

BLACKROCK MUNIVEST FUND, INC.

Form N-Q

July 23, 2014

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: 08/31/2014

Date of reporting period: 05/31/2014

Item 1 Schedule of Investments

Schedule of Investments May 31, 2014 (Unaudited)

BlackRock MuniVest Fund, Inc. (MVF)

(Percentages shown are based on Net Assets)

	Par (000)	Value
Municipal Bonds		
Alabama 2.6%		
City of Selma Alabama IDB, RB, Gulf Opportunity Zone, International Paper Co. Project, Series A: 5.80%, 5/01/34	\$ 1,850	\$ 2,039,273
5.38%, 12/01/35	1,000	1,074,620
County of Jefferson Alabama Sewer, Refunding RB, Senior Lien, Series A (AGM), 5.25%, 10/01/48	5,000	5,311,550
State of Alabama Docks Department, Refunding RB, 6.00%, 10/01/40	7,610	8,799,291
		17,224,734
Alaska 0.1%		
Northern Tobacco Securitization Corp., Refunding RB, Tobacco Settlement, Asset-Backed, Series A, 5.00%, 6/01/46	1,250	938,675
Arizona 3.2%		
City of Phoenix Arizona Civic Improvement Corp., Refunding RB, Junior Lien, Series A, 5.00%, 7/01/40	2,000	2,104,820
City of Phoenix Arizona IDA, RB, Candeo School, Inc. Project: 6.63%, 7/01/33	2,245	2,379,520
6.88%, 7/01/44	3,440	3,642,685
County of Maricopa Arizona IDA, RB, Arizona Charter Schools Project, Series A, 6.75%, 7/01/29	3,600	3,330,756
County of Maricopa Arizona Pollution Control Corp., Refunding RB, Southern California Edison Co., Series A, 5.00%, 6/01/35	3,300	3,530,868
Salt Verde Financial Corp., RB, Senior, 5.00%, 12/01/37	5,000	5,553,950
		20,542,599
California 7.8%		
California Health Facilities Financing Authority, RB: St. Joseph Health System, Series A, 5.75%, 7/01/39	5,000	5,785,850
Sutter Health, Series B, 6.00%, 8/15/42	5,600	6,740,664
California Health Facilities Financing Authority, Refunding RB, Catholic Healthcare West, Series A, 6.00%, 7/01/34	1,055	1,197,910
	Par	
Municipal Bonds		
California (concluded)		
California HFA, RB, S/F Housing, Home Mortgage, Series K, AMT, 5.50%, 2/01/42	\$ 1,120	\$ 1,143,285
City of Los Angeles California Department of Airports, Refunding ARB, Los Angeles International Airport, Series A, 5.25%, 5/15/39	1,200	1,367,112
Los Angeles Community College District California, GO, Refunding, Election of 2008, Series A, 6.00%, 8/01/33	9,585	11,446,311
Poway Unified School District, GO, Refunding, CAB, School Facilities Improvement District No. 2007-1, Election of 2008, Series B, 0.00%, 8/01/46 (a)	10,000	2,138,800
San Diego Community College District California, GO, Election of 2006, 5.00%, 8/01/43	4,285	4,795,944
State of California, GO, Various Purposes, 6.50%, 4/01/33	9,675	11,847,231
State of California Public Works Board, LRB, Department of Mental Health, Coalinga, Series A, 5.13%, 6/01/14 (b)	4,000	4,000,560
		50,463,667
Colorado 1.0%		
Colorado Health Facilities Authority, RB, Catholic Health Initiatives, Series D, 6.25%, 10/01/33	2,500	2,882,600
Colorado Health Facilities Authority, Refunding RB, Evangelical Lutheran, Series A, 5.25%, 6/01/34	3,000	3,002,790
Regional Transportation District, COP, Refunding, Series A, 5.38%, 6/01/31	385	423,889
		6,309,279
Delaware 0.4%		
County of Sussex Delaware, RB, NRG Energy, Inc., Indian River Power LLC Project, 6.00%, 10/01/40	2,500	2,732,200
District of Columbia 0.2%		
Metropolitan Washington Airports Authority, Refunding RB, 1st Senior Lien, Series A: 5.00%, 10/01/39	415	437,597

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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		
District of Columbia (concluded)		
Metropolitan Washington Airports Authority, Refunding RB, 1st Senior Lien, Series A (concluded): 5.25%, 10/01/44	\$ 650	\$ 690,261
		1,127,858
Florida 7.2%		
County of Miami-Dade Florida, GO, Building Better Communities Program:		
Series B, 6.38%, 7/01/28	4,630	5,456,825
Series B-1, 5.63%, 7/01/38	5,000	5,675,100
County of Miami-Dade Florida, Refunding RB, Transit System Sales Surtax, 5.00%, 7/01/42	3,750	4,066,088
County of Miami-Dade Florida Aviation, Refunding ARB, Miami International Airport:		
Series A, AMT (AGC), 5.00%, 10/01/40	10,000	10,271,100
Series A-1, 5.38%, 10/01/41	10,290	11,627,083
County of Miami-Dade Florida Expressway Authority, RB, Toll System, Series A (AGM), 5.00%, 7/01/35	8,900	9,515,079
		46,611,275
Georgia 1.8%		
City of Atlanta Georgia Department of Aviation, Refunding GARB, Series B, AMT, 5.00%, 1/01/29	1,070	1,167,595
County of DeKalb Georgia Hospital Authority, Refunding RB, DeKalb Medical Center, Inc. Project, 6.13%, 9/01/40	3,570	3,756,639
DeKalb Private Hospital Authority, Refunding RB, Children's Healthcare, 5.25%, 11/15/39	3,335	3,749,907
Municipal Electric Authority of Georgia, Refunding RB, Series W, 6.60%, 1/01/18	2,510	2,742,351
		11,416,492
Hawaii 0.9%		
State of Hawaii Harbor System, RB, Series A, 5.50%, 7/01/35	5,000	5,596,050
Illinois 13.5%		
City of Chicago Illinois, GARB, O'Hare International Airport, 3rd Lien, Series B-2, AMT (NPFGC), 6.00%, 1/01/27	605	607,735
	Par	
	(000)	Value
Municipal Bonds		
Illinois (continued)		
City of Chicago Illinois, GO, Refunding, Series A, 5.00%, 1/01/36	\$ 15,000	\$ 15,460,350
City of Chicago Illinois, Refunding RB, Sales Tax Receipts, Series A, 5.00%, 1/01/41	4,640	4,832,931
City of Chicago Illinois Board of Education, GO, Series A, 5.50%, 12/01/39	3,390	3,577,331
City of Chicago Illinois Midway Airport, Refunding ARB, 2nd Lien, Series A, AMT, 5.00%, 1/01/41 (c)	1,740	1,827,818
City of Chicago Illinois Transit Authority, RB, Sales Tax Receipts, 5.25%, 12/01/36	2,110	2,302,348
City of Chicago Illinois Waterworks, Refunding RB, 2nd Lien, Water Project (AGM), 5.25%, 11/01/33	1,330	1,416,091
County of Cook Illinois Community College District No. 508, GO, University & College Improvements, 5.25%, 12/01/31	5,000	5,531,700
Illinois Finance Authority, RB:		
Advocate Health Care Network, Series D, 6.50%, 11/01/38	9,700	11,304,768
Community Rehabilitation Providers Facilities, Series A, 6.50%, 7/01/22	575	575,103
Disposal Waste Management, Inc., Series A, AMT, 5.05%, 8/01/29	1,000	1,032,420
Memorial Health System, Series A, 5.25%, 7/01/44	1,785	1,909,986
Illinois Finance Authority, Refunding RB, Series A:		
Northwestern Memorial Hospital, 6.00%, 8/15/39	9,000	10,466,820
OSF Healthcare System, 6.00%, 5/15/39	4,990	5,627,023
Railsplitter Tobacco Settlement Authority, RB, 6.00%, 6/01/28	2,645	3,097,295
Regional Transportation Authority, RB:		
Series A (AMBAC), 7.20%, 11/01/20	2,500	2,936,300
Series C (NPFGC), 7.75%, 6/01/20	4,000	4,875,480

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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		
Illinois (concluded)		
Village of Hodgkins Illinois, RB, Metropolitan Biosolids Management LLC Project, AMT, 6.00%, 11/01/23	\$ 10,000	\$ 10,012,900
		87,394,399
Indiana 3.3%		
City of Valparaiso Indiana, RB, Exempt Facilities, Pratt Paper LLC Project, AMT, 6.75%, 1/01/34	2,250	2,499,750
Indiana Finance Authority, RB, Private Activity Bond, Ohio River Bridges East End Crossing Project, Series A, AMT: 5.00%, 7/01/40	2,640	2,743,435
5.00%, 7/01/44	1,525	1,573,251
5.00%, 7/01/48	5,000	5,146,950
Indiana Health & Educational Facilities Financing Authority, RB, Clarian Health Obligation, Series A, 5.25%, 2/15/40	8,980	9,177,919
		21,141,305
Iowa 1.3%		
Iowa Finance Authority, Refunding RB, Midwestern Disaster Area, Iowa Fertilizer Co. Project, 5.25%, 12/01/25	4,500	4,687,920
Iowa Tobacco Settlement Authority, Refunding RB, Asset-Backed, Series C, 5.63%, 6/01/46	4,500	3,855,690
		8,543,610
Kentucky 2.8%		
County of Owen Kentucky, RB, Kentucky American Water Co. Project, Series B, 5.63%, 9/01/39	1,000	1,078,200
Kentucky Economic Development Finance Authority, Refunding RB, Hospital Facilities, St. Elizabeth Medical Center, Inc., Series A, 5.50%, 5/01/39	8,000	9,022,400
Lexington-Fayette Urban County Airport Board, Refunding GARB, Series A, 5.00%, 7/01/27	7,000	7,935,690
		18,036,290
	Par	
	(000)	Value
Municipal Bonds		
Louisiana 3.1%		
Louisiana Local Government Environmental Facilities & Community Development Authority, RB, Westlake Chemical Corp. Project, Series A-1, 6.50%, 11/01/35	\$ 2,615	\$ 3,034,734
Parish of St. Charles Louisiana, RB, Valero Energy Corp., 4.00%, 12/01/40 (d)	2,210	2,385,783
Tobacco Settlement Financing Corp., Refunding RB, Asset-Backed, Series A: 5.25%, 5/15/31	3,420	3,696,781
5.25%, 5/15/32	4,375	4,686,019
5.25%, 5/15/33	4,750	5,064,497
5.25%, 5/15/35	1,500	1,600,395
		20,468,209
Maine 1.0%		
Maine Health & Higher Educational Facilities Authority, RB, Series A, 5.00%, 7/01/39	5,000	5,286,800
Portland Housing Development Corp., Refunding RB, Senior Living, Retirement Facilities, Series A, 6.00%, 2/01/34	1,190	1,208,540
		6,495,340
Maryland 1.8%		
Maryland Community Development Administration, HRB, Series H, AMT, 5.10%, 9/01/37	1,835	1,867,351
Maryland Community Development Administration, Refunding HRB, Residential, Series D, AMT, 4.90%, 9/01/42	3,250	3,280,583
Maryland Health & Higher Educational Facilities Authority, Refunding RB: Charlestown Community Project, 6.25%, 1/01/41	2,000	2,203,480
University of Maryland Medical System, 5.00%, 7/01/34	2,100	2,211,510

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University of Maryland Medical System, 5.13%, 7/01/39	2,100	2,208,675
		11,771,599
Massachusetts 5.6%		
Massachusetts Bay Transportation Authority, Refunding RB, General Transportation System, Series A, 7.00%, 3/01/19	3,010	3,351,846

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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		
Massachusetts (concluded)		
Massachusetts HFA, RB, AMT:		
M/F Housing, Series A, 5.20%, 12/01/37	\$ 2,865	\$ 2,907,087
S/F Housing, Series 130, 5.00%, 12/01/32	2,500	2,563,775
Massachusetts HFA, Refunding RB, Series C, AMT, 5.35%, 12/01/42	6,550	6,746,303
Massachusetts School Building Authority, RB, Dedicated Sales Tax, Senior, Series A, 5.00%, 5/15/43	4,500	5,037,210
Massachusetts Water Resources Authority, RB, Series A, 6.50%, 7/15/19 (e)	13,855	15,738,864
		36,345,085
Michigan 3.9%		
City of Detroit Michigan Water Supply System, RB, 2nd Lien, Series B (AGM):		
6.25%, 7/01/36	2,500	2,551,650
7.00%, 7/01/36	1,250	1,347,612
Michigan State Hospital Finance Authority, Refunding RB, Series A:		
Henry Ford Health System, 5.25%, 11/15/46	7,950	8,062,731
McLaren Health Care, 5.75%, 5/15/38	7,285	8,212,818
Royal Oak Hospital Finance Authority, Refunding RB, William Beaumont Hospital, Series V, 8.25%, 9/01/18 (b)	4,100	5,341,685
		25,516,496
Mississippi 4.8%		
County of Lowndes Mississippi, Refunding RB, Solid Waste Disposal & Pollution Control, Weyerhaeuser Co. Project:		
Series A, 6.80%, 4/01/22	9,160	10,904,064
Series B, 6.70%, 4/01/22	4,500	5,310,090
Mississippi Business Finance Corp., Refunding RB, System Energy Resource, Inc. Project, 5.88%, 4/01/22	15,000	15,008,250
		31,222,404
Montana 0.2%		
State of Montana Board of Regents, RB, 5.00%, 11/15/43	1,430	1,588,044
	Par	
	(000)	Value
Municipal Bonds		
Nebraska 1.0%		
Central Plains Energy Project Nebraska, RB, Gas Project No. 3, 5.00%, 9/01/42	\$ 6,200	\$ 6,467,778
Nevada 0.9%		
County of Clark Nevada Airport System, ARB, Series B, 5.75%, 7/01/42	5,000	5,822,450
New Hampshire 0.8%		
New Hampshire Housing Finance Authority, Refunding RB, S/F Housing, Acquisition, Series H, AMT, 5.15%, 1/01/40	5,240	5,317,290
New Jersey 7.7%		
New Jersey EDA, RB:		
Cigarette Tax, 5.75%, 6/15/14 (b)	3,695	3,703,609
Continental Airlines, Inc. Project, Series A, AMT, 5.63%, 11/15/30	1,530	1,623,116
Private Activity Bond, The Goethals Bridge Replacement Project, AMT, 5.13%, 1/01/34	1,050	1,122,282
Private Activity Bond, The Goethals Bridge Replacement Project, AMT, 5.38%, 1/01/43	10,000	10,682,100
New Jersey EDA, Refunding RB, School Facilities Construction, Series AA, 5.25%, 12/15/33	10,000	10,913,300
New Jersey Housing & Mortgage Finance Agency, RB, S/F Housing, Series AA, 6.38%, 10/01/28	670	698,100
New Jersey Transportation Trust Fund Authority, RB:		
CAB, Transportation System, Series A, 0.00%, 12/15/38 (a)	7,260	2,150,267
Transportation Program, Series AA, 5.25%, 6/15/33	8,750	9,870,087
Transportation System, Series B, 5.50%, 6/15/31	8,000	9,162,560
		49,925,421
New York 4.6%		
	4,150	4,743,824

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City of New York New York Municipal Water Finance Authority, Refunding RB, Water & Sewer System, 2nd General Resolution, Series FF-2, 5.50%, 6/15/40

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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		
New York (concluded)		
Metropolitan Transportation Authority, RB, Series C: 6.25%, 11/15/23	\$ 3,245	\$ 3,875,828
6.50%, 11/15/28	14,925	17,943,880
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	3,543,502
		30,107,034
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	4,085,214
Ohio 3.8%		
Buckeye Tobacco Settlement Financing Authority, RB, Asset-Backed, Senior Turbo Term, Series A-2, 6.50%, 6/01/47	1,125	989,426
County of Allen Ohio Hospital Facilities, Refunding RB, Catholic Healthcare Partners, Series A, 5.25%, 6/01/38	2,875	3,112,906
County of Franklin Ohio, RB, Health Care Facilities Improvement, OPRS Communities Obligation Group, Series A, 6.13%, 7/01/40	1,690	1,808,148
County of Lucas Ohio, Refunding RB, Promedica Healthcare, Series A, 6.50%, 11/15/37	1,915	2,311,558
County of Montgomery Ohio, RB, Catholic Health Initiatives, Series D-2, 5.45%, 10/01/38	9,230	10,299,019
County of Montgomery Ohio, Refunding RB, Catholic Health, Series A, 5.50%, 5/01/34	5,470	6,239,793
		24,760,850
Pennsylvania 1.3%		
City of Philadelphia Pennsylvania IDA, RB: Arbor House, Inc. Project, Series E, 6.10%, 7/01/33	980	988,732
Retirement Facilities, Rieder House Project, Series A, 6.10%, 7/01/33	1,315	1,326,717
Commonwealth of Pennsylvania, GO, 1st Series, 5.00%, 6/15/29	5,000	5,899,450
	Par	
Municipal Bonds		
Pennsylvania (concluded)		
Delaware River Port Authority, RB, Series D, 5.00%, 1/01/40	\$ 195	\$ 208,086
		8,422,985
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	1,024,440
Texas 12.7%		
Brazos River Authority, Refunding RB, Texas Utility Co., Series A, AMT, 7.70%, 4/01/33 (f)(g)	3,055	160,388
Central Texas Regional Mobility Authority, Refunding RB, Senior Lien: 5.75%, 1/01/31	1,000	1,115,720
6.00%, 1/01/41	4,300	4,767,195
Series A, 5.00%, 1/01/43	6,925	7,290,017
City of Houston Texas Airport System, Refunding RB, United Airlines, Inc. Terminal E Project, AMT (c): 4.75%, 7/01/24	3,330	3,376,820
5.00%, 7/01/29	2,665	2,695,621
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	954,201
County of Harris Texas Health Facilities Development Corp., Refunding RB, Memorial Hermann Healthcare System, Series B (b): 7.13%, 12/01/18	3,500	4,431,210
7.25%, 12/01/18	5,400	6,866,316
	5,000	6,020,650

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County of Tarrant Texas Cultural Education Facilities Finance Corp., RB, Scott & White Healthcare, 6.00%, 8/15/45		
La Vernia Higher Education Finance Corp., RB, KIPP, Inc., Series A, 6.25%, 8/15/39	925	1,031,578
Love Field Airport Modernization Corp., RB, Southwest Airlines Co. Project, 5.25%, 11/01/40	3,600	3,816,864
New Hope Cultural Education Facilities Corp., HRB, University & College Revenue (AGM), 5.00%, 4/01/46	680	726,220

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		
Texas (concluded)		
New Hope Cultural Education Facilities Corp., Refunding RB, 1st Mortgage, Morningside Ministries Project, 6.25%, 1/01/33	\$ 1,600	\$ 1,716,224
North Texas Education Finance Corp., ERB, Uplift Education, Series A, 5.13%, 12/01/42	1,000	1,049,840
North Texas Tollway Authority, Refunding RB, 1st Tier, Series A, 6.25%, 1/01/39	3,500	4,009,705
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	11,902,400
NTE Mobility Partners LLC, North Tarrant Express Managed Lanes Project, 6.88%, 12/31/39	4,710	5,522,710
Texas State University System, Refunding RB (AGM), 5.00%, 3/15/30	5,660	6,034,126
Texas Transportation Commission, Refunding RB, Central Texas Turnpike System, 1st Tier, Series A, 4.00%, 8/15/38	9,375	8,953,969
		82,441,774
Vermont 0.0%		
Vermont Educational & Health Buildings Financing Agency, RB, Developmental & Mental Health, Series A, 6.38%, 6/15/22	30	30,567
Virginia 4.7%		
City of Portsmouth Virginia, GO, Refunding, Series D, 5.00%, 7/15/34	3,105	3,489,834
County of Fairfax Virginia EDA, Refunding RB, Goodwin House, Inc.: 5.13%, 10/01/37	2,000	2,067,620
5.13%, 10/01/42	6,015	6,188,052
Virginia Commonwealth Transportation Board, RB, Capital Projects, 5.00%, 5/15/32	8,000	8,982,000
Virginia HDA, Refunding RB, S/F Housing, Sub-Series A-3, AMT, 5.05%, 7/01/26	1,325	1,378,450
	Par	
	(000)	Value
Municipal Bonds		
Virginia (concluded)		
Virginia Small Business Financing Authority, RB, Senior Lien, Elizabeth River Crossings OpCo LLC Project, AMT: 6.00%, 1/01/37	\$ 2,620	\$ 2,893,161
5.50%, 1/01/42	5,140	5,467,058
		30,466,175
Washington 4.5%		
Energy Northwest, Refunding RB, Series B, 7.13%, 7/01/16	14,320	16,312,055
Washington Health Care Facilities Authority, RB, Catholic Health Initiatives, Series A, 5.75%, 1/01/45	4,010	4,537,355
Washington Health Care Facilities Authority, Refunding RB, Catholic Health Initiatives, Series D, 6.38%, 10/01/36	7,000	8,107,050
		28,956,460
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	2,684,450
Wisconsin 1.0%		
Wisconsin Health & Educational Facilities Authority, Refunding RB, Froedtert & Community Health, Inc., Series C, 5.25%, 4/01/39	6,100	6,554,023
Wyoming 1.3%		
County of Sweetwater Wyoming, Refunding RB, Idaho Power Co. Project, Remarketing, 5.25%, 7/15/26	4,500	4,932,945
Wyoming Community Development Authority, Refunding RB, Series 2 & 3, 4.05%, 12/01/38	3,250	3,244,995
		8,177,940
Total Municipal Bonds 112.0%		726,730,461

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 (TOB) Trusts (h)		
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	\$ 3,944,920
California 3.5%		
University of California, RB, General, Series O, 5.25%, 5/15/39	20,000	22,916,600
Connecticut 2.0%		
Connecticut State Health & Educational Facility Authority, RB, Yale University, Series Z-3, 5.05%, 7/01/42	12,000	13,188,360
District of Columbia 1.3%		
District of Columbia Water & Sewer Authority, Refunding RB, Senior Lien, Series A, 5.50%, 10/01/39	7,495	8,477,920
Florida 2.4%		
County of Miami-Dade Florida Water & Sewer System, RB (AGM), 5.00%, 10/01/39	14,747	15,820,068
Illinois 3.0%		
State of Illinois Finance Authority, RB, University of Chicago, Series B, 6.25%, 7/01/38	10,000	11,591,100
State of Illinois Toll Highway Authority, RB, Senior Priority, Series B, 5.50%, 1/01/33	6,999	7,783,346
		19,374,446
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	10,540,596
Maryland 0.8%		
State of Maryland Transportation Authority, RB, Transportation Facilities Project (AGM), 5.00%, 7/01/41	4,710	5,226,310
Nevada 2.9%		
County of Clark Nevada Water Reclamation District, GO, Limited Tax, Series B, 5.75%, 7/01/34	15,789	18,544,415
	Par	
Municipal Bonds Transferred to Tender Option Bond (TOB) Trusts (h)		
	(000)	Value
New York 5.7%		
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	\$ 25,958,753
New York Liberty Development Corp., Refunding RB, 4 World Trade Center Project, 5.75%, 11/15/51 (i)	10,000	11,214,600
		37,173,353
North Carolina 3.0%		
North Carolina Capital Facilities Finance Agency, Refunding RB:		
Duke University Project, Series A, 5.00%, 10/01/41	12,678	13,632,363
Wake Forest University, 5.00%, 1/01/38	5,000	5,602,800
		19,235,163
Ohio 2.2%		
Ohio Higher Educational Facility Commission, RB, Cleveland Clinic Health, Series A, 5.25%, 1/01/33	4,400	4,849,064
State of Ohio, RB, Cleveland Clinic Health Obligated Group, Series B, 5.50%, 1/01/34	8,500	9,574,655
		14,423,719
Oregon 2.1%		
State of Oregon Housing & Community Services Department, HRB, M/F Housing, Series A, AMT, 4.95%, 7/01/30	13,000	13,552,883
South Carolina 0.4%		
State of South Carolina Housing Finance & Development Authority, Refunding RB, S/F Housing, Series B-1, 5.55%, 7/01/39	2,339	2,400,534
Texas 7.9%		
City of Houston Texas, Refunding RB, Airport System, Senior Lien, Series A, 5.50%, 7/01/34	8,333	9,449,389
City of Houston Texas Higher Education Finance Corp., RB, Rice University Project, Series A, 5.00%, 5/15/40	10,000	11,239,984

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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 Transferred to Tender Option Bond (TOB) Trusts (h)		
Texas (concluded)		
County of Harris Texas Health Facilities Development Corp., Refunding RB, School Health Care System, Series B, 5.75%, 7/01/27 (e)	\$ 20,970	\$ 26,854,392
Texas Department of Housing & Community Affairs, RB, S/F Mortgage, Series B, AMT (Ginnie Mae), 5.25%, 9/01/32	3,407	3,498,204
		51,041,969
Virginia 1.2%		
County of Fairfax Virginia IDA, Refunding RB, Health Care, Inova Health System, Series A, 5.50%, 5/15/35	2,099	2,345,776
Virginia Small Business Financing Authority, Refunding RB, Sentara Healthcare, 5.00%, 11/01/40	5,002	5,377,639
		7,723,415
Washington 4.3%		
Central Puget Sound Regional Transit Authority, RB, Series A: 5.00%, 11/01/34	5,000	5,513,600
5.00%, 11/01/36	6,000	6,616,320
(AGM), 5.00%, 11/01/32	14,007	15,441,383
		27,571,303
Total Municipal Bonds Transferred to Tender Option Bond (TOB) Trusts	44.9%	291,155,974
Total Long-Term Investments		1,017,886,435
(Cost \$925,668,995) 156.9%		
Short-Term Securities		
	Shares	Value
FFI Institutional Tax-Exempt Fund, 0.03% (j)(k)	16,035,751	\$ 16,035,751
Total Short-Term Securities		16,035,751
(Cost \$16,035,751) 2.5%		
Total Investments (Cost \$941,704,746*) 159.4%		1,033,922,186
Other Assets Less Liabilities 0.6%		3,986,804
Liability for TOB Trust Certificates, Including Interest Expense and Fees Payable (22.4%)		(145,356,569)
VMTP Shares, at Liquidation Value (37.6%)		(243,800,000)
Net Assets Applicable to Common Shares 100.0%		\$ 648,752,421

* As of May 31, 2014, gross unrealized appreciation and depreciation based on cost for federal income tax purposes were as follows:

Tax cost	\$ 798,988,963
Gross unrealized appreciation	\$ 96,055,044
Gross unrealized depreciation	(6,447,502)
Net unrealized appreciation	\$ 89,607,542

Notes to Schedule of Investments

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(a) Zero-coupon bond.

(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) When-issued security. Unsettled when-issued transactions were as follows:

Counterparty	Value	Unrealized Appreciation
Barclays Bank PLC	\$ 1,827,818	\$ 4,367
Citigroup Global Markets, Inc.	\$ 6,072,441	\$ 158,642

(d) Variable rate security. Rate shown is as of report date.

(e) Security is collateralized by municipal or U.S. Treasury obligations.

(f) Non-income producing security.

(g) Issuer filed for bankruptcy and/or is in default of principal and/or interest payments.

Schedule of Investments (continued)

BlackRock MuniVest Fund, Inc. (MVF)

- (h) Represent bonds transferred to a TOB. In exchange for which the Fund acquired residual interest certificates. These bonds serve as collateral in a financing transaction.
- (i) All or a portion of security is subject to a recourse agreement, which may require the Fund 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. In the case of a shortfall, the aggregate maximum potential amount the Fund could ultimately be required to pay under the agreement, which expires on November 15, 2019 is \$5,295,486.
- (j) Investments in issuers considered to be an affiliate of the Fund during the period ended May 31, 2014, 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,	Net	Shares Held at May 31,	Income
	2013	Activity	2014	
FFI Institutional Tax-Exempt Fund	6,144,050	9,891,701	16,035,751	\$ 2,406

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

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
LRB	Lease Revenue Bonds
M/F	Multi-Family
NPFGC	National Public Finance Guarantee Corp.
RB	Revenue Bonds
S/F	Single-Family

Financial futures contracts outstanding as of May 31, 2014 were as follows:

Contracts Sold	Issue	Exchange	Expiration	Notional Value	Unrealized Appreciation
(650)	10-Year U.S. Treasury Note	Chicago Board of Trade	September 2014	\$ 81,585,156	\$ 40,652

Schedule of Investments (continued)

BlackRock MuniVest Fund, Inc. (MVF)

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 as follows:

Level 1 unadjusted price quotations in active markets/exchanges for identical assets or liabilities that the Fund 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 Fund'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.

Changes in valuation techniques may result in transfers into or out of an assigned level within the disclosure hierarchy. In accordance with the Fund'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. 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. For information about the Fund's policy regarding valuation of investments and derivative financial instruments, please refer to the Fund's most recent financial statements as contained in its semi-annual report.

The following tables summarize the Fund's investments and derivative financial instruments categorized in the disclosure hierarchy as of May 31, 2014:

	Level 1	Level 2	Level 3	Total
Assets:				
Investments:				
Long-Term Investments ¹		\$ 1,017,886,435		\$ 1,017,886,435
Short-Term Securities	\$ 16,035,751			16,035,751
Total	\$ 16,035,751	\$ 1,017,886,435		\$ 1,033,922,186

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

	Level 1	Level 2	Level 3	Total
Derivative Financial Instruments²				
Assets:				
Interest rate contracts	\$ 40,652			\$ 40,652

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 Fund may hold assets and/or liabilities in which the fair value approximates the carrying amount for financial reporting purposes. As of May 31, 2014, 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	\$ 888,000			\$ 888,000
Liabilities:				
TOB trust certificates		\$ (145,325,681)		(145,325,681)
VMTP Shares		(243,800,000)		(243,800,000)
Total	\$ 888,000	\$ (389,125,681)		\$ (388,237,681)

There were no transfers between levels during the period ended May 31, 2014.

BLACKROCK MUNIVEST FUND, INC.

MAY 31, 2014

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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 23, 2014

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, 2014

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

Date: July 23, 2014