers in a transaction exempt from registration.

At December 31, 2010, the value of these securities amounted to \$29,560,603, or 10.7% 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 rate shown is the coupon rate at December 31, 2010.

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

(c) The interest rate is subject to change periodically. The interest rate shown is the rate at December 31, 2010.

(d) Non-income producing.

(e) Security is fair valued (See Note A).

(f) 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, 2010.

(g) Indicates a security that has been deemed illiquid. The aggregate cost of

illiquid securities is \$16,342,295. The aggregate value is \$8,212,043, or 3.0% of the total net assets applied to common shareowners.

(h) Escrow to maturity.

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

|                           |       |
|---------------------------|-------|
| Insured                   |       |
| FSA                       | 5.9 % |
| AMBAC                     | 1.8   |
| MBIA                      | 1.4   |
| AGM                       | 0.7   |
| Q-SBLF                    | 0.2   |
| Health Revenue            | 35.5  |
| Tobacco Revenue           | 11.1  |
| Development Revenue       | 9.7   |
| Airport Revenue           | 8.7   |
| Other Revenue             | 7.4   |
| Pollution Control Revenue | 6.5   |
| Housing Revenue           | 2.8   |
| Facilities Revenue        | 2.5   |
| Transportation Revenue    | 2.3   |

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|                    |        |
|--------------------|--------|
| Education Revenue  | 1.2    |
| Water Revenue      | 1.2    |
| Power Revenue      | 1.1    |
| Utilities Revenue* | 0.0    |
|                    | 100.0% |

Amount is less than 0.1%

- (j) At December 31, 2010, the net unrealized gain on investments based on cost for federal income tax purposes of \$421,164,839 was as follows:

Aggregate gross unrealized gain for all investments in which there is an excess of value over tax cost \$ 31,254,889

Aggregate gross unrealized loss for all investments in which there is an excess of tax cost over value (39,383,191)  
 Net unrealized gain \$ (8,128,302)

For financial reporting purposes net unrealized loss on investments was \$14,215,133 and cost of investments aggregated \$427,251,670.

Purchases and sales of securities (excluding temporary cash investments) for the nine months ended December 31, 2010 aggregated \$35,093,146 and \$30,073,880, respectively.

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, 2010, in valuing the Trust's Investments:

The following is a summary of the inputs used as of December 31, 2010, in valuing the Fund's assets:

|                          | Level 1     | Level 2       | Level 3 | Total         |
|--------------------------|-------------|---------------|---------|---------------|
| Tax exempt obligations   | \$0         | \$403,795,404 | \$0     | \$403,795,404 |
| Municipal collateralized | 0           | 7,849,530     | 34      | 7,849,564     |
| Common Stock             | 1,391,569   | 0             | 0       | 1,391,569     |
| Total                    | \$1,391,569 | \$411,644,934 | \$34    | \$413,036,537 |

Following is a reconciliation of assets valued using significant unobservable inputs (Level 3):

|                       |                                      |
|-----------------------|--------------------------------------|
|                       | Tax-Exempt<br>Obligation<br>Michigan |
| Balance as of 3/31/10 | \$0                                  |
| Realized gain (loss)  | 0                                    |

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|                                  |      |
|----------------------------------|------|
| Change in unrealized gain (loss) | 0    |
| Net purchases (sales)            | 34   |
| Transfers in and out of level 3  |      |
| Balance as of 12/31/10           | \$34 |

### ITEM 2. CONTROLS AND PROCEDURES.

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

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.



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John F. Cogan, Jr, President

Date March 1, 2011

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, 2011

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

Date March 1, 2011

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