

BLACKROCK MUNIVEST FUND, INC.

Form N-Q

July 23, 2015

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: 08/31/2015

Date of reporting period: 05/31/2015

Item 1 Schedule of Investments

Schedule of Investments May 31, 2015 (Unaudited)

BlackRock MuniVest Fund, Inc. (MVF)

(Percentages shown are based on Net Assets)

	Par	
	(000)	Value
Municipal Bonds		
Alabama 1.9%		
City of Selma Alabama IDB, RB, Gulf Opportunity Zone, International Paper Co. Project, Series A:		
5.80%, 5/01/34	\$ 1,850	\$ 2,122,746
5.38%, 12/01/35	1,000	1,127,080
State of Alabama Docks Department, Refunding RB, 6.00%, 10/01/40	7,610	8,826,839
		12,076,665
Alaska 0.7%		
City of Anchorage Alaska Electric Revenue, Refunding RB, Series A, 5.00%, 12/01/41	3,000	3,333,000
Northern Tobacco Securitization Corp., Refunding RB, Tobacco Settlement, Asset-Backed, Series A, 5.00%, 6/01/46	1,250	975,275
		4,308,275
Arizona 4.7%		
City of Phoenix Arizona Civic Improvement Corp., Refunding RB, Junior Lien, Series A, 5.00%, 7/01/40	2,000	2,158,840
City of Phoenix Arizona IDA, RB:		
Basis Schools, Inc. Projects, 5.00%, 7/01/35 (a)	600	608,520
Basis Schools, Inc. Projects, 5.00%, 7/01/45 (a)	760	758,792
Candeo School, Inc. Project, 6.63%, 7/01/33	2,245	2,514,063
Candeo School, Inc. Project, 6.88%, 7/01/44	3,440	3,905,638
City of Phoenix Arizona IDA, Refunding RB, Legacy Traditional School Projects, 5.00%, 7/01/45 (a)	700	688,198
County of Maricopa Arizona IDA, RB, Arizona Charter Schools Project, Series A, 6.75%, 7/01/29	3,430	3,205,438
County of Maricopa Arizona Pollution Control Corp., Refunding RB, Southern California Edison Co., Series A, 5.00%, 6/01/35	3,300	3,683,526
	Par	
	(000)	Value
Municipal Bonds		
Arizona (concluded)		
Salt Verde Financial Corp., RB, Senior, 5.00%, 12/01/37	\$ 11,725	\$ 13,063,643
		30,586,658
California 6.3%		
California Health Facilities Financing Authority, RB:		
St. Joseph Health System, Series A, 5.75%, 7/01/39	5,000	5,738,900
Sutter Health, Series B, 6.00%, 8/15/42	5,600	6,652,352
California Health Facilities Financing Authority, Refunding RB, Catholic Healthcare West, Series A, 6.00%, 7/01/34	1,055	1,210,918
California HFA, RB, S/F Housing, Home Mortgage, Series K, AMT, 5.50%, 2/01/42	495	503,648
City of Los Angeles California Department of Airports, Refunding ARB, Los Angeles International Airport, Series A, 5.25%, 5/15/39	1,200	1,351,908
Los Angeles Community College District California, GO, Refunding, Election of 2008, Series A, 6.00%, 8/01/19 (b)	9,585	11,442,190
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	2,443,200
State of California, GO, Various Purposes, 6.50%, 4/01/33	9,675	11,580,878
		40,923,994
Colorado 1.0%		
Colorado Health Facilities Authority, RB, Catholic Health Initiatives, Series D, 6.25%, 10/01/33	2,500	2,843,175
Colorado Health Facilities Authority, Refunding RB, Evangelical Lutheran, Series A, 5.25%, 6/01/34	3,000	3,011,010

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BLACKROCK MUNIVEST FUND, INC.

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Schedule of Investments (continued)

BlackRock MuniVest Fund, Inc. (MVF)

(Percentages shown are based on Net Assets)

	Par	
	(000)	Value
Municipal Bonds		
Colorado (concluded)		
Regional Transportation District, COP, Refunding, Series A, 5.38%, 6/01/31	\$ 385	\$ 439,304
		6,293,489
Delaware 0.4%		
County of Sussex Delaware, RB, NRG Energy, Inc., Indian River Power LLC Project, 6.00%, 10/01/40	2,500	2,865,850
District of Columbia 0.2%		
Metropolitan Washington Airports Authority, Refunding RB, Dulles Toll Road, 1st Senior Lien, Series A:		
5.00%, 10/01/39	415	449,341
5.25%, 10/01/44	650	719,862
		1,169,203
Florida 7.3%		
County of Miami-Dade Florida, GO, Building Better Communities Program:		
Series B, 6.38%, 7/01/28	4,630	5,302,091
Series B-1, 5.63%, 7/01/38	5,000	5,604,950
County of Miami-Dade Florida, Refunding RB, Transit System Sales Surtax, 5.00%, 7/01/42	3,750	4,112,662
County of Miami-Dade Florida Aviation, Refunding ARB, Miami International Airport:		
Series A, AMT (AGC), 5.00%, 10/01/40	10,000	10,410,700
Series A-1, 5.38%, 10/01/41	10,290	11,584,585
County of Miami-Dade Florida Expressway Authority, RB, Toll System, Series A (AGM), 5.00%, 7/01/35	8,900	9,859,420
		46,874,408
Georgia 1.7%		
City of Atlanta Georgia Department of Aviation, Refunding GARB, Series B, AMT, 5.00%, 1/01/29	1,070	1,166,674
County of DeKalb Georgia Hospital Authority, Refunding RB, DeKalb Medical Center, Inc. Project, 6.13%, 9/01/40	3,570	3,873,878
DeKalb Private Hospital Authority, Refunding RB, Children's Healthcare, 5.25%, 11/15/39	3,335	3,770,985
	Par	
Municipal Bonds		
Georgia (concluded)		
Municipal Electric Authority of Georgia, Refunding RB, Series W, 6.60%, 1/01/18	\$ 1,790	\$ 1,902,663
		10,714,200
Hawaii 0.9%		
State of Hawaii Harbor System, RB, Series A, 5.50%, 7/01/35	5,000	5,697,150
Illinois 10.4%		
City of Chicago Illinois, GARB, O'Hare International Airport, 3rd Lien, Series B-2, AMT (NPFGC), 6.00%, 1/01/27	605	607,759
City of Chicago Illinois, Refunding RB, Sales Tax Receipts, Series A, 5.00%, 1/01/41	4,640	4,746,905
City of Chicago Illinois Midway International Airport, Refunding GARB, 2nd Lien, Series A, 5.00%, 1/01/41	1,740	1,830,463
City of Chicago Illinois Transit Authority, RB, Sales Tax Receipts, 5.25%, 12/01/36	2,110	2,234,975
City of Chicago Illinois Waterworks, Refunding RB, 2nd Lien (AGM), 5.25%, 11/01/33	1,330	1,419,456
County of Cook Illinois Community College District No. 508, GO, University & College Improvements, 5.25%, 12/01/31	5,000	5,595,950
Illinois Finance Authority, RB:		
Advocate Health Care Network, Series D, 6.50%, 11/01/18 (b)	9,700	11,367,236
Community Rehabilitation Providers Facilities, Series A, 6.50%, 7/01/22	575	575,397
Disposal Waste Management, Inc., Series A, AMT, 5.05%, 8/01/29	1,000	1,017,600
Memorial Health System, Series A, 5.25%, 7/01/44	1,785	1,917,411
Illinois Finance Authority, Refunding RB, Series A:		

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Northwestern Memorial Hospital, 6.00%, 8/15/39	9,000	10,321,110
OSF Healthcare System, 6.00%, 5/15/39	4,990	5,777,372
Railsplitter Tobacco Settlement Authority, RB, 6.00%, 6/01/28	2,645	3,122,555

Schedule of Investments (continued)

BlackRock MuniVest Fund, Inc. (MVF)

(Percentages shown are based on Net Assets)

	Par	
	(000)	Value
Municipal Bonds		
Illinois (concluded)		
Regional Transportation Authority, RB:		
Series A (AMBAC), 7.20%, 11/01/20	\$ 2,240	\$ 2,580,682
Series C (NPFGC), 7.75%, 6/01/20	3,455	3,984,755
Village of Hodgkins Illinois, RB, Metropolitan Biosolids Management LLC Project, AMT, 6.00%, 11/01/23	10,000	10,016,600
		67,116,226
Indiana 0.9%		
City of Valparaiso Indiana, RB, Exempt Facilities, Pratt Paper LLC Project, AMT, 6.75%, 1/01/34	2,250	2,720,858
Indiana Finance Authority, RB, Private Activity Bond, Ohio River Bridges, Series A, AMT, 5.00%, 7/01/40	2,640	2,776,092
		5,496,950
Iowa 1.6%		
Iowa Finance Authority, Refunding RB, Midwestern Disaster Area, Iowa Fertilizer Co. Project, 5.25%, 12/01/25	4,500	4,998,060
Iowa Tobacco Settlement Authority, Refunding RB, Asset-Backed:		
CAB, Series B, 5.60%, 6/01/34	1,500	1,421,130
Series C, 5.63%, 6/01/46	4,500	3,966,750
		10,385,940
Kentucky 2.8%		
County of Owen Kentucky, RB, Kentucky American Water Co. Project, Series B, 5.63%, 9/01/39	1,000	1,091,130
Kentucky Economic Development Finance Authority, Refunding RB, Hospital Facilities, St. Elizabeth Medical Center, Inc., Series A, 5.50%, 5/01/39	8,000	8,995,360
	Par	
Municipal Bonds (000) Value		
Kentucky (concluded)		
Lexington-Fayette Urban County Airport Board, Refunding GARB, Series A, 5.00%, 7/01/27	\$ 7,000	\$ 7,885,360
		17,971,850
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	3,137,869
Parish of St. Charles Louisiana, RB, Valero Energy Corp., 4.00%, 12/01/40 (d)	2,210	2,409,651
Tobacco Settlement Financing Corp., Refunding RB, Asset-Backed, Series A:		
5.25%, 5/15/31	3,420	3,825,270
5.25%, 5/15/32	4,375	4,971,575
5.25%, 5/15/33	4,750	5,284,328
5.25%, 5/15/35	1,500	1,676,250
		21,304,943
Maine 1.0%		
Maine Health & Higher Educational Facilities Authority, RB, Series A, 5.00%, 7/01/39	5,000	5,411,450
Portland Housing Development Corp., Refunding RB, Senior Living, Retirement Facilities, Series A, 6.00%, 2/01/34	1,190	1,202,388
		6,613,838
Maryland 1.8%		
Maryland Community Development Administration, HRB, Series H, AMT, 5.10%, 9/01/37	1,835	1,861,626
Maryland Community Development Administration, Refunding, HRB, Residential, Series D, AMT, 4.90%, 9/01/42	3,250	3,280,225
Maryland Health & Higher Educational Facilities Authority, Refunding RB:		
Charlestown Community Project, 6.25%, 1/01/41	2,000	2,222,240

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University of Maryland Medical System, 5.00%, 7/01/34

2,100

2,262,120

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Schedule of Investments (continued)

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(Percentages shown are based on Net Assets)

	Par	
	(000)	Value
Municipal Bonds		
Maryland (concluded)		
Maryland Health & Higher Educational Facilities Authority, Refunding RB (concluded):		
University of Maryland Medical System, 5.13%, 7/01/39	\$ 2,100	\$ 2,262,078
		11,888,289
Massachusetts 4.1%		
Massachusetts Bay Transportation Authority, Refunding RB, General Transportation System, Series A, 7.00%, 3/01/19	1,460	1,566,697
Massachusetts HFA, RB, AMT:		
M/F Housing, Series A, 5.20%, 12/01/37	2,865	2,903,592
S/F Housing, Series 130, 5.00%, 12/01/32	2,500	2,543,125
Massachusetts HFA, Refunding RB, Series C, AMT, 5.35%, 12/01/42	6,550	6,775,320
Massachusetts Water Resources Authority, RB, Series A, 6.50%, 7/15/19 (e)	11,640	12,778,159
		26,566,893
Michigan 3.8%		
City of Detroit Michigan Water Supply System, RB, 2nd Lien, Series B (AGM), 6.25%, 7/01/36	2,500	2,725,875
Michigan State Hospital Finance Authority, Refunding RB, Series A:		
Henry Ford Health System, 5.25%, 11/15/46	7,950	8,298,528
McLaren Health Care, 5.75%, 5/15/18 (b)	7,285	8,252,885
Royal Oak Hospital Finance Authority Michigan, Refunding RB, William Beaumont Hospital, Series V, 8.25%, 9/01/18 (b)	4,100	5,029,306
		24,306,594
Mississippi 4.6%		
County of Lowndes Mississippi, Refunding RB, Solid Waste Disposal & Pollution Control, Weyerhaeuser Co. Project:		
Series A, 6.80%, 4/01/22	9,160	11,523,097
Series B, 6.70%, 4/01/22	4,500	5,608,980
	Par	
	(000)	Value
Municipal Bonds		
Mississippi (concluded)		
Mississippi Business Finance Corp., Refunding RB, System Energy Resource, Inc. Project, 5.88%, 4/01/22	\$ 12,570	\$ 12,645,168
		29,777,245
Nebraska 1.0%		
Central Plains Energy Project Nebraska, RB, Gas Project No. 3, 5.00%, 9/01/42	6,200	6,635,116
New Hampshire 0.8%		
New Hampshire Housing Finance Authority, Refunding RB, S/F Housing, Acquisition, Series H, AMT, 5.15%, 1/01/40	5,160	5,245,501
New Jersey 8.7%		
New Jersey EDA, RB:		
Continental Airlines, Inc. Project, Series A, AMT, 5.63%, 11/15/30	1,530	1,733,964
Private Activity Bond, The Goethals Bridge Replacement Project, AMT, 5.13%, 1/01/34	1,050	1,151,504
School Facilities Construction, Series UU, 5.00%, 6/15/40	3,890	3,920,887
The Goethals Bridge Replacement Project, AMT, 5.38%, 1/01/43	10,000	10,884,600
New Jersey EDA, Refunding RB, School Facilities Construction, Series AA, 5.25%, 12/15/33	10,000	10,229,800
New Jersey Housing & Mortgage Finance Agency, RB, S/F Housing, Series AA, 6.38%, 10/01/28	465	482,819
New Jersey Transportation Trust Fund Authority, RB:		
CAB, Transportation System, Series A, 0.00%, 12/15/38 (c)	7,260	2,042,311
Transportation Program, Series AA, 5.25%, 6/15/33	8,750	9,116,712
Transportation Program, Series AA, 5.00%, 6/15/44	8,075	8,109,803

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Schedule of Investments (continued)

BlackRock MuniVest Fund, Inc. (MVF)

(Percentages shown are based on Net Assets)

	Par	
	(000)	Value
Municipal Bonds		
New Jersey (concluded)		
New Jersey Transportation Trust Fund Authority, RB (concluded): Transportation System, Series B, 5.50%, 6/15/31	\$ 8,000	\$ 8,492,960
		56,165,360
New York 7.8%		
City of New York New York Build Resource Corp., Refunding RB, Pratt Paper, Inc. Project, AMT, 5.00%, 1/01/35 (a)	545	580,654
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	4,775,820
County of New York Tobacco Trust IV, Refunding RB, Settlement Pass-Through Turbo, Series A, 6.25%, 6/01/41 (a)	3,500	3,571,050
Erie Tobacco Asset Securitization Corp., Refunding RB, Asset-Backed, Series A, 5.00%, 6/01/45	4,435	4,068,447
Metropolitan Transportation Authority, RB, Series C: 6.25%, 11/15/23	3,245	3,800,122
6.50%, 11/15/28	14,925	17,582,396
New York Liberty Development Corp., RB, Goldman Sachs Headquarters, 5.50%, 10/01/37	2,000	2,430,220
New York Liberty Development Corp., Refunding RB, 3 World Trade Center Project (a): Class 1, 5.00%, 11/15/44	7,735	7,892,640
Class 2, 5.15%, 11/15/34	460	492,706
Class 2, 5.38%, 11/15/40	1,145	1,237,058
Port Authority of New York & New Jersey, JFK International Air Terminal LLC Project, ARB, Special Project, Series 8, 6.00%, 12/01/36	3,165	3,706,595
		50,137,708
North Carolina 0.6%		
County of Gaston North Carolina Industrial Facilities & Pollution Control Financing Authority, RB, Exempt Facilities, National Gypsum Co. Project, AMT, 5.75%, 8/01/35	4,105	4,106,970
	Par	
Municipal Bonds		
	(000)	Value
Ohio 4.9%		
Buckeye Tobacco Settlement Financing Authority, RB, Asset-Backed, Senior Turbo Term, Series A-2, 6.50%, 6/01/47	\$ 1,125	\$ 980,719
County of Allen Ohio Hospital Facilities, Refunding RB, Catholic Healthcare Partners, Series A, 5.25%, 6/01/38	2,875	3,207,551
County of Franklin Ohio, RB, Health Care Facilities Improvement, OPRS Communities Obligation Group, Series A, 6.13%, 7/01/40	1,690	1,858,256
County of Lucas Ohio, Refunding RB, Promedica Healthcare, Series A, 6.50%, 11/15/37	1,915	2,365,523
County of Montgomery Ohio, RB, Catholic Health Initiatives, Series D-2, 5.45%, 10/01/38	9,230	10,458,974
County of Montgomery Ohio, Refunding RB, Catholic Health, Series A, 5.50%, 5/01/34	5,470	6,183,562
Ohio Higher Educational Facility Commission, Refunding RB, University of Dayton, Series A, 5.00%, 12/01/44	4,350	4,784,913
State of Ohio, RB, Portsmouth Bypass Project, AMT, 5.00%, 6/30/53	1,585	1,667,008
		31,506,506
Pennsylvania 1.1%		
City of Philadelphia Pennsylvania IDA, RB, Retirement Facilities, Rieder House Project, Series A, 6.10%, 7/01/33	1,295	1,296,528
County of Montgomery Pennsylvania IDA, Refunding RB: Albert Einstein Healthcare Network, Series A, 5.25%, 1/15/45 (f)	180	188,865
Whitemarsh Continuing Care, 5.25%, 1/01/40	2,625	2,643,559
Delaware River Port Authority, RB, Series D, 5.00%, 1/01/40	195	213,394

Schedule of Investments (continued)

BlackRock MuniVest Fund, Inc. (MVF)

(Percentages shown are based on Net Assets)

	Par (000)	Value
Municipal Bonds		
Pennsylvania (continued)		
Pennsylvania Economic Development Financing Authority, RB, The Pennsylvania Rapid Bridge Replacement Project, AMT, 5.00%, 12/31/38	\$ 2,565	\$ 2,754,708
		7,097,054
Rhode Island 1.0%		
Tobacco Settlement Financing Corp., Refunding RB, Series B, 4.50%, 6/01/45	6,820	6,580,482
South Carolina 0.2%		
County of Georgetown South Carolina, Refunding RB, International Paper Co. Project, Series A, AMT, 5.55%, 12/01/29	1,000	1,010,560
Texas 12.1%		
Brazos River Authority, Refunding RB, Texas Utility Co., Series A, AMT, 7.70%, 4/01/33 (g)(h)	3,055	297,862
Central Texas Regional Mobility Authority, Refunding RB, Senior Lien: 5.75%, 1/01/31	1,000	1,147,990
6.00%, 1/01/41	4,300	4,957,900
Series A, 5.00%, 1/01/43	6,925	7,472,906
City of Houston Texas Airport System, Refunding ARB, United Airlines, Inc. Terminal E Project, AMT, 5.00%, 7/01/29	2,665	2,814,693
City of San Antonio Texas Water System Revenue, Refunding RB, System Junior Lien, Series B: 5.00%, 5/15/24	500	606,285
5.00%, 5/15/26	1,000	1,202,040
County of Harris Texas Cultural Education Facilities Finance Corp., RB, 1st Mortgage, Brazos Presbyterian Homes, Inc. Project, Series B, 7.00%, 1/01/43	850	1,012,749
County of Harris Texas Health Facilities Development Corp., Refunding RB, Memorial Hermann Healthcare System, Series B (b): 7.13%, 12/01/18	3,500	4,202,835
7.25%, 12/01/18	5,400	6,507,486
County of Tarrant Texas Cultural Education Facilities Finance Corp., RB, Scott & White Healthcare: 6.00%, 8/15/20 (b)	370	453,261
6.00%, 8/15/45	4,630	5,509,191
	Par	
	(000)	Value
Municipal Bonds		
Texas (concluded)		
County of Tarrant Texas Cultural Education Facilities Finance Corp., Refunding RB, Trinity Terrace Project, 5.00%, 10/01/44	\$ 875	\$ 913,439
La Vernia Higher Education Finance Corp., RB, KIPP, Inc., Series A, 6.25%, 8/15/19 (b)	925	1,100,935
Love Field Airport Modernization Corp., RB, Southwest Airlines Co. Project, 5.25%, 11/01/40	3,600	3,916,764
New Hope Cultural Education Facilities Corp., RB, Collegiate Housing Tarleton State University Project, 5.00%, 4/01/35	500	530,695
New Hope Cultural Education Facilities Corp., Refunding RB, 1st Mortgage, Morningside Ministries Project, 6.25%, 1/01/33	1,600	1,785,872
North Texas Education Finance Corp., ERB, Uplift Education, Series A, 5.13%, 12/01/42	1,000	1,075,730
North Texas Tollway Authority, Refunding RB, Series A: 1st Tier, 6.25%, 1/01/39	3,500	4,002,145
5.00%, 1/01/38	5,000	5,453,050
Texas Private Activity Bond Surface Transportation Corp., RB, Senior Lien: LBJ Infrastructure Group LLC, LBJ Freeway Managed Lanes Project, 7.00%, 6/30/40	10,000	12,017,200
NTE Mobility Partners LLC, North Tarrant Express Managed Lanes Project, 6.88%, 12/31/39	4,710	5,560,532
Texas State University System, RB: 5.00%, 3/15/16 (b)	5,005	5,189,284
5.00%, 3/15/30	655	679,222
		78,410,066
Vermont 0.0%		
Vermont Educational & Health Buildings Financing Agency, RB, Developmental & Mental Health, Series A, 6.38%, 6/15/22	30	30,620
Virginia 4.8%		

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City of Portsmouth Virginia, GO, Refunding, Series D, 5.00%, 7/15/34	3,105	3,486,077
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Schedule of Investments (continued)

BlackRock MuniVest Fund, Inc. (MVF)

(Percentages shown are based on Net Assets)

	Par	
	(000)	Value
Municipal Bonds		
Virginia (concluded)		
County of Fairfax Virginia EDA, Refunding RB, Goodwin House, Inc.:		
5.13%, 10/01/37	\$ 2,000	\$ 2,053,260
5.13%, 10/01/42	6,015	6,158,939
Virginia Commonwealth Transportation Board, RB, Capital Projects, 5.00%, 5/15/32	8,000	9,138,000
Virginia HDA, Refunding RB, S/F Housing, Sub-Series A-3, AMT, 5.05%, 7/01/26	1,325	1,366,525
Virginia Small Business Financing Authority, RB, Senior Lien, Elizabeth River Crossings OpCo LLC Project, AMT:		
6.00%, 1/01/37	2,620	3,012,895
5.50%, 1/01/42	5,140	5,581,886
		30,797,582
Washington 4.3%		
Energy Northwest, Refunding RB, Series B, 7.13%, 7/01/16	14,320	15,370,085
Washington Health Care Facilities Authority, RB, Catholic Health Initiatives, Series A, 5.75%, 1/01/45	4,010	4,603,761
Washington Health Care Facilities Authority, Refunding RB, Catholic Health Initiatives, Series D, 6.38%, 10/01/36	7,000	7,993,930
		27,967,776
West Virginia 0.4%		
West Virginia Hospital Finance Authority, Refunding RB, Improvement, Charleston Area Medical Center, Inc., Series A, 5.63%, 9/01/32	2,500	2,768,650
Wisconsin 1.0%		
Wisconsin Health & Educational Facilities Authority, Refunding RB, Froedtert & Community Health, Inc., Series C, 5.25%, 4/01/39	6,100	6,628,565
Wyoming 1.3%		
County of Sweetwater Wyoming, Refunding RB, Idaho Power Co. Project, Remarketing, 5.25%, 7/15/26	4,500	5,115,510
	Par	
		Value
Municipal Bonds		
Wyoming (concluded)		
Wyoming Community Development Authority, Refunding RB, Series 2 & 3, 4.05%, 12/01/38	\$ 3,100	\$ 3,109,951
		8,225,461
Total Municipal Bonds 109.4%		706,252,637
	Par	
	(000)	Value
Municipal Bonds Transferred to Tender Option Bond Trusts (i)		
Arizona 0.6%		
City of Phoenix Arizona Civic Improvement Corp., Refunding RB, Water System, Junior Lien, Series A, 5.00%, 7/01/34	3,500	3,908,065
California 3.5%		
University Of California, RB, General, Series O:		
5.25%, 5/15/19 (b)	3,235	3,712,848
5.25%, 5/15/39	16,765	18,876,152
		22,589,000
Connecticut 2.0%		
Connecticut State Health & Educational Facility Authority, RB, Yale University, Series Z-3, 5.05%, 7/01/42	12,000	12,903,720
District of Columbia 1.3%		
	7,495	8,397,570

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District of Columbia Water & Sewer Authority, Refunding RB, Senior Lien, Series A, 5.50%, 10/01/39		
Florida 2.6%		
County of Miami-Dade Florida Water & Sewer System (AGM), 5.00%, 10/01/39	14,747	16,557,716
Illinois 3.0%		
State of Illinois Finance Authority, RB, University of Chicago, Series B, 6.25%, 7/01/18 (b)	10,000	11,503,700
State of Illinois Toll Highway Authority, RB, Senior Priority, Series B, 5.50%, 1/01/33	6,999	7,643,485
		19,147,185
Kentucky 1.6%		
County of Louisville & Jefferson Kentucky Metropolitan Government Parking Authority, RB, River City, Inc., 1st Mortgage, Series A, 5.38%, 12/01/39	9,195	10,528,183

BLACKROCK MUNIVEST FUND, INC.

MAY 31, 2015

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Schedule of Investments (continued)

BlackRock MuniVest Fund, Inc. (MVF)

(Percentages shown are based on Net Assets)

	Par	
	(000)	Value
Municipal Bonds Transferred to Tender Option Bond Trusts (i)		
Maryland 0.8%		
State of Maryland Transportation Authority, RB, Transportation Facilities Project (AGM), 5.00%, 7/01/41	\$ 4,710	\$ 5,170,544
Nevada 2.8%		
County of Clark Nevada Water Reclamation District, GO, Limited Tax, Series B, 5.75%, 7/01/34	15,789	18,363,562
New York 5.9%		
City of New York New York Municipal Water Finance Authority, Refunding RB, Water & Sewer System, 2nd General Resolution, Series DD, 5.00%, 6/15/37	24,199	26,710,889
New York Liberty Development Corp., Refunding RB, 4 World Trade Center Project, 5.75%, 11/15/51 (j)	10,000	11,534,400
		38,245,289
North Carolina 2.9%		
North Carolina Capital Facilities Finance Agency, Refunding RB:		
Duke University Project, Series A, 5.00%, 10/01/41	12,678	13,326,141
Wake Forest University, 5.00%, 1/01/38	5,000	5,537,050
		18,863,191
Ohio 2.2%		
Ohio Higher Educational Facility Commission, RB, Cleveland Clinic Health, Series A, 5.25%, 1/01/33	4,400	4,752,000
State of Ohio, RB, Cleveland Clinic Health Obligated Group, Series B, 5.50%, 1/01/34	8,500	9,503,255
		14,255,255
Oregon 2.0%		
State of Oregon Housing & Community Services Department, HRB, M/F Housing, Series A, AMT, 4.95%, 7/01/30	12,295	12,785,071
	Par	
Municipal Bonds Transferred to Tender Option Bond Trusts (i)		
	(000)	Value
South Carolina 0.3%		
State of South Carolina Housing Finance & Development Authority, Refunding RB, S/F Housing, Series B-1, 5.55%, 7/01/39	1,808	1,833,856
Texas 7.7%		
City of Houston Texas, Refunding RB, Airport System, Senior Lien, Series A, 5.50%, 7/01/34	\$ 8,333	\$ 9,326,402
City of Houston Texas Higher Education Finance Corp., RB, Rice University Project, Series A, 5.00%, 5/15/40	10,000	11,311,887
County of Harris Texas Health Facilities Development Corp., Refunding RB, School Health Care System, Series B, 5.75%, 7/01/27 (e)	20,970	26,142,460
Texas Department of Housing & Community Affairs, RB, S/F Mortgage, Series B, AMT, 5.25%, 9/01/32	2,531	2,578,756
		49,359,505
Virginia 1.2%		
County of Fairfax Virginia IDA, Refunding RB, Health Care, Inova Health System, Series A, 5.50%, 5/15/35	2,099	2,354,806
Virginia Small Business Financing Authority, Refunding RB, Sentara Healthcare, 5.00%, 11/01/40	5,002	5,553,127
		7,907,933
Washington 6.0%		
Central Puget Sound Regional Transit Authority, RB, Series A:		
5.00%, 11/01/34	5,000	5,414,470
5.00%, 11/01/36	6,000	6,485,494
(AGM), 5.00%, 11/01/32	14,007	15,169,029
Washington Health Care Facilities Authority, Refunding RB, Seattle Children's Hospital, 5.00%, 10/01/38	10,000	11,461,400

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	38,530,393
Total Municipal Bonds Transferred to Tender Option Bond Trusts 46.4%	299,346,038
Total Long-Term Investments (Cost \$918,849,525) 155.8%	1,005,598,675

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BLACKROCK MUNIVEST FUND, INC.

MAY 31, 2015

Schedule of Investments (continued)

BlackRock MuniVest Fund, Inc. (MVF)

(Percentages shown are based on Net Assets)

Short-Term Securities	Shares	Value
FFI Institutional Tax-Exempt Fund, 0.02% (k)(l)	21,645,487	\$ 21,645,487
Total Short-Term Securities		
(Cost \$21,645,487) 3.3%		21,645,487
Total Investments (Cost \$940,495,012*) 159.1%		1,027,244,162
Other Assets Less Liabilities 1.8%		11,072,845
Liability for TOB Trust Certificates, Including Interest		
Expense and Fees Payable (23.1)%		(149,042,632)
VMTP Shares, at Liquidation Value (37.8)%		(243,800,000)
Net Assets Applicable to Common Shares 100.0%		\$ 645,474,375

* As of May 31, 2015, gross unrealized appreciation and depreciation based on cost for federal income tax purposes were as follows:

Tax cost	\$ 793,893,857
Gross unrealized appreciation	\$ 92,493,519
Gross unrealized depreciation	(8,159,695)
Net unrealized appreciation	\$ 84,333,824

Notes to Schedule of Investments

- (a) 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.
- (b) 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.
- (c) Zero-coupon bond.
- (d) Variable rate security. Rate shown is as of report date.
- (e) Security is collateralized by municipal or U.S. Treasury obligations.
- (f) When-issued security. Unsettled when-issued transactions were as follows:

Counterparty	Value	Unrealized Appreciation
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Merrill Lynch Pierce Fenner & Smith, Inc.	\$ 188,865	\$ 20,936
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- (g) Issuer filed for bankruptcy and/or is in default of principal and/or interest payments.
- (h) Non-income producing security.
- (i) 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.
- (j) All or a portion of security is subject to a recourse agreement, which may require the Trust to pay the liquidity provider in the event there is a shortfall between the TOB Trust Certificates and proceeds received from the sale of the security contributed to the TOB Trust or in the event of a default on the security. In the case of a shortfall or default, the aggregate maximum potential amount the Trust could ultimately be required to pay under the agreement, which expires on November 15, 2019, is \$5,295,486.
- (k) During the period ended May 31, 2015, investments in issuers considered to be an affiliate 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, 2014	Net Activity	Shares Held at May 31, 2015	Income
FFI Institutional Tax-Exempt Fund	13,105,794	8,539,693	21,645,487	\$ 9,352

- (l) Represents the current yield as of report date.

BLACKROCK MUNIVEST FUND, INC.

MAY 31, 2015

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Schedule of Investments (continued)

BlackRock MuniVest Fund, Inc. (MVF)

Portfolio Abbreviations

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
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
HDA	Housing Development Authority
HFA	Housing Finance Agency
HRB	Housing Revenue Bonds
IDA	Industrial Development Authority
IDB	Industrial Development Board
M/F	Multi-Family
NPFGC	National Public Finance Guarantee Corp.
RB	Revenue Bonds
S/F	Single-Family

As of May 31, 2015, financial futures contracts outstanding were as follows:

Contracts	Issue	Exchange	Expiration	Notional Value	Unrealized Depreciation
Short (217)	10-Year U.S. Treasury Note	Chicago Board of Trade	September 2015	\$ 27,708,188	\$ (124,073)

See Notes to Financial Statements.

Schedule of Investments (continued)

BlackRock MuniVest Fund, Inc. (MVF)

For Trust compliance purposes, the Trust's sector classifications refer to any one or more of the sector sub-classifications used by one or more widely recognized market indexes or rating group indexes, and/or as defined by the investment advisor. These definitions may not apply for purposes of this report, which may combine such sector sub-classifications for reporting ease.

Fair Value Measurements Various inputs are used in determining the fair value of investments and derivative financial instruments. These inputs to valuation techniques are categorized into a disclosure hierarchy consisting of three broad levels for financial reporting purposes. 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. The categorization of a value determined for investments and derivative financial instruments is based on the pricing transparency of the investment and derivative financial instrument and is not necessarily an indication of the risks associated with investing in those securities. The three levels of the fair value hierarchy are as follows:

Level 1 unadjusted quoted prices 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)

Changes in valuation techniques may result in transfers into or out of an assigned level within the disclosure hierarchy. In accordance with the Trust's policy, transfers between different levels of the fair value disclosure hierarchy are deemed to have occurred as of the beginning of the reporting period. For information about the Trust's policy regarding valuation of investments and derivative financial instruments, please refer to the Trust's most recent financial statements as contained in its semi-annual report.

As of May 31, 2015, the following tables summarize the Trust's investments and derivative financial instruments categorized in the disclosure hierarchy:

	Level 1	Level 2	Level 3	Total
Assets:				
Investments:				
Long-Term Investments ¹		\$ 1,005,598,675		\$ 1,005,598,675
Short-Term Securities	\$ 21,645,487			21,645,487
Total	\$ 21,645,487	\$ 1,005,598,675		\$ 1,027,244,162

¹ See above Schedule of Investments for values in each state or political subdivision.

	Level 1	Level 2	Level 3	Total
Derivative Financial Instruments²				
Liabilities:				
Interest rate contracts	\$ (124,073)			\$ (124,073)

² Derivative financial instruments are financial futures contracts, which are valued at the unrealized appreciation/depreciation on the instrument.

Schedule of Investments (concluded)

BlackRock MuniVest Fund, Inc. (MVF)

The Trust may hold assets and/or liabilities in which the fair value approximates the carrying amount for financial reporting purposes. As of May 31, 2015, such assets and/or liabilities are categorized within the disclosure hierarchy as follows:

	Level 1	Level 2	Level 3	Total
Assets:				
Cash pledged for financial futures contracts	\$ 292,950			\$ 292,950
Liabilities:				
TOB Trust Certificates		\$ (149,016,481)		\$ (149,016,481)
VMTP Shares		(243,800,000)		(243,800,000)
Total	\$ 292,950	\$ (392,816,481)		\$ (392,523,531)

During the ended May 31, 2015, there were no transfers between levels.

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 23, 2015

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 23, 2015

By: /s/ Neal J. Andrews
Neal J. Andrews
Chief Financial Officer (principal financial officer) of
BlackRock MuniVest Fund, Inc.

Date: July 23, 2015