

Pioneer Municipal High Income Advantage Fund, Inc.

Schedule of Investments | December 31,
2024

Ticker Symbol: MAV

Schedule of Investments | 12/31/24

(unaudited)

Principal Amount USD (\$)		Value
UNAFFILIATED ISSUERS — 121.0%		
MUNICIPAL BONDS — 121.0% of Net Assets(a)		
Alabama — 1.8%		
2,500,000	Mobile County Industrial Development Authority, Calvert LLC Project, Series A, 5.00%, 6/1/54	\$ 2,526,350
1,400,000	Mobile County Industrial Development Authority, Calvert LLC Project, Series B, 4.75%, 12/1/54	1,343,020
Total Alabama		\$ 3,869,370
Arizona — 1.4%		
1,325,000	Arizona Industrial Development Authority, Doral Academy Nevada Fire Mesa, Series A, 5.00%, 7/15/39	\$ 1,325,252
1,965,000	Industrial Development Authority of the City of Phoenix, 3rd & Indian School Assisted Living Project, 5.40%, 10/1/36	1,795,813
Total Arizona		\$ 3,121,065
Arkansas — 5.4%		
1,500,000	Arkansas Development Finance Authority, Big River Steel Project, 4.75%, 9/1/49 (144A)	\$ 1,497,930
10,000,000	Arkansas Development Finance Authority, Green Bond, 5.45%, 9/1/52	10,214,400
Total Arkansas		\$ 11,712,330
California — 13.1%		
38,610,000(b)	California County Tobacco Securitization Agency, Capital Appreciation, Stanislaus County, Subordinated, Series A, 6/1/46	\$ 10,988,020
1,500,000	California Municipal Finance Authority, Series A, 5.25%, 11/1/52 (AGM Insured)	1,596,405
1,000,000	California Municipal Finance Authority, Westside Neighborhood School Project, 6.375%, 6/15/64 (144A)	1,082,630
300,000	California School Finance Authority, Envision Education - Obligated Group, Series A, 5.00%, 6/1/54 (144A)	305,733
600,000	California School Finance Authority, New Designs Charter School Project, Series A, 5.00%, 6/1/64 (144A)	592,134
1,875,000	California Statewide Communities Development Authority, Lancer Plaza Project, 5.875%, 11/1/43	1,878,150
2,000,000	California Statewide Communities Development Authority, Loma Linda University Medical Center, 5.50%, 12/1/58 (144A)	2,062,440

Principal Amount USD (\$)		Value
California — (continued)		
5,915,000	California Statewide Communities Development Authority, Loma Linda University Medical Center, Series A, 5.00%, 12/1/46 (144A)	\$ 5,946,290
4,000,000	San Diego County Regional Airport Authority, Private Activity, Series B, 5.25%, 7/1/58	4,207,000
	Total California	\$ 28,658,802
Colorado — 2.1%		
1,000,000	Aerotropolis Regional Transportation Authority, 4.375%, 12/1/52	\$ 882,330
1,250,000	Colorado Educational & Cultural Facilities Authority, Ascent Classical Academy Charter Schools, Inc Project, 5.75%, 4/1/59 (144A)	1,290,438
2,350,000	Dominion Water & Sanitation District, 5.875%, 12/1/52	2,369,975
	Total Colorado	\$ 4,542,743
Delaware — 0.5%		
450,000	Delaware State Economic Development Authority, Aspira of Delaware Charter, 3.00%, 6/1/32	\$ 405,297
700,000	Delaware State Economic Development Authority, Aspira of Delaware Charter, 4.00%, 6/1/42	627,130
	Total Delaware	\$ 1,032,427
District of Columbia — 3.9%		
500,000	District of Columbia, Union Market Project, Series A, 5.125%, 6/1/34 (144A)	\$ 499,600
5,715,000	District of Columbia Tobacco Settlement Financing Corp., Asset-Backed, 6.75%, 5/15/40	5,907,081
2,000,000	Washington Metropolitan Area Transit Authority Dedicated Revenue, Climate Transition Bonds, Series A, 5.25%, 7/15/59	2,150,620
	Total District of Columbia	\$ 8,557,301
Florida — 4.4%		
600,000	Capital Projects Finance Authority, Navigator Academy Of Leadership Obligated Group Project, 5.00%, 6/15/54 (144A)	\$ 582,264
940,000	Capital Projects Finance Authority, Navigator Academy Of Leadership Obligated Group Project, 5.00%, 6/15/64 (144A)	891,844
1,410,000	Capital Projects Finance Authority, Unionwest Properties LLC Project, Series A-1, 5.25%, 6/1/44 (144A)	1,444,912

Schedule of Investments | 12/31/24 (unaudited) (continued)

Principal Amount USD (\$)		Value
Florida — (continued)		
750,000	Capital Trust Authority, Mason Classical Academy Project, Series A, 5.00%, 6/1/54 (144A)	\$ 747,412
850,000	Capital Trust Authority, Mason Classical Academy Project, Series A, 5.00%, 6/1/64 (144A)	824,381
750,000	City of Venice, Village On The Isle Project, Series A, 5.625%, 1/1/60 (144A)	763,987
825,000	County of Lake, Imagine South Lake, Charter School Project, 5.00%, 1/15/49 (144A)	804,936
1,000,000	Florida Development Finance Corp., Brightline Florida Passenger Rail Project, 5.25%, 7/1/53 (AGM Insured)	1,033,140
1,000,000	Florida Development Finance Corp., Brightline Florida Passenger Rail Project, 5.50%, 7/1/53	1,005,430
500,000	Florida Development Finance Corp., The Henry Project, Series A-1, 5.25%, 6/1/54 (144A)	506,730
1,000,000	Florida Development Finance Corp., The Henry Project, Series A-1, 5.25%, 6/1/59 (144A)	1,005,120
	Total Florida	\$ 9,610,156
Idaho — 0.9%		
2,000,000	Power County Industrial Development Corp., FMC Corp. Project, 6.45%, 8/1/32	\$ 2,005,360
	Total Idaho	\$ 2,005,360
Illinois — 6.0%		
3,760,000(c)	Chicago Board of Education, Series A, 5.00%, 12/1/47	\$ 3,680,438
1,000,000(c)	Chicago Board of Education, Series A, 7.00%, 12/1/46 (144A)	1,063,030
1,200,000(c)	Chicago Board of Education, Series D, 5.00%, 12/1/46	1,170,072
2,000,000(c)	Chicago Board of Education, Series H, 5.00%, 12/1/46	1,950,480
1,250,000	Chicago O'Hare International Airport, Series A, 5.50%, 1/1/59	1,334,363
2,000,000(c)	City of Chicago, Series B-R, 5.50%, 1/1/34	2,002,320
140,903(b)	Illinois Finance Authority, Cabs Clare Oaks Project, Series B-1, 11/15/52	14
54,417(d)(e)	Illinois Finance Authority, Clare Oaks Project, Series A-3, 4.00%, 11/15/52	1,633
2,000,000	Metropolitan Pier & Exposition Authority, McCormick Place Expansion, 4.00%, 6/15/50	1,795,420
631,129(d)	Southwestern Illinois Development Authority, Village of Sauget Project, 5.625%, 11/1/26	132,537
	Total Illinois	\$ 13,130,307

Principal Amount USD (\$)		Value
	Indiana — 0.8%	
750,000	City of Valparaiso, Pratt Paper LLC Project, 5.00%, 1/1/54 (144A)	\$ 756,533
1,000,000	Indiana Finance Authority, Multipurpose Educational Facilities, Avondale Meadows Academy Project, 5.125%, 7/1/37	1,009,750
	Total Indiana	\$ 1,766,283
	Iowa — 4.1%	
6,900,000	Iowa Finance Authority, Alcoa Inc. Projects, 4.75%, 8/1/42	\$ 6,903,726
2,055,000	Iowa Tobacco Settlement Authority, Series A-2, 4.00%, 6/1/49	1,966,450
	Total Iowa	\$ 8,870,176
	Louisiana — 0.3%	
700,000	Louisiana Public Facilities Authority, I-10 Calcasieu River Bridge Public-Private Partnership Project, 5.75%, 9/1/64	\$ 750,736
	Total Louisiana	\$ 750,736
	Massachusetts — 4.8%	
370,000	Massachusetts Development Finance Agency, Gingercare Living Issue, Series A, 5.50%, 12/1/44 (144A)	\$ 357,479
435,000	Massachusetts Development Finance Agency, Gingercare Living Issue, Series A, 5.875%, 12/1/60 (144A)	419,068
8,000,000	Massachusetts Development Finance Agency, WGBH Educational Foundation, Series A, 5.75%, 1/1/42 (AMBAC Insured)	9,783,360
	Total Massachusetts	\$ 10,559,907
	Michigan — 2.4%	
1,955,000	David Ellis Academy-West, 5.25%, 6/1/45	\$ 1,761,827
3,000,000	Michigan Finance Authority, The Henry Ford Health Detroit South Campus Central Utility Plant Project, 5.50%, 2/28/49	3,290,940
205,000	Michigan Public Educational Facilities Authority, Crescent Academy, 7.00%, 10/1/36	205,496
	Total Michigan	\$ 5,258,263

Schedule of Investments | 12/31/24

(unaudited) (continued)

Principal Amount USD (\$)		Value
	Minnesota — 0.7%	
650,000	City of Brooklyn Park, Prairie Seeds Academy Project, 5.25%, 6/15/64	\$ 626,366
1,000,000	City of Ham Lake, DaVinci Academy, Series A, 5.00%, 7/1/47	937,740
	Total Minnesota	\$ 1,564,106
	Montana — 0.2%	
2,445,000(d)(e)	City of Hardin, Tax Allocation, Rocky Mountain Power, Inc., Project, 6.25%, 9/1/31	\$ 464,550
1,000,000(d)	Two Rivers Authority, 7.375%, 11/1/27	15,000
	Total Montana	\$ 479,550
	New Hampshire — 0.5%	
1,375,000	New Hampshire Health and Education Facilities Authority Act, Catholic Medical Centre, 3.75%, 7/1/40	\$ 1,143,904
	Total New Hampshire	\$ 1,143,904
	New York — 11.0%	
2,000,000	Erie Tobacco Asset Securitization Corp., Asset-Backed, Series A, 5.00%, 6/1/45	\$ 1,876,540
2,000,000	Metropolitan Transportation Authority, Green Bond, Series C-1, 5.25%, 11/15/55	2,087,340
5,000,000	Metropolitan Transportation Authority, Green Bond, Series D-2, 4.00%, 11/15/48	4,669,600
1,500,000	Metropolitan Transportation Authority Dedicated Tax Fund, Series B-1, 4.00%, 11/15/54	1,402,770
2,530,000	New York Counties Tobacco Trust IV, Series A, 5.00%, 6/1/45	2,388,775
3,240,000	New York Counties Tobacco Trust VI, Series 2B, 5.00%, 6/1/45	3,094,168
1,750,000	New York Transportation Development Corp., Green Bond, 5.375%, 6/30/60	1,791,300
5,500,000	New York Transportation Development Corp., John F. Kennedy International Airport New Terminal One Project, 5.50%, 6/30/60	5,762,405
1,000,000	Westchester County Local Development Corp., Purchase Senior Learning Community, Inc. Project, 4.50%, 7/1/56 (144A)	917,690
	Total New York	\$ 23,990,588
	North Carolina — 2.2%	
4,000,000	North Carolina Medical Care Commission, Carolina Meadows, 5.25%, 12/1/54	\$ 4,272,920

Principal Amount USD (\$)		Value
	North Carolina — (continued)	
200,000	North Carolina Medical Care Commission, Penick Village Project, Series A, 5.50%, 9/1/44	\$ 206,114
220,000	North Carolina Medical Care Commission, Penick Village Project, Series A, 5.50%, 9/1/54	222,587
	Total North Carolina	\$ 4,701,621
	Ohio — 8.3%	
14,355,000	Buckeye Tobacco Settlement Financing Authority, Senior Class 2, Series B-2, 5.00%, 6/1/55	\$ 12,703,601
1,500,000	County of Muskingum, Genesis Healthcare System Project, 5.00%, 2/15/44	1,500,060
1,995,000	Ohio Housing Finance Agency, Mortgage-Backed Securities Program, Series B, 4.70%, 9/1/54 (GNMA/FNMA/FHLMC Insured)	1,952,606
2,000,000	State of Ohio, 5.00%, 12/31/39	2,004,040
	Total Ohio	\$ 18,160,307
	Pennsylvania — 8.5%	
500,000	Allentown Commercial and Industrial Development Authority, Executive Education Academy Charter School Project, 5.00%, 7/1/59 (144A)	\$ 473,255
1,500,000	Allentown Neighborhood Improvement Zone Development Authority, Waterfront - 30 E. Allen Street Project, Series A, 5.25%, 5/1/42 (144A)	1,520,625
1,000,000	Chester County Industrial Development Authority, Collegium Charter School, Series A, 5.25%, 10/15/47	977,680
300,000	Chester County Industrial Development Authority, Renaissance Academy Charter School Project, 4.50%, 10/1/64 (144A)	277,977
6,665,000	Montgomery County Higher Education and Health Authority, Thomas Jefferson University, 4.00%, 9/1/49	6,088,678
2,000,000	Montgomery County Industrial Development Authority, The Haverford School Project, 4.00%, 3/1/49	1,805,660
3,335,000	Pennsylvania Higher Educational Facilities Authority, University of Pennsylvania, 4.00%, 8/15/49	3,154,843
2,500,000(e)	Philadelphia Authority for Industrial Development, 5.125%, 12/15/44 (144A)	2,376,825
500,000	Philadelphia Authority for Industrial Development, 5.50%, 6/1/49 (144A)	501,610

Schedule of Investments | 12/31/24

(unaudited) (continued)

Principal Amount USD (\$)		Value
	Pennsylvania — (continued)	
1,000,000	Philadelphia Authority for Industrial Development, Global Leadership Academy Charter School Project, Series A, 5.00%, 11/15/50	\$ 876,400
470,000	Philadelphia Authority for Industrial Development, Greater Philadelphia Health Action, Inc., Project, Series A, 6.625%, 6/1/50	470,160
	Total Pennsylvania	\$ 18,523,713
	Puerto Rico — 18.7%	
2,692,857(e)	Commonwealth of Puerto Rico, 11/1/43	\$ 1,642,643
2,375,679(c)	Commonwealth of Puerto Rico, Restructured Series A-1, 4.00%, 7/1/37	2,325,790
5,021,480(c)	Commonwealth of Puerto Rico, Restructured Series A-1, 4.00%, 7/1/41	4,902,370
6,810,000(c)	Commonwealth of Puerto Rico, Restructured Series A-1, 4.00%, 7/1/46	6,282,497
14,250,000	Puerto Rico Commonwealth Aqueduct & Sewer Authority, Series A, 5.00%, 7/1/47 (144A)	14,342,198
1,400,000(e)	Puerto Rico Industrial Development Co., 7.00%, 1/1/54	1,331,050
9,996,000	Puerto Rico Sales Tax Financing Corp. Sales Tax Revenue, Restructured Series A-1, 5.00%, 7/1/58	9,896,040
	Total Puerto Rico	\$ 40,722,588
	Rhode Island — 0.3%	
1,355,000(d)	Central Falls Detention Facility Corp., 7.25%, 7/15/35	\$ 542,000
	Total Rhode Island	\$ 542,000
	South Carolina — 2.6%	
550,000	South Carolina Jobs-Economic Development Authority, Beaufort Memorial Hospital & South Of Broad Healthcare Project, 5.75%, 11/15/54	\$ 580,745
4,400,000(f)	Tobacco Settlement Revenue Management Authority, Series B, 6.375%, 5/15/30	5,043,808
	Total South Carolina	\$ 5,624,553
	Tennessee — 0.3%	
550,000	Knox County Health Educational & Housing Facility Board, University of Tennessee Project, Series B-1, 5.25%, 7/1/64 (BAM Insured)	\$ 567,490
	Total Tennessee	\$ 567,490
	Texas — 7.8%	
450,000	Arlington Higher Education Finance Corp., BASIS Texas Charter Schools, Inc., 4.875%, 6/15/59 (144A)	\$ 442,418

Principal Amount USD (\$)		Value
Texas — (continued)		
300,000	Arlington Higher Education Finance Corp., Great Hearts America, Series A, 5.00%, 8/15/54	\$ 292,101
500,000	Arlington Higher Education Finance Corp., LTTS Charter School, Universal Academy, 5.45%, 3/1/49 (144A)	511,930
1,000,000	Arlington Higher Education Finance Corp., Universal Academy, Series A, 7.00%, 3/1/34	1,001,600
1,500,000	Arlington Higher Education Finance Corp., Universal Academy, Series A, 7.125%, 3/1/44	1,500,210
7,345,000	City of Houston Airport System Revenue, 4.00%, 7/15/41	6,760,044
1,000,000	City of Houston Airport System Revenue, Series A, 4.00%, 7/1/41	931,970
5,000,000(d)(e)	Greater Texas Cultural Education Facilities Finance Corp., 9.00%, 2/1/50 (144A)	3,050,000
2,430,000	Greater Texas Cultural Education Facilities Finance Corp., Texas Biomedical Research Institute Project, Series A, 5.25%, 6/1/54	2,552,982
Total Texas		\$ 17,043,255
Utah — 0.5%		
400,000	Mida Mountain Village Public Infrastructure District, Series 1, 5.125%, 6/15/54 (144A)	\$ 379,612
600,000	Mida Mountain Village Public Infrastructure District, Series 2, 6.00%, 6/15/54 (144A)	617,502
Total Utah		\$ 997,114
Virginia — 7.0%		
1,000,000	Lynchburg Economic Development Authority, 3.00%, 1/1/51	\$ 735,520
50,000	Tobacco Settlement Financing Corp., Series B-1, 5.00%, 6/1/47	49,068
1,000,000	Virginia Small Business Financing Authority, Senior Lien, 5.00%, 12/31/47	1,008,390
1,000,000	Virginia Small Business Financing Authority, Senior Lien 95 Express Lanes LLC Project, 4.00%, 1/1/48	891,590
5,500,000	Virginia Small Business Financing Authority, Transform 66-P3 Project, 5.00%, 12/31/49	5,541,250
2,500,000	Virginia Small Business Financing Authority, Transform 66-P3 Project, 5.00%, 12/31/52	2,515,375
4,600,000	Virginia Small Business Financing Authority, Transform 66-P3 Project, 5.00%, 12/31/56	4,620,562
Total Virginia		\$ 15,361,755

Schedule of Investments | 12/31/24 (unaudited) (continued)

Principal Amount USD (\$)		Value
500,000	Washington — 0.2% Washington State Housing Finance Commission, Radford Court And Nordhem Court Portfolio, 5.00%, 7/1/54	\$ 516,725
	Total Washington	\$ 516,725
750,000	Wisconsin — 0.3% Public Finance Authority, Roseman University Health Sciences Project, 5.875%, 4/1/45	\$ 752,340
	Total Wisconsin	\$ 752,340
	TOTAL MUNICIPAL BONDS (Cost \$258,259,477)	\$264,136,835
	TOTAL INVESTMENTS IN UNAFFILIATED ISSUERS — 121.0% (Cost \$258,259,477)	\$264,136,835
	OTHER ASSETS AND LIABILITIES — (21.0)%	\$(45,867,057)
	NET ASSETS — 100.0%	\$218,269,778

AGM Assured Guaranty Municipal Corp.

AMBAC Ambac Assurance Corporation.

BAM Build America Mutual Assurance Company.

(144A) The resale of such security is exempt from registration under Rule 144A of the Securities Act of 1933. Such securities may be resold normally to qualified institutional buyers. At December 31, 2024, the value of these securities amounted to \$48,856,533, or 22.4% of net assets.

(a) Consists of Revenue Bonds unless otherwise indicated.

(b) Security issued with a zero coupon. Income is recognized through accretion of discount.

(c) Represents a General Obligation Bond.

(d) Security is in default.

(e) The interest rate is subject to change periodically. The interest rate and/or reference index and spread shown at December 31, 2024.

(f) Escrow to maturity.

FUTURES CONTRACTS

FIXED INCOME INDEX FUTURES CONTRACTS

Number of Contracts Long	Description	Expiration Date	Notional Amount	Market Value	Unrealized (Depreciation)
135	U.S. Long Bond (CBT)	3/20/25	\$15,737,348	\$15,368,906	\$(368,442)
TOTAL FUTURES CONTRACTS			\$15,737,348	\$15,368,906	\$(368,442)

CBT Chicago Board of Trade.

Various inputs are used in determining the value of the Fund's investments. These inputs are summarized in the three broad levels below.

Level 1 - unadjusted 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 risks, etc.).

Level 3 - significant unobservable inputs (including the Adviser's own assumptions in determining fair value of investments).

The following is a summary of the inputs used as of December 31, 2024 in valuing the Fund's investments:

	Level 1	Level 2	Level 3	Total
Municipal Bonds	\$ —	\$264,136,835	\$—	\$264,136,835
Total Investments in Securities	\$ —	\$264,136,835	\$—	\$264,136,835
Other Financial Instruments				
Net unrealized depreciation on futures contracts	\$(368,442)	\$ —	\$—	\$(368,442)
Total Other Financial Instruments	\$(368,442)	\$ —	\$—	\$(368,442)

During the period ended December 31, 2024, there were no transfers in or out of Level 3.