

# Pioneer Municipal High Income Advantage Fund, Inc.

Schedule of Investments | June 30, 2024

Ticker Symbol: MAV

# Schedule of Investments | 6/30/24

(unaudited)

Principal Amount USD (\$)		Value
<b>UNAFFILIATED ISSUERS — 122.0%</b>		
<b>MUNICIPAL BONDS — 122.0% of Net Assets(a)</b>		
<b>Alabama — 0.6%</b>		
1,250,000	Mobile County Industrial Development Authority, Calvert LLC Project, Series A, 5.00%, 6/1/54	\$ 1,271,587
	<b>Total Alabama</b>	<b>\$ 1,271,587</b>
<b>Arizona — 1.4%</b>		
1,325,000	Arizona Industrial Development Authority, Doral Academy Nevada Fire Mesa, Series A, 5.00%, 7/15/39	\$ 1,327,875
1,965,000	Industrial Development Authority of the City of Phoenix, 3rd & Indian School Assisted Living Project, 5.40%, 10/1/36	1,760,345
	<b>Total Arizona</b>	<b>\$ 3,088,220</b>
<b>Arkansas — 5.3%</b>		
1,500,000	Arkansas Development Finance Authority, Big River Steel Project, 4.75%, 9/1/49 (144A)	\$ 1,491,180
10,000,000	Arkansas Development Finance Authority, Green Bond, 5.45%, 9/1/52	10,076,400
	<b>Total Arkansas</b>	<b>\$ 11,567,580</b>
<b>California — 14.4%</b>		
38,610,000(b)	California County Tobacco Securitization Agency, Capital Appreciation, Stanislaus County, Subordinated, Series A, 6/1/46	\$ 10,195,743
5,000,000	California Health Facilities Financing Authority, Cedars-Sinai Health System, Series A, 3.00%, 8/15/51	3,922,900
1,500,000	California Municipal Finance Authority, Series A, 5.25%, 11/1/52 (AGM Insured)	1,596,585
1,000,000	California Municipal Finance Authority, Westside Neighborhood School Project, 6.375%, 6/15/64 (144A)	1,066,270
600,000	California School Finance Authority, New Designs Charter School Project, Series A, 5.00%, 6/1/64 (144A)	606,126
1,875,000	California Statewide Communities Development Authority, Lancer Plaza Project, 5.875%, 11/1/43	1,878,394
2,000,000	California Statewide Communities Development Authority, Loma Linda University Medical Center, 5.50%, 12/1/58 (144A)	2,057,860

Principal Amount USD (\$)		Value
<b>California — (continued)</b>		
5,915,000	California Statewide Communities Development Authority, Loma Linda University Medical Center, Series A, 5.00%, 12/1/46 (144A)	\$ 5,949,070
4,000,000	San Diego County Regional Airport Authority, Private Activity, Series B, 5.25%, 7/1/58	4,259,560
	<b>Total California</b>	<b>\$ 31,532,508</b>
<b>Colorado — 3.0%</b>		
1,000,000	Aerotropolis Regional Transportation Authority, 4.375%, 12/1/52	\$ 868,190
1,250,000	Colorado Educational & Cultural Facilities Authority, Ascent Classical Academy Charter Schools, Inc Project, Series A, 5.75%, 4/1/59 (144A)	1,281,000
1,148,000(c)	Cottonwood Highlands Metropolitan District No. 1, Series A, 5.00%, 12/1/49	1,147,587
2,350,000	Dominion Water & Sanitation District, 5.875%, 12/1/52	2,358,178
1,000,000	Nine Mile Metropolitan District, 5.125%, 12/1/40	997,810
	<b>Total Colorado</b>	<b>\$ 6,652,765</b>
<b>Delaware — 0.5%</b>		
450,000	Delaware State Economic Development Authority, Aspira of Delaware Charter, 3.00%, 6/1/32	\$ 396,751
700,000	Delaware State Economic Development Authority, Aspira of Delaware Charter, 4.00%, 6/1/42	619,199
	<b>Total Delaware</b>	<b>\$ 1,015,950</b>
<b>District of Columbia — 2.9%</b>		
500,000	District of Columbia, Union Market Project, Series A, 5.125%, 6/1/34 (144A)	\$ 494,890
5,715,000	District of Columbia Tobacco Settlement Financing Corp., Asset-Backed, 6.75%, 5/15/40	5,904,395
	<b>Total District of Columbia</b>	<b>\$ 6,399,285</b>
<b>Florida — 2.7%</b>		
825,000	County of Lake, Imagine South Lake, Charter School Project, 5.00%, 1/15/49 (144A)	\$ 779,328
1,000,000	Florida Development Finance Corp., Brightline Florida Passenger Rail Project, 5.25%, 7/1/53 (AGM Insured)	1,041,360
1,000,000	Florida Development Finance Corp., Brightline Florida Passenger Rail Project, 5.50%, 7/1/53	1,042,950
500,000	Florida Development Finance Corp., The Henry Project, Series A-1, 5.25%, 6/1/54 (144A)	511,230

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(unaudited) (continued)

Principal Amount USD (\$)		Value
<b>Florida — (continued)</b>		
1,000,000	Florida Development Finance Corp., The Henry Project, Series A-1, 5.25%, 6/1/59 (144A)	\$ 1,017,750
2,000,000	State of Florida Department of Transportation Turnpike System Revenue, Series B, 2.00%, 7/1/37	1,520,040
	<b>Total Florida</b>	<b>\$ 5,912,658</b>
<b>Idaho — 0.9%</b>		
2,000,000	Power County Industrial Development Corp., FMC Corp. Project, 6.45%, 8/1/32	\$ 2,005,580
	<b>Total Idaho</b>	<b>\$ 2,005,580</b>
<b>Illinois — 6.3%</b>		
3,760,000(c)	Chicago Board of Education, Series A, 5.00%, 12/1/47	\$ 3,810,347
1,000,000(c)	Chicago Board of Education, Series A, 7.00%, 12/1/46 (144A)	1,072,510
1,200,000(c)	Chicago Board of Education, Series D, 5.00%, 12/1/46	1,200,132
2,000,000(c)	Chicago Board of Education, Series H, 5.00%, 12/1/46	2,005,740
2,000,000(c)	City of Chicago, Series B-R, 5.50%, 1/1/34	2,004,580
140,903(b)(d)	Illinois Finance Authority, Cabs Clare Oaks Project, Series B-1, 11/15/52	8,454
223,202(d)(e)	Illinois Finance Authority, Clare Oaks Project, Series A-3, 4.00%, 11/15/52	145,081
3,000,000	Metropolitan Pier & Exposition Authority, McCormick Place Expansion, 4.00%, 6/15/50	2,807,970
1,015,000(d)	Southwestern Illinois Development Authority, Village of Sauget Project, 5.625%, 11/1/26	710,500
	<b>Total Illinois</b>	<b>\$ 13,765,314</b>
<b>Indiana — 0.8%</b>		
750,000	City of Valparaiso, Pratt Paper LLC Project, 5.00%, 1/1/54 (144A)	\$ 776,407
1,000,000	Indiana Finance Authority, Multipurpose Educational Facilities, Avondale Meadows Academy Project, 5.125%, 7/1/37	1,007,050
	<b>Total Indiana</b>	<b>\$ 1,783,457</b>
<b>Iowa — 3.9%</b>		
6,900,000	Iowa Finance Authority, Alcoa Inc. Projects, 4.75%, 8/1/42	\$ 6,839,901
2,055,000	Iowa Tobacco Settlement Authority, Series A-2, 4.00%, 6/1/49	1,811,339
	<b>Total Iowa</b>	<b>\$ 8,651,240</b>

Principal Amount USD (\$)		Value
2,000,000	<b>Maine — 0.9%</b> Maine Health & Higher Educational Facilities Authority, Series A, 4.00%, 7/1/50	\$ 1,900,500
	<b>Total Maine</b>	<b>\$ 1,900,500</b>
1,000,000(f)	<b>Massachusetts — 6.7%</b> Massachusetts Bay Transportation Authority Sales Tax Revenue, Series A, 5.25%, 7/1/52	\$ 1,103,810
3,500,000	Massachusetts Development Finance Agency, Lowell General Hospital, Series G, 5.00%, 7/1/44	3,486,945
8,000,000	Massachusetts Development Finance Agency, WGBH Educational Foundation, Series A, 5.75%, 1/1/42 (AMBAC Insured)	10,040,880
	<b>Total Massachusetts</b>	<b>\$ 14,631,635</b>
1,955,000	<b>Michigan — 2.4%</b> David Ellis Academy-West, 5.25%, 6/1/45	\$ 1,793,185
3,000,000	Michigan Finance Authority, The Henry Ford Health Detroit South Campus Central Utility Plant Project, 5.50%, 2/28/49	3,281,790
205,000	Michigan Public Educational Facilities Authority, Crescent Academy, 7.00%, 10/1/36	205,494
	<b>Total Michigan</b>	<b>\$ 5,280,469</b>
1,000,000	<b>Minnesota — 0.4%</b> City of Ham Lake, DaVinci Academy, Series A, 5.00%, 7/1/47	\$ 950,100
	<b>Total Minnesota</b>	<b>\$ 950,100</b>
2,445,000(d)(e)	<b>Montana — 0.2%</b> City of Hardin, Tax Allocation, Rocky Mountain Power, Inc., Project, 6.25%, 9/1/31	\$ 489,000
1,000,000(d)	Two Rivers Authority, 7.375%, 11/1/27	40,000
	<b>Total Montana</b>	<b>\$ 529,000</b>
1,375,000	<b>New Hampshire — 0.5%</b> New Hampshire Health and Education Facilities Authority Act, Catholic Medical Centre, 3.75%, 7/1/40	\$ 1,194,132
	<b>Total New Hampshire</b>	<b>\$ 1,194,132</b>
3,000,000	<b>New York — 12.9%</b> Erie Tobacco Asset Securitization Corp., Asset-Backed, Series A, 5.00%, 6/1/45	\$ 2,811,510
2,000,000	Metropolitan Transportation Authority, Green Bond, Series C-1, 5.25%, 11/15/55	2,086,480

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(unaudited) (continued)

Principal Amount USD (\$)		Value
<b>New York — (continued)</b>		
5,000,000	Metropolitan Transportation Authority, Green Bond, Series D-2, 4.00%, 11/15/48	\$ 4,738,200
2,530,000	New York Counties Tobacco Trust IV, Settlement pass through, Series A, 5.00%, 6/1/45	2,313,938
3,240,000	New York Counties Tobacco Trust VI, Series 2B, 5.00%, 6/1/45	3,055,579
4,685,000	New York State Housing Finance Agency, Sustainability Bond, Series G, 2.73%, 11/1/51 (SONYMA Insured)	3,070,971
1,750,000	New York Transportation Development Corp., Green Bond, 5.375%, 6/30/60	1,846,075
5,500,000	New York Transportation Development Corp., Green Bond, 5.50%, 6/30/60	5,794,690
2,000,000	TSASC, Inc., Series B, 5.00%, 6/1/48	1,741,060
1,000,000	Westchester County Local Development Corp., Purchase Senior Learning Community, Inc. Project, 4.50%, 7/1/56 (144A)	870,970
	<b>Total New York</b>	<b>\$ 28,329,473</b>
<b>Ohio — 7.3%</b>		
13,855,000	Buckeye Tobacco Settlement Financing Authority, Senior Class 2, Series B-2, 5.00%, 6/1/55	\$ 12,722,215
1,500,000	County of Muskingum, Genesis Healthcare System Project , 5.00%, 2/15/44	1,424,520
2,000,000	State of Ohio, 5.00%, 12/31/39	2,012,340
	<b>Total Ohio</b>	<b>\$ 16,159,075</b>
<b>Pennsylvania — 8.6%</b>		
1,000,000	Chester County Industrial Development Authority, Collegium Charter School, Series A, 5.25%, 10/15/47	\$ 939,290
6,665,000	Montgomery County Higher Education and Health Authority, Thomas Jefferson University, 4.00%, 9/1/49	6,187,653
2,000,000	Montgomery County Industrial Development Authority, The Haverford School Project, 4.00%, 3/1/49	1,827,660
6,000,000	Pennsylvania Higher Educational Facilities Authority, University of Pennsylvania, 4.00%, 8/15/49	5,797,500
2,500,000(e)	Philadelphia Authority for Industrial Development, 5.125%, 12/15/44 (144A)	2,336,425
500,000	Philadelphia Authority for Industrial Development, 5.50%, 6/1/49 (144A)	500,530

Principal Amount USD (\$)		Value
	<b>Pennsylvania — (continued)</b>	
1,000,000	Philadelphia Authority for Industrial Development, Global Leadership Academy Charter School Project, Series A, 5.00%, 11/15/50	\$ 856,330
470,000	Philadelphia Authority for Industrial Development, Greater Philadelphia Health Action, Inc., Project, Series A, 6.625%, 6/1/50	457,728
	<b>Total Pennsylvania</b>	<b>\$ 18,903,116</b>
	<b>Puerto Rico — 17.9%</b>	
2,885,151(e)	Commonwealth of Puerto Rico, 11/1/43	\$ 1,767,155
2,375,679(c)	Commonwealth of Puerto Rico, Restructured Series A-1, 4.00%, 7/1/37	2,286,805
5,021,480(c)	Commonwealth of Puerto Rico, Restructured Series A-1, 4.00%, 7/1/41	4,708,089
6,810,000(c)	Commonwealth of Puerto Rico, Restructured Series A-1, 4.00%, 7/1/46	6,144,867
14,250,000	Puerto Rico Commonwealth Aqueduct & Sewer Authority, Series A, 5.00%, 7/1/47 (144A)	14,361,720
9,996,000	Puerto Rico Sales Tax Financing Corp. Sales Tax Revenue, Restructured Series A-1, 5.00%, 7/1/58	9,984,905
	<b>Total Puerto Rico</b>	<b>\$ 39,253,541</b>
	<b>Rhode Island — 0.2%</b>	
1,355,000(d)	Central Falls Detention Facility Corp., 7.25%, 7/15/35	\$ 542,000
	<b>Total Rhode Island</b>	<b>\$ 542,000</b>
	<b>South Carolina — 2.3%</b>	
4,400,000(g)	Tobacco Settlement Revenue Management Authority, Series B, 6.375%, 5/15/30	\$ 5,054,588
	<b>Total South Carolina</b>	<b>\$ 5,054,588</b>
	<b>South Dakota — 1.7%</b>	
4,000,000	South Dakota Health & Educational Facilities Authority, Sanford Health, Series B, 4.00%, 11/1/44	\$ 3,853,000
	<b>Total South Dakota</b>	<b>\$ 3,853,000</b>
	<b>Tennessee — 0.3%</b>	
550,000	Knox County Health Educational & Housing Facility Board, University of Tennessee Project, Series B-1, 5.25%, 7/1/64 (BAM Insured)	\$ 578,507
	<b>Total Tennessee</b>	<b>\$ 578,507</b>
	<b>Texas — 8.2%</b>	
450,000(f)	Arlington Higher Education Finance Corp., BASIS Texas Charter Schools, Inc., 4.875%, 6/15/59 (144A)	\$ 440,253

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(unaudited) (continued)

Principal Amount USD (\$)		Value
<b>Texas — (continued)</b>		
300,000	Arlington Higher Education Finance Corp., Great Hearts America, Series A, 5.00%, 8/15/54	\$ 297,900
500,000	Arlington Higher Education Finance Corp., Universal Academy, Series A, 5.45%, 3/1/49 (144A)	525,335
1,000,000	Arlington Higher Education Finance Corp., Universal Academy, Series A, 7.00%, 3/1/34	1,001,480
1,500,000	Arlington Higher Education Finance Corp., Universal Academy, Series A, 7.125%, 3/1/44	1,500,090
7,345,000	City of Houston Airport System Revenue, 4.00%, 7/15/41	6,943,890
1,000,000	City of Houston Airport System Revenue, Series A, 4.00%, 7/1/41	940,710
5,000,000(d)(e)	Greater Texas Cultural Education Facilities Finance Corp., 8.00%, 2/1/50 (144A)	3,050,000
2,430,000(f)	Greater Texas Cultural Education Facilities Finance Corp., Texas Bipomedical Research Institute Project, Series A, 5.25%, 6/1/54	2,542,047
6,960,000(d)+	Sanger Industrial Development Corp., Texas Pellets Project, Series B, 8.00%, 7/1/38	1
1,000,000(e)	Texas Midwest Public Facility Corp., Secure Treatment Facility Project, Restructured, 12/1/30	695,930
<b>Total Texas</b>		<b>\$ 17,937,636</b>
<b>Virginia — 8.0%</b>		
2,035,000	Lynchburg Economic Development Authority, 3.00%, 1/1/51	\$ 1,494,402
50,000	Tobacco Settlement Financing Corp., Series B-1, 5.00%, 6/1/47	46,837
2,000,000	Virginia College Building Authority, Public Higher Education Financing Program, Series C, 3.00%, 9/1/51 (ST INTERCEPT Insured)	1,512,280
10,000(h)	Virginia Public Building Authority, Series A, 4.00%, 8/1/40	10,523
1,000,000	Virginia Small Business Financing Authority, Senior Lien, 5.00%, 12/31/47	997,210
1,000,000	Virginia Small Business Financing Authority, Senior Lien 95 Express Lanes LLC Project, 4.00%, 1/1/48	915,320
5,500,000	Virginia Small Business Financing Authority, Transform 66-P3 Project, 5.00%, 12/31/49	5,445,495



Principal Amount USD (\$)		Value
	<b>Virginia — (continued)</b>	
2,500,000	Virginia Small Business Financing Authority, Transform 66-P3 Project, 5.00%, 12/31/52	\$ 2,462,400
4,600,000	Virginia Small Business Financing Authority, Transform 66-P3 Project, 5.00%, 12/31/56	4,609,430
	<b>Total Virginia</b>	<b>\$ 17,493,897</b>
	<b>Washington — 0.2%</b>	
500,000	Washington State Housing Finance Commission, Radford Court And Nordhem Court Portfolio, 5.00%, 7/1/54	\$ 517,030
	<b>Total Washington</b>	<b>\$ 517,030</b>
	<b>Wisconsin — 0.6%</b>	
750,000	Public Finance Authority, Roseman University Health Sciences Project, 5.875%, 4/1/45	\$ 756,705
500,000	Public Finance Authority, SearStone CCRC Project, Series A, 5.00%, 6/1/37 (144A)	478,005
	<b>Total Wisconsin</b>	<b>\$ 1,234,710</b>
	<b>TOTAL MUNICIPAL BONDS</b> (Cost \$269,086,671)	<b>\$267,988,553</b>
	<b>TOTAL INVESTMENTS IN UNAFFILIATED ISSUERS — 122.0%</b> (Cost \$269,086,671)	<b>\$267,988,553</b>
	<b>OTHER ASSETS AND LIABILITIES — (22.0)%</b>	<b>\$ (48,391,607)</b>
	<b>NET ASSETS — 100.0%</b>	<b>\$219,596,946</b>

AGM	Assured Guaranty Municipal Corp.
AMBAC	Ambac Assurance Corporation.
BAM	Build America Mutual Assurance Company.
SONYMA	State of New York Mortgage Agency.
ST INTERCEPT (144A)	State Aid Intercept. 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 June 30, 2024, the value of these securities amounted to \$39,666,859, or 18.1% 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.

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## (unaudited) (continued)

- (e) The interest rate is subject to change periodically. The interest rate and/or reference index and spread shown at June 30, 2024.
  - (f) Securities purchased on a when-issued basis. Rates do not take effect until settlement date.
  - (g) Escrow to maturity.
  - (h) Pre-refunded 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.
- + Security is valued using significant unobservable inputs (Level 3).

### FUTURES CONTRACTS

#### FIXED INCOME INDEX FUTURES CONTRACTS

Number of Contracts Long	Description	Expiration Date	Notional Amount	Market Value	Unrealized Appreciation
135	U.S. Long Bond (CBT)	9/19/24	\$15,778,832	\$15,972,187	\$193,355
<b>TOTAL FUTURES CONTRACTS</b>			<b>\$15,778,832</b>	<b>\$15,972,187</b>	<b>\$193,355</b>
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 June 30, 2024 in valuing the Fund's investments:

	Level 1	Level 2	Level 3	Total
Municipal Bonds	\$ —	\$267,988,552	\$ 1	\$267,988,553
<b>Total Investments in Securities</b>	<b>\$ —</b>	<b>\$267,988,552</b>	<b>\$ 1</b>	<b>\$267,988,553</b>
<b>Other Financial Instruments</b>				
Net unrealized appreciation on futures contracts	\$193,355	\$ —	\$—	\$ 193,355
<b>Total Other Financial Instruments</b>	<b>\$193,355</b>	<b>\$ —</b>	<b>\$—</b>	<b>\$ 193,355</b>

Transfers are calculated on the beginning of period values. During the period ended June 30, 2024, a security valued at \$696 was transferred from Level 2 to Level 3, due to valuing the security using observable inputs. There were no other transfers in or out of Level 3 during the period.