

BLACKROCK MUNIVEST FUND, INC.

Form N-Q

July 24, 2017

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: 811-05611

Name of Fund: BlackRock MuniVest Fund, Inc. (MVF)

Fund Address: 100 Bellevue Parkway, Wilmington, DE 19809

Name and address of agent for service: John M. Perlowski, Chief Executive Officer, BlackRock MuniVest Fund, Inc., 55 East 52nd Street, New York, NY 10055

Registrant's telephone number, including area code: (800) 882-0052, Option 4

Date of fiscal year end: 08/31/2017

Date of reporting period: 05/31/2017

Item 1 Schedule of Investments

Schedule of Investments May 31, 2017 (Unaudited)

BlackRock MuniVest Fund, Inc. (MVF)

(Percentages shown are based on Net Assets)

	Par (000)	Value
Municipal Bonds		
Alabama 3.0%		
City of Selma Alabama IDB, RB, Gulf Opportunity Zone, International Paper Co. Project, Series A: 5.80%, 5/01/34	\$ 1,850	\$ 2,054,573
5.38%, 12/01/35	1,000	1,117,040
Lower Alabama Gas District, RB, Series A, 5.00%, 9/01/46	5,555	6,907,587
State of Alabama Docks Department, Refunding RB, 6.00%, 10/01/20 (a)	7,610	8,817,555
		18,896,755
Alaska 0.5%		
City of Anchorage Alaska Electric Revenue, Refunding RB, Series A, 5.00%, 12/01/41	3,000	3,398,130
Arizona 4.0%		
Arizona IDA, Refunding RB, Basis Schools, Inc. Projects, Series A, 5.38%, 7/01/50 (b)	2,500	2,596,500
City of Phoenix Arizona Civic Improvement Corp., Refunding RB, Junior Lien, Series A, 5.00%, 7/01/40	2,000	2,179,140
City of Phoenix Arizona IDA, RB, Candeo School, Inc. Project: 6.63%, 7/01/33	2,245	2,534,807
6.88%, 7/01/44	3,440	3,899,240
City of Phoenix Arizona IDA, Refunding RB (b): Basis Schools, Inc. Projects, 5.00%, 7/01/35	600	616,026
Basis Schools, Inc. Projects, 5.00%, 7/01/45	760	774,136
Basis Schools, Inc. Projects, Series A, 5.00%, 7/01/35	1,125	1,155,049
Legacy Traditional School Projects, 5.00%, 7/01/45	700	711,137
County of Maricopa Arizona Pollution Control Corp., Refunding RB, Southern California Edison Co., Series A, 5.00%, 6/01/35	3,300	3,598,980
Salt Verde Financial Corp., RB, Senior, 5.00%, 12/01/37	5,725	6,954,959
		25,019,974
California 6.3%		
California Health Facilities Financing Authority, RB: St. Joseph Health System, Series A, 5.75%, 7/01/39	5,000	5,423,400
Municipal Bonds		
California (continued)		
California Health Facilities Financing Authority, RB (continued): Sutter Health, Series B, 6.00%, 8/15/42	\$ 5,600	\$ 6,406,512
California Health Facilities Financing Authority, Refunding RB, Dignity Health, Series A, 6.00%, 7/01/19 (a)	1,055	1,165,564
City of Los Angeles California Department of Airports, Refunding ARB, Los Angeles International Airport, Series A, 5.25%, 5/15/39	1,200	1,294,008
Los Angeles Community College District, GO, Refunding, Election of 2008, Series A, 6.00%, 8/01/19 (a)	9,585	10,632,161
Oakland Unified School District/Alameda County, GO, Series A, 5.00%, 8/01/40	1,000	1,156,410
Poway Unified School District, GO, Refunding, CAB, School Facilities Improvement District No. 2007-1, Election of 2008, Series B, 0.00%, 8/01/46 (c)	10,000	2,975,100
State of California, GO, Various Purposes, 6.50%, 4/01/33	9,675	10,658,367
		39,711,522
Colorado 0.8%		
Centerra Metropolitan District No. 1, Tax Allocation Bonds, 5.00%, 12/01/47	1,025	1,037,741
Colorado Health Facilities Authority, RB, Catholic Health Initiatives, Series D, 6.25%, 10/01/33	2,500	2,643,450
Copperleaf Metropolitan District No. 2, GO, Refunding, 5.75%, 12/01/45	1,000	1,044,740
Regional Transportation District, COP, Refunding, Series A, 5.38%, 6/01/31	385	424,358
		5,150,289
Connecticut 1.9%		
Connecticut State Health & Educational Facility Authority, RB, Yale University, Series Z3, 5.05%, 7/01/42	12,000	12,042,480

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Schedule of Investments (continued)

BlackRock MuniVest Fund, Inc. (MVF)

	Par (000)	Value
Municipal Bonds		
Delaware 0.4%		
County of Sussex Delaware, RB, NRG Energy, Inc., Indian River Power LLC Project, 6.00%, 10/01/40	\$ 2,500	\$ 2,699,350
District of Columbia 0.2%		
Metropolitan Washington DC Airports Authority, Refunding RB, Dulles Toll Road, 1st Senior Lien, Series A:		
5.00%, 10/01/39	415	445,374
5.25%, 10/01/44	650	700,069
		1,145,443
Florida 8.8%		
Celebration Pointe Community Development District, Special Assessment Bonds, County of Alachua Florida (b):		
5.00%, 5/01/32	905	920,539
5.00%, 5/01/48	2,270	2,276,946
County of Miami-Dade Florida, GO, Building Better Communities Program (a):		
Series B, 6.38%, 7/01/18	4,630	4,904,189
Series B-1, 5.63%, 7/01/18	5,000	5,255,750
County of Miami-Dade Florida, Refunding RB, Transit System Sales Surtax, 5.00%, 7/01/42	3,750	4,189,200
County of Miami-Dade Florida Aviation, Refunding ARB, Miami International Airport:		
Series A, AMT (AGC), 5.00%, 10/01/40	10,000	10,100,700
Series A-1, 5.38%, 10/01/41	10,290	11,369,112
County of Miami-Dade Florida Educational Facilities Authority, Refunding RB, University of Miami, Series A, 5.00%, 4/01/45	4,625	5,194,199
County of Miami-Dade Florida Expressway Authority, RB, Toll System, Series A (AGM), 5.00%, 7/01/35	8,900	9,789,822
Lakewood Ranch Stewardship District, Special Assessment Bonds, Lakewood National & Polo Run Projects:		
4.63%, 5/01/27	255	261,005
5.25%, 5/01/37	470	481,666
	Par (000)	Value
Municipal Bonds		
Florida (continued)		
Lakewood Ranch Stewardship District, Special Assessment Bonds, Lakewood National & Polo Run Projects (continued):		
5.38%, 5/01/47	\$ 770	\$ 790,505
		55,533,633
Georgia 0.8%		
City of Atlanta Georgia Department of Aviation, Refunding GARB, Series B, AMT, 5.00%, 1/01/29	1,070	1,180,445
DeKalb Georgia Private Hospital Authority, Refunding RB, Children s Healthcare, 5.25%, 11/15/39	3,335	3,637,918
		4,818,363
Hawaii 0.9%		
State of Hawaii Harbor System, RB, Series A, 5.50%, 7/01/35	5,000	5,517,550
Illinois 9.7%		
City of Chicago Illinois Transit Authority, RB, Sales Tax Receipts, 5.25%, 12/01/36	2,110	2,285,341
City of Chicago Illinois Wastewater Transmission, Refunding RB, 2nd Lien, Series C, 5.00%, 1/01/39	1,000	1,088,700
City of Chicago Illinois Waterworks, Refunding RB, 2nd Lien (AGM), 5.25%, 11/01/33	1,330	1,384,357
County of Cook Illinois Community College District No. 508, GO, University & College Improvements, 5.25%, 12/01/31	5,000	5,402,150
Illinois Finance Authority, RB:		
Advocate Health Care Network, Series D, 6.50%, 11/01/18 (a)	9,700	10,462,323
Memorial Health System, Series A, 5.25%, 7/01/44	1,785	1,918,322
Illinois Finance Authority, Refunding RB:		
Northwestern Memorial Hospital, Series A, 6.00%, 8/15/39	9,000	9,914,490
OSF Healthcare System, 6.00%, 5/15/20 (a)	3,205	3,652,161
OSF Healthcare System, 6.00%, 5/15/39	1,455	1,609,710
Presence Health Network, Series C, 4.00%, 2/15/41	2,205	2,045,204

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BLACKROCK MUNIVEST FUND, INC.

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Schedule of Investments (continued)

BlackRock MuniVest Fund, Inc. (MVF)

	Par (000)	Value
Municipal Bonds		
Illinois (continued)		
Illinois Finance Authority, Refunding RB (continued):		
Presence Health Network, Series C, 5.00%, 2/15/41	\$ 3,600	\$ 3,880,980
Railsplitter Tobacco Settlement Authority, RB, 6.00%, 6/01/28	2,645	3,028,393
Regional Transportation Authority, RB:		
Series A (AMBAC), 7.20%, 11/01/20	1,595	1,774,326
Series C (NPFGC), 7.75%, 6/01/20	2,230	2,451,305
Village of Hodgkins Illinois, RB, Metropolitan Biosolids Management LLC Project, AMT, 6.00%, 11/01/23	10,000	10,016,400
		60,914,162
Indiana 2.3%		
City of Valparaiso Indiana, RB, Exempt Facilities, Pratt Paper LLC Project, AMT, 6.75%, 1/01/34	2,250	2,681,662
Indiana Finance Authority, RB, Baptist Healthcare System Obligated Group, Series A, 5.00%, 8/15/51	4,920	5,311,534
Indiana Finance Authority, Refunding RB, Deaconess Health System, Series A, 5.00%, 3/01/39	3,000	3,376,680
State of Indiana Finance Authority, RB, Private Activity Bond, Ohio River Bridges, Series A, AMT, 5.00%, 7/01/40	2,640	2,826,094
		14,195,970
Iowa 0.9%		
Iowa Finance Authority, Refunding RB, Midwestern Disaster Area, Iowa Fertilizer Co. Project, 5.25%, 12/01/25	4,500	4,649,985
Iowa Tobacco Settlement Authority, Refunding RB, Asset-Backed, CAB, Series B, 5.60%, 6/01/34	1,000	1,000,040
		5,650,025
Kansas 1.0%		
City of Lenexa Kansas, Refunding RB, Lakeview Village, Inc., Series A, 5.00%, 5/15/43	1,965	2,014,538
	Par (000)	Value
Municipal Bonds		
Kansas (continued)		
Wyandotte County-Kansas City Unified Government Utility System, RB, Series A, 5.00%, 9/01/40	\$ 3,700	\$ 4,202,349
		6,216,887
Kentucky 2.8%		
County of Owen Kentucky, RB, Kentucky American Water Co. Project, Series B, 5.63%, 9/01/39	1,000	1,073,600
Kentucky Economic Development Finance Authority, Refunding RB, Hospital Facilities, St. Elizabeth Medical Center, Inc., Series A, 5.50%, 5/01/19 (a)	8,000	8,681,680
Lexington-Fayette Urban County Airport Board, Refunding GARB, Series A, 5.00%, 7/01/19 (a)	7,000	7,578,830
		17,334,110
Louisiana 3.3%		
Louisiana Local Government Environmental Facilities & Community Development Authority, RB, Westlake Chemical Corp. Project, Series A-1, 6.50%, 11/01/35	2,615	2,985,415
Parish of St. Charles Louisiana, RB, Valero Energy Corp., 4.00%, 12/01/40 (d)	2,210	2,351,197
Tobacco Settlement Financing Corp., Refunding RB, Asset-Backed, Series A:		
5.25%, 5/15/31	3,420	3,679,817
5.25%, 5/15/32	4,375	4,764,113
5.25%, 5/15/33	4,750	5,149,855
5.25%, 5/15/35	1,500	1,637,205
		20,567,602
Maine 1.0%		
Maine Health & Higher Educational Facilities Authority, RB, Series A, 5.00%, 7/01/39	5,000	5,331,500

Schedule of Investments (continued)

BlackRock MuniVest Fund, Inc. (MVF)

	Par (000)	Value
Municipal Bonds		
Maine (continued)		
Portland Housing Development Corp., Refunding RB, Senior Living, Retirement Facilities, Series A, 6.00%, 2/01/34	\$ 1,190	\$ 1,191,666
		6,523,166
Maryland 3.2%		
City of Baltimore Maryland, Refunding RB, East Baltimore Research Park, Series A, 4.50%, 9/01/33 (e)	545	558,451
County of Howard Maryland Housing Commission, RB, M/F Housing, Woodfield Oxford Square Apartments, 5.00%, 12/01/42	4,935	5,603,989
Maryland Health & Higher Educational Facilities Authority, Refunding RB:		
Charlestown Community Project, 6.25%, 1/01/21 (a)	2,000	2,357,820
Meritus Medical Center Issue, 5.00%, 7/01/40	6,350	6,982,523
University of Maryland Medical System, 5.00%, 7/01/19 (a)	1,990	2,154,135
University of Maryland Medical System, 5.13%, 7/01/19 (a)	2,100	2,278,605
University of Maryland Medical System, 5.00%, 7/01/34	110	115,615
		20,051,138
Massachusetts 3.0%		
Massachusetts Bay Transportation Authority, Refunding RB, General Transportation System, Series A, 7.00%, 3/01/19	740	770,954
Massachusetts Development Finance Agency, RB, Emerson College Issue, Series A:		
5.00%, 1/01/47	845	938,694
5.25%, 1/01/42	1,895	2,166,288
Massachusetts HFA, RB, M/F Housing, Series A, AMT, 5.20%, 12/01/37	2,865	2,869,154
Massachusetts HFA, Refunding RB, Series C, AMT, 5.35%, 12/01/42	5,070	5,403,048
Municipal Bonds		
Massachusetts (continued)		
Massachusetts Water Resources Authority, RB, Series A, 6.50%, 7/15/19 (f)	\$ 6,685	\$ 6,984,087
		19,132,225
Michigan 2.4%		
City of Detroit Michigan Water Supply System Revenue, RB, 2nd Lien, Series B (AGM):		
6.25%, 7/01/19 (a)	2,495	2,766,007
6.25%, 7/01/36	5	5,457
Michigan State Hospital Finance Authority, Refunding RB, McLaren Health Care, Series A, 5.75%, 5/15/18 (a)	7,285	7,623,097
Royal Oak Michigan Hospital Finance Authority, Refunding RB, William Beaumont Hospital, Series V, 8.25%, 9/01/18 (a)	4,100	4,471,460
		14,866,021
Minnesota 0.2%		
City of Cologne Minnesota Charter School, LRB, Cologne Academy Project, Series A, 5.00%, 7/01/45	1,500	1,529,505
Mississippi 4.5%		
County of Lowndes Mississippi, Refunding RB, Solid Waste Disposal & Pollution Control, Weyerhaeuser Co. Project:		
Series A, 6.80%, 4/01/22	9,160	10,701,262
Series B, 6.70%, 4/01/22	4,500	5,240,385
Mississippi Business Finance Corp., Refunding RB, System Energy Resource, Inc. Project, 5.88%, 4/01/22	9,305	9,396,375
Mississippi Development Bank, Refunding RB, Municipal Energy Agency Of Mississippi, Series A (AGM), 4.00%, 3/01/41	3,000	3,112,080
		28,450,102
Nebraska 1.1%		
Central Plains Nebraska Energy Project, RB, Gas Project No. 3, 5.00%, 9/01/42	6,200	6,666,798
New Hampshire 0.7%		
New Hampshire Housing Finance Authority, Refunding RB, S/F Housing, Acquisition, Series H, AMT, 5.15%, 1/01/40	4,170	4,174,128

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BLACKROCK MUNIVEST FUND, INC.

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Schedule of Investments (continued)

BlackRock MuniVest Fund, Inc. (MVF)

	Par (000)	Value
Municipal Bonds		
New Jersey 8.7%		
Casino Reinvestment Development Authority, Refunding RB, 5.25%, 11/01/44	\$ 1,400	\$ 1,428,364
New Jersey EDA, RB:		
Continental Airlines, Inc. Project, Series A, AMT, 5.63%, 11/15/30	1,530	1,720,516
Goethals Bridge Replacement Project, AMT, Private Activity Bond, 5.38%, 1/01/43	10,000	11,181,500
Goethals Bridge Replacement Project, AMT, Private Activity Bond, 5.13%, 1/01/34	1,050	1,139,555
School Facilities Construction, Series UU, 5.00%, 6/15/40	3,390	3,452,308
New Jersey EDA, Refunding RB, School Facilities Construction:		
5.25%, 6/15/19 (a)	2,650	2,881,478
Series AA, 5.25%, 6/15/19 (a)	700	761,145
Series AA, 5.25%, 12/15/33	6,650	6,787,721
New Jersey Housing & Mortgage Finance Agency, RB, S/F Housing, Series AA, 6.38%, 10/01/28	50	51,558
New Jersey Transportation Trust Fund Authority, RB:		
CAB, Transportation System, Series A, 0.00%, 12/15/38 (c)	7,260	2,348,029
Transportation Program, Series AA, 5.25%, 6/15/33	8,750	9,173,587
Transportation Program, Series AA, 5.25%, 6/15/41	780	818,548
Transportation Program, Series AA, 5.00%, 6/15/44	4,450	4,526,451
Transportation System, Series B, 5.50%, 6/15/31	8,000	8,458,560
		54,729,320
New York 7.6%		
Build NYC Resource Corp., Refunding RB, Pratt Paper, Inc. Project, AMT, 5.00%, 1/01/35 (b)	2,145	2,308,749
City of New York New York Municipal Water Finance Authority, Refunding RB, Water & Sewer System, Series FF-2, 5.50%, 6/15/40	4,150	4,512,046
Counties of New York Tobacco Trust IV, Refunding RB, Settlement Pass-Through Turbo, Series A, 6.25%, 6/01/41 (b)	3,500	3,645,495
	Par (000)	Value
Municipal Bonds		
New York (continued)		
Erie Tobacco Asset Securitization Corp., Refunding RB, Asset-Backed, Series A, 5.00%, 6/01/45	\$ 4,435	\$ 4,409,853
Metropolitan Transportation Authority, RB, Series C:		
6.25%, 11/15/18 (a)	25	26,946
6.25%, 11/15/18 (a)	2,595	2,796,969
6.50%, 11/15/18 (a)	925	1,000,332
6.50%, 11/15/18 (a)	11,135	12,041,834
6.25%, 11/15/23	625	673,844
6.50%, 11/15/28	2,865	3,098,813
New York Liberty Development Corp., Refunding RB, 3 World Trade Center Project, Class 2 (b):		
5.15%, 11/15/34	460	499,206
5.38%, 11/15/40	1,145	1,248,691
New York Transportation Development Corp., ARB, LaGuardia Airport Terminal B Redevelopment Project, Series A, AMT, 5.25%, 1/01/50		
	1,225	1,348,014
New York Transportation Development Corp., Refunding RB, American Airlines, Inc., AMT:		
5.00%, 8/01/26	1,285	1,383,290
5.00%, 8/01/31	3,070	3,269,888
Port Authority of New York & New Jersey, ARB, Special Project, JFK International Air Terminal LLC Project, Series 8, 6.00%, 12/01/36		
	3,165	3,571,766
TSASC, Inc., Refunding RB, Series A, 5.00%, 6/01/41	1,785	1,967,141
		47,802,877
Ohio 3.4%		
County of Allen Ohio Hospital Facilities, Refunding RB, Catholic Healthcare Partners, Series A, 5.25%, 6/01/38	2,875	3,119,490
County of Franklin Ohio, RB, Health Care Facilities Improvement, OPRS Communities Obligation Group, Series A, 6.13%, 7/01/40	1,690	1,877,438
County of Lucas Ohio, Refunding RB, Promedica Healthcare, Series A, 6.50%, 11/15/37	1,915	2,274,273
County of Montgomery Ohio, RB, Catholic Health Initiatives, Series D-2, 5.45%, 10/01/38	7,430	8,227,090

Schedule of Investments (continued)

BlackRock MuniVest Fund, Inc. (MVF)

	Par (000)	Value
Municipal Bonds		
Ohio (continued)		
County of Montgomery Ohio, Refunding RB, Catholic Health: 5.50%, 5/01/19 (a)	\$ 1,910	\$ 2,074,279
Series A, 5.50%, 5/01/34	3,560	3,746,936
		21,319,506
Oklahoma 0.6%		
Oklahoma Development Finance Authority, RB, Provident Oklahoma Education Resources, Inc., Cross Village Student Housing Project, Series A, 5.25%, 8/01/57	3,275	3,586,518
Pennsylvania 3.1%		
County of Delaware Pennsylvania IDA, Refunding RB, Covanta Project, 5.00%, 7/01/43	5,000	5,035,100
County of Montgomery Pennsylvania IDA, Refunding RB, Whitmarsh Continuing Care Retirement Community, 5.25%, 1/01/40	4,170	4,213,952
Delaware River Port Authority, RB, Series D, 5.00%, 1/01/40	195	211,555
Geisinger Authority Pennsylvania, Refunding RB, Health System, Series A-1, 4.00%, 2/15/47	2,775	2,844,514
Pennsylvania Economic Development Financing Authority, RB, Pennsylvania Bridge Finco LP, 5.00%, 12/31/38	2,565	2,862,104
Pennsylvania HFA, RB, S/F Housing Mortgage, Series 118-B, 4.05%, 10/01/40	3,850	3,977,820
Pennsylvania Turnpike Commission, RB, Series A-1, 5.00%, 12/01/41	440	495,642
		19,640,687
Puerto Rico 1.1%		
Children s Trust Fund, Refunding RB, Tobacco Settlement Asset-Backed Bonds: 5.50%, 5/15/39	3,555	3,572,420
Municipal Bonds		
Puerto Rico (continued)		
Children s Trust Fund, Refunding RB, Tobacco Settlement Asset-Backed Bonds (continued): 5.63%, 5/15/43	\$ 3,400	\$ 3,402,210
		6,974,630
Rhode Island 1.7%		
Rhode Island Health & Educational Building Corp., Refunding RB, Hospital Financing, LifeSpan Obligation Group, 5.00%, 5/15/39	1,425	1,543,617
Tobacco Settlement Financing Corp., Refunding RB, Series B: 4.50%, 6/01/45	6,820	6,902,317
5.00%, 6/01/50	2,000	2,063,860
		10,509,794
South Carolina 1.1%		
State of South Carolina Public Service Authority, Refunding RB, Series E, 5.25%, 12/01/55	6,450	7,190,589
Texas 10.9%		
Central Texas Regional Mobility Authority, RB, Senior Lien, Series A: 5.00%, 1/01/40	1,215	1,377,980
5.00%, 1/01/45	3,500	3,950,835
Central Texas Regional Mobility Authority, Refunding RB, Senior Lien: 5.75%, 1/01/21 (a)	1,000	1,160,250
6.00%, 1/01/21 (a)	4,300	5,026,700
Series A, 5.00%, 1/01/43	6,925	7,572,349
City of Houston Texas Airport System, Refunding ARB, United Airlines, Inc. Terminal E Project, AMT, 5.00%, 7/01/29	2,665	2,862,743
County of Harris Texas Cultural Education Facilities Finance Corp., RB, 1st Mortgage, Brazos Presbyterian Homes, Inc. Project, Series B, 7.00%, 1/01/23 (a)	850	1,094,213
County of Harris Texas Health Facilities Development Corp., Refunding RB, Memorial Hermann Healthcare System, Series B (a): 7.13%, 12/01/18	3,500	3,823,785
7.25%, 12/01/18	5,400	5,909,598

Schedule of Investments (continued)

BlackRock MuniVest Fund, Inc. (MVF)

	Par	
	(000)	Value
Municipal Bonds		
Texas (continued)		
County of Tarrant Texas Cultural Education Facilities Finance Corp., RB, Scott & White Healthcare (a):		
6.00%, 8/15/20	\$ 370	\$ 427,291
6.00%, 8/15/20	4,630	5,346,909
County of Tarrant Texas Cultural Education Facilities Finance Corp., Refunding RB, Trinity Terrace Project, 5.00%, 10/01/44	875	931,805
La Vernia Higher Education Finance Corp., RB, KIPP, Inc., Series A, 6.25%, 8/15/19 (a)	925	1,028,665
Love Field Airport Modernization Corp., RB, Southwest Airlines Co. Project, 5.25%, 11/01/40	1,100	1,193,522
New Hope Cultural Education Facilities Corp., RB, Collegiate Housing Tarleton State University Project, 5.00%, 4/01/35	500	535,395
New Hope Cultural Education Facilities Corp., Refunding RB, 1st Mortgage, Morningside Ministries Project, 6.25%, 1/01/33	1,600	1,803,200
North Texas Education Finance Corp., ERB, Uplift Education, Series A, 5.13%, 12/01/42	1,000	1,053,770
North Texas Tollway Authority, Refunding RB, Series A: 5.00%, 1/01/38	5,000	5,662,750
1st Tier System, 6.25%, 1/01/19 (a)	2,845	3,081,363
1st Tier System, 6.25%, 1/01/39	655	702,206
Texas Private Activity Bond Surface Transportation Corp., RB, Senior Lien:		
LBJ Infrastructure Group LLC, 7.00%, 6/30/40	8,000	9,080,560
NTE Mobility Partners LLC, North Tarrant Express Managed Lanes Project, 6.88%, 12/31/39	4,710	5,305,674
		68,931,563
Virginia 4.1%		
Ballston Quarter Community Development Authority, Tax Allocation Bonds, Series A: 5.38%, 3/01/36	430	431,638
	Par	
	(000)	Value
Municipal Bonds		
Virginia (continued)		
Ballston Quarter Community Development Authority, Tax Allocation Bonds, Series A (continued): 5.50%, 3/01/46	\$ 1,475	\$ 1,482,596
City of Portsmouth Virginia, GO, Refunding Series D: 5.00%, 7/15/20 (a)	3,030	3,397,569
5.00%, 7/15/34	75	82,820
County of Fairfax Virginia EDA, Refunding RB, Goodwin House, Inc. (a): 5.13%, 10/01/17	2,000	2,028,640
5.13%, 10/01/17	6,015	6,101,135
County of Fairfax Virginia IDA, Refunding RB, Health Care-Inova Health: 5.50%, 5/15/19 (a)	735	799,687
5.50%, 5/15/35	1,365	1,472,849
Tobacco Settlement Financing Corp., Refunding RB, Senior Series B-1, 5.00%, 6/01/47	1,895	1,852,382
Virginia Small Business Financing Authority, RB, Senior Lien, Elizabeth River Crossings OpCo LLC Project, AMT: 6.00%, 1/01/37	2,150	2,427,608
5.50%, 1/01/42	5,140	5,645,108
		25,722,032
Washington 5.1%		
Central Puget Sound Regional Transit Authority, RB, Series A (a): 5.00%, 11/01/17	6,000	6,104,160
(AGM), 5.00%, 11/01/17	14,000	14,243,040
Washington Health Care Facilities Authority, RB, Catholic Health Initiatives, Series A, 5.75%, 1/01/45	4,010	4,408,394
Washington Health Care Facilities Authority, Refunding RB, Catholic Health Initiatives, Series D, 6.38%, 10/01/36	7,000	7,426,510
		32,182,104
West Virginia 0.4%		

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West Virginia Hospital Finance Authority, Refunding RB, Improvement, Charleston Area Medical Center, Inc., Series A, 5.63%, 9/01/32	2,500	2,669,225
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BLACKROCK MUNIVEST FUND, INC.

MAY 31, 2017

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Schedule of Investments (continued)

BlackRock MuniVest Fund, Inc. (MVF)

	Par	
	(000)	Value
Municipal Bonds		
Wisconsin 1.0%		
Wisconsin Health & Educational Facilities Authority, Refunding RB, Froedtert & Community Health, Inc., Series C, 5.25%, 4/01/19 (a)	\$ 6,100	\$ 6,570,920
Wyoming 1.4%		
County of Sweetwater Wyoming, Refunding RB, Idaho Power Co. Project, Remarketing, 5.25%, 7/15/26	4,500	4,893,075
State of Wyoming Municipal Power Agency, Inc., Refunding RB, Series A (BAM), 5.00%, 1/01/42	1,120	1,279,264
Wyoming Community Development Authority, Refunding RB, Series 2 & 3, 4.05%, 12/01/38	2,475	2,541,330
		8,713,669
Total Municipal Bonds 113.9%		716,748,762
Municipal Bonds Transferred to Tender Option Bond Trusts (g)		
Arizona 0.6%		
City of Phoenix Arizona Civic Improvement Corp., Refunding RB, Water System, Junior Lien, Series A, 5.00%, 7/01/19 (a)	3,500	3,790,920
California 6.2%		
Sacramento Area Flood Control Agency, Refunding, Consolidated Capital Assessment District No. 2, Series A, 5.00%, 10/01/47	14,998	17,473,975
University of California, RB, General, Series O (a):		
5.25%, 5/15/19	6,667	7,222,466
5.25%, 5/15/19	6,667	7,222,467
5.25%, 5/15/19	6,667	7,222,467
		39,141,375
District of Columbia 1.3%		
District of Columbia Water & Sewer Authority, Refunding RB, Senior Lien, Series A, 5.50%, 10/01/18 (a)	7,495	7,952,995
Florida 2.6%		
County of Miami-Dade Florida Water & Sewer System, (AGC), 5.00%, 10/01/39	14,747	16,296,715
	Par	
Municipal Bonds Transferred to Tender Option Bond Trusts (g)		
	(000)	Value
Illinois 4.8%		
State of Illinois Finance Authority, RB, University of Chicago, Series B, 6.25%, 7/01/18 (a)	\$ 10,000	\$ 10,579,900
State of Illinois Toll Highway Authority, RB, Series B, Senior: 5.00%, 1/01/40	10,976	12,457,165
Priority, 5.50%, 1/01/18 (a)	6,999	7,189,350
		30,226,415
Kentucky 1.6%		
County of Louisville & Jefferson Kentucky Metropolitan Government Parking Authority, RB, River City, Inc., 1st Mortgage, Series A, 5.38%, 12/01/19 (a)	9,195	10,180,520
Maryland 1.7%		
City of Baltimore Maryland, RB, Wastewater Project, Sub-Series A, 5.00%, 7/01/46	4,898	5,681,491
State of Maryland Transportation Authority, RB, Transportation Facilities Project (AGM), 5.00%, 7/01/41	4,710	4,910,128
		10,591,619
Nevada 2.8%		
County of Clark Nevada Water Reclamation District, GO, Limited Tax, Series B, 5.75%, 7/01/19 (a)	15,789	17,345,627
New York 5.8%		
City of New York New York Municipal Water Finance Authority, Refunding RB, Water & Sewer System, 2nd General Resolution, Series DD:		

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5.00%, 6/15/18 (a)	3,556	3,702,870
5.00%, 6/15/37	20,643	21,496,928
New York Liberty Development Corp., Refunding RB, 4 World Trade Center Project, 5.75%, 11/15/51 (h)	10,001	11,485,595
		36,685,393
North Carolina 0.8%		
North Carolina Capital Facilities Finance Agency, Refunding RB, Wake Forest University, 5.00%, 1/01/19 (a)	5,000	5,321,500

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BLACKROCK MUNIVEST FUND, INC.

MAY 31, 2017

Schedule of Investments (continued)

BlackRock MuniVest Fund, Inc. (MVF)

	Par	
	(000)	Value
Municipal Bonds Transferred to Tender Option Bond Trusts (g)		
Ohio 2.2%		
Ohio Higher Educational Facility Commission, RB, Cleveland Clinic Health, Series A, 5.25%, 1/01/33	\$ 4,400	\$ 4,506,612
State of Ohio, RB, Cleveland Clinic Health Obligated Group, Series B, 5.50%, 1/01/34	8,500	9,083,950
		13,590,562
Oregon 1.1%		
State of Oregon Housing & Community Services Department, HRB, M/F Housing, Series A, AMT, 4.95%, 7/01/30	6,792	7,073,323
Pennsylvania 0.7%		
County of Westmoreland Pennsylvania Municipal Authority, Refunding RB, (BAM), 5.00%, 8/15/38	3,925	4,476,732
Texas 7.4%		
City of Houston Texas, Refunding RB, Airport System, Senior Lien, Series A, 5.50%, 7/01/34	8,333	8,730,788
City of Houston Texas Higher Education Finance Corp., RB, Rice University Project, Series A, 5.00%, 5/15/40	10,000	10,970,182
County of Harris Texas Health Facilities Development Corp., Refunding RB, School Health Care System, Series B, 5.75%, 7/01/27 (f)	20,970	26,401,859
Texas Department of Housing & Community Affairs, RB, S/F Mortgage, Series B, AMT, 5.25%, 9/01/32	568	568,966
		46,671,795
Virginia 3.6%		
County of Fairfax Virginia EDA, RB, Metrorail Parking System, 5.00%, 4/01/47 (h)	6,960	8,148,838
Virginia Commonwealth Transportation Board, RB, Capital Projects, 5.00%, 5/15/32	7,999	9,010,498
	Par	
Municipal Bonds Transferred to Tender Option Bond Trusts (g)		
Virginia (continued)		
Virginia Small Business Financing Authority, Refunding RB, Sentara Healthcare, 5.00%, 11/01/40	\$ 5,002	\$ 5,424,967
		22,584,303
Washington 1.9%		
Washington Health Care Facilities Authority, Refunding RB, Seattle Children's Hospital, Series B, 5.00%, 10/01/38	10,000	12,045,800
Total Municipal Bonds Transferred to Tender Option Bond Trusts 45.1%		283,975,594
Total Long-Term Investments (Cost \$932,222,182) 159.0%		1,000,724,356
Short-Term Securities		
BlackRock Liquidity Funds, MuniCash, Institutional Class, 0.60% (i)(j)	6,250,916	6,252,166
Total Short-Term Securities (Cost \$6,252,166) 1.0%		6,252,166
Total Investments (Cost \$938,474,348) 160.0%		1,006,976,522
Other Assets Less Liabilities 1.6%		10,660,773
Liability for TOB Trust Certificates, Including Interest Expense and Fees Payable (22.9)%		(144,318,166)
VMTP Shares, at Liquidation Value (38.7)%		(243,800,000)
Net Assets Applicable to Common Shares 100.0%		\$ 629,519,129

* As of May 31, 2017, gross unrealized appreciation and depreciation based on cost

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for U.S. federal income tax purposes were as follows:

Tax cost	\$ 796,770,766
Gross unrealized appreciation	\$ 69,152,414
Gross unrealized depreciation	(2,928,716)
Net unrealized appreciation	\$ 66,223,698

Notes to Schedule of Investments

- (a) U.S. Government securities, held in escrow, are used to pay interest on this security, as well as to retire the bond in full at the date indicated, typically at a premium to par.
- (b) Security exempt from registration pursuant to Rule 144A under the Securities Act of 1933, as amended. These securities may be resold in transactions exempt from registration to qualified institutional investors.

BLACKROCK MUNIVEST FUND, INC.

MAY 31, 2017

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Schedule of Investments (continued)

BlackRock MuniVest Fund, Inc. (MVF)

- (c) Zero-coupon bond.
- (d) Variable rate security. Rate as of period end.
- (e) When-issued security.
- (f) Security is collateralized by municipal bonds or U.S. Treasury obligations.
- (g) Represent bonds transferred to a TOB Trust in exchange of cash and residual certificates received by the Trust. These bonds serve as collateral in a secured borrowing.
- (h) All or a portion of security is subject to a recourse agreement. The aggregate maximum potential amount the Trust could ultimately be required to pay under the agreements, which expire between November 15, 2019 to October 1, 2024, is \$8,954,336.
- (i) During the period ended May 31, 2017, investments in issuers considered to be affiliates of the Trust for purposes of Section 2(a)(3) of the Investment Company Act of 1940, as amended, were as follows:

Affiliate	Shares Held at August 31, 2016	Net Activity	Shares Held at May 31, 2017	Value at May 31, 2017	Income	Net	
						Realized Gain ¹	Change in Unrealized Appreciation (Depreciation)
BlackRock Liquidity Funds, MuniCash, Institutional Class	6,852,839	(601,923)	6,250,916	\$ 6,252,166	\$ 31,015	\$ 7,182	

¹ Includes net capital gain distributions.

- (j) Current yield as of period end.

Derivative Financial Instruments Outstanding as of Period End

Futures Contracts
Contracts

Short	Issue	Expiration	Notional Value	Unrealized Depreciation
(118)	5-Year U.S. Treasury Note	September 2017	\$ 13,960,875	\$ (20,616)
(153)	10-Year U.S. Treasury Note	September 2017	\$ 19,323,422	(58,151)
(123)	Long U.S. Treasury Bond	September 2017	\$ 18,918,937	(153,922)
(40)	Ultra U.S. Treasury Bond	September 2017	\$ 6,605,000	(79,329)
Total				\$ (312,018)

Portfolio Abbreviations

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AGC	Assured Guarantee Corp.
AGM	Assured Guaranty Municipal Corp.
AMBAC	American Municipal Bond Assurance Corp.
AMT	Alternative Minimum Tax (subject to)
ARB	Airport Revenue Bonds
BAM	Build America Mutual Assurance Co.
CAB	Capital Appreciation Bonds
COP	Certificates of Participation
EDA	Economic Development Authority
ERB	Education Revenue Bonds
GARB	General Airport Revenue Bonds
GO	General Obligation Bonds
HFA	Housing Finance Agency
HRB	Housing Revenue Bonds
IDA	Industrial Development Authority
IDB	Industrial Development Board
LRB	Lease Revenue Bonds
M/F	Multi-Family
NPFGC	National Public Finance Guarantee Corp.
RB	Revenue Bonds
S/F	Single-Family

Schedule of Investments (concluded)

BlackRock MuniVest Fund, Inc. (MVF)

Fair Value Hierarchy as of Period End

Various inputs are used in determining the fair value of investments and derivative financial instruments. These inputs to valuation techniques are categorized into a fair value hierarchy consisting of three broad levels for financial reporting purposes as follows:

Level 1 unadjusted price quotations in active markets/exchanges for identical assets or liabilities that the Trust has the ability to access

Level 2 other observable inputs (including, but not limited to, quoted prices for similar assets or liabilities in markets that are active, quoted prices for identical or similar assets or liabilities in markets that are not active, inputs other than quoted prices that are observable for the assets or liabilities (such as interest rates, yield curves, volatilities, prepayment speeds, loss severities, credit risks and default rates) or other market corroborated inputs)

Level 3 unobservable inputs based on the best information available in the circumstances, to the extent observable inputs are not available (including the Trust's own assumptions used in determining the fair value of investments and derivative financial instruments)

The hierarchy gives the highest priority to unadjusted quoted prices in active markets for identical assets or liabilities (Level 1 measurements) and the lowest priority to unobservable inputs (Level 3 measurements). Accordingly, the degree of judgment exercised in determining fair value is greatest for instruments categorized in Level 3. The inputs used to measure fair value may fall into different levels of the fair value hierarchy. In such cases, for disclosure purposes, the fair value hierarchy classification is determined based on the lowest level input that is significant to the fair value measurement in its entirety. Investments classified within Level 3 have significant unobservable inputs used by the BlackRock Global Valuation Methodologies Committee (the Global Valuation Committee) in determining the price for Fair Valued Investments. Level 3 investments include equity or debt issued by privately held companies or funds. There may not be a secondary market, and/or there are a limited number of investors. Level 3 investments may also be adjusted to reflect illiquidity and/or non-transferability, with the amount of such discount estimated by the Global Valuation Committee in the absence of market information.

Changes in valuation techniques may result in transfers into or out of an assigned level within the hierarchy. In accordance with the Trust's policy, transfers between different levels of the fair value hierarchy are deemed to have occurred as of the beginning of the reporting period. The categorization of a value determined for investments and derivative financial instruments is based on the pricing transparency of the investments and derivative financial instruments and is not necessarily an indication of the risks associated with investing in those securities. For information about the Trust's policy regarding valuation of investments and derivative financial instruments, refer to the Trust's most recent financial statements as contained in its semi-annual report.

	Level 1	Level 2	Level 3	Total
Assets:				
Investments:				
Long-Term Investments ¹		\$ 1,000,724,356		\$ 1,000,724,356
Short-Term Securities	\$ 6,252,166			6,252,166
Total	\$ 6,252,166	\$ 1,000,724,356		\$ 1,006,976,522
Derivative Financial Instruments ²				
Liabilities:				
Interest rate contracts	\$ (312,018)			\$ (312,018)

¹ See above Schedule of Investments for values in each state or political sub-division.

² Derivative financial instruments are futures contracts, which are valued at the unrealized appreciation (depreciation) on the instrument. The Trust may hold assets and/or liabilities in which the fair value approximates the carrying for financial reporting purposes. As of period end, such assets and/or liabilities are categorized within the disclosure hierarchy as follows:

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	Level 1	Level 2	Level 3	Total
Liabilities:				
TOB Trust Certificates		\$ (143,982,058)		\$ (143,982,058)
VMTP Shares at Liquidation Value		(243,800,000)		(243,800,000)
Total		\$ (387,782,058)		\$ (387,782,058)

During the period ended May 31, 2017, there were no transfers between levels.

BLACKROCK MUNIVEST FUND, INC.

MAY 31, 2017

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Item 2 Controls and Procedures

- 2(a) The registrant's principal executive and principal financial officers, or persons performing similar functions, have concluded that the registrant's disclosure controls and procedures (as defined in Rule 30a-3(c) under the Investment Company Act of 1940, as amended (the "1940 Act")) are effective as of a date within 90 days of the filing of this report based on the evaluation of these controls and procedures required by Rule 30a-3(b) under the 1940 Act and Rule 13a-15(b) under the Securities Exchange Act of 1934, as amended.
- 2(b) There were no changes in the registrant's internal control over financial reporting (as defined in Rule 30a-3(d) under the 1940 Act) that occurred during the registrant's last fiscal quarter that have materially affected, or are reasonably likely to materially affect, the registrant's internal control over financial reporting.

Item 3 Exhibits

Certifications Attached hereto

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.

BlackRock MuniVest Fund, Inc.

By: /s/ John M. Perlowski

John M. Perlowski

Chief Executive Officer (principal executive officer) of

BlackRock MuniVest Fund, Inc.

Date: July 24, 2017

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: /s/ John M. Perlowski

John M. Perlowski

Chief Executive Officer (principal executive officer) of

BlackRock MuniVest Fund, Inc.

Date: July 24, 2017

By: /s/ Neal J. Andrews

Neal J. Andrews

Chief Financial Officer (principal financial officer) of

BlackRock MuniVest Fund, Inc.

Date: July 24, 2017