

BEFORE THE  
WASHINGTON UTILITIES & TRANSPORTATION COMMISSION

UG-\_\_  
GENERAL RATE APPLICATION  
OF  
NORTHWEST NATURAL GAS COMPANY

December 18, 2020

**Direct Exhibit of Dr. Bente Villadsen**

**RATE OF RETURN ON EQUITY**

**Exh. BV-4**

## Schedule No. BV-1

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**Schedule No. BV-2**

**Full Sample**

**Classification of Companies by Assets**

<b>Company</b>	<b>Company Category</b>
Atmos Energy	MR
Chesapeake Utilities	R
New Jersey Resources	R
NiSource Inc.	R
Northwest Natural	MR
ONE Gas Inc.	R
South Jersey Inds.	R
Southwest Gas	MR
Spire Inc.	R
Amer. States Water	R
Amer. Water Works	R
California Water	R
Middlesex Water	R
SJW Group	R
York Water Co. (The)	R

Sources and Notes:

Calculations based on EEI definitions and Company 10K filings:

R = Regulated (greater than 80 percent of total assets are regulated).

MR = Mostly Regulated (Less than 80 percent of total assets are regulated).

Schedule No. BV-3  
Market Value of the Full Sample

Panel A: Atmos Energy

(\$MM)

	DCF Capital Structure	2nd Quarter, 2020	2nd Quarter, 2019	2nd Quarter, 2018	2nd Quarter, 2017	2nd Quarter, 2016	2nd Quarter, 2015	Notes
<b>MARKET VALUE OF COMMON EQUITY</b>								
Book Value, Common Shareholder's Equity	\$6,461	\$6,461	\$5,642	\$4,760	\$3,902	\$3,467	\$3,238	[a]
Shares Outstanding (in millions) - Common	123	123	118	111	106	104	101	[b]
Price per Share - Common	\$94	\$100	\$105	\$88	\$84	\$77	\$52	[c]
Market Value of Common Equity	\$11,561	\$12,331	\$12,430	\$9,783	\$8,918	\$7,998	\$5,266	[d] = [b] x [c]
Market Value of GP Equity	\$0	\$0	\$0	\$0	\$0	\$0	\$0	[e] = See Sources and Notes
Total Market Value of Equity	\$11,561	\$12,331	\$12,430	\$9,783	\$8,918	\$7,998	\$5,266	[f] = [d] + [e]
Market to Book Value of Common Equity	1.79	1.91	2.20	2.06	2.29	2.31	1.63	[g] = [f] / [a]
<b>MARKET VALUE OF PREFERRED EQUITY</b>								
Book Value of Preferred Equity	\$0	\$0	\$0	\$0	\$0	\$0	\$0	[h]
Market Value of Preferred Equity	\$0	\$0	\$0	\$0	\$0	\$0	\$0	[i] = [h]
<b>MARKET VALUE OF DEBT</b>								
Current Assets	\$602	\$602	\$504	\$453	\$534	\$649	\$617	[j]
Current Liabilities	\$703	\$703	\$901	\$1,466	\$746	\$1,530	\$917	[k]
Current Portion of Long-Term Debt	\$34	\$34	\$125	\$450	\$0	\$250	\$0	[l]
Net Working Capital	(\$66)	(\$66)	(\$273)	(\$563)	(\$211)	(\$631)	(\$300)	[m] = [j] - ([k] - [l])
Notes Payable (Short-Term Debt)	\$0	\$0	\$75	\$245	\$259	\$670	\$252	[n]
Adjusted Short-Term Debt	\$0	\$0	\$75	\$245	\$211	\$631	\$252	[o] = See Sources and Notes
Long-Term Debt	\$4,732	\$4,732	\$3,529	\$2,618	\$3,067	\$2,206	\$2,455	[p]
Book Value of Long-Term Debt	\$4,766	\$4,766	\$3,729	\$3,313	\$3,278	\$3,087	\$2,707	[q] = [l] + [o] + [p]
Adjustment to Book Value of Long-Term Debt	\$656	\$656	\$77	\$297	\$385	\$209	\$310	[r] = See Sources and Notes
Market Value of Long-Term Debt	\$5,422	\$5,422	\$3,806	\$3,610	\$3,663	\$3,296	\$3,017	[s] = [q] + [r]
Market Value of Debt	\$5,422	\$5,422	\$3,806	\$3,610	\$3,663	\$3,296	\$3,017	[t] = [s]
<b>MARKET VALUE OF FIRM</b>								
	\$16,983	\$17,753	\$16,236	\$13,393	\$12,581	\$11,294	\$8,282	[u] = [f] + [i] + [t]
<b>DEBT AND EQUITY TO MARKET VALUE RATIOS</b>								
Common Equity - Market Value Ratio	68.07%	69.46%	76.56%	73.04%	70.88%	70.82%	63.58%	[v] = [f] / [u]
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	-	[w] = [i] / [u]
Debt - Market Value Ratio	31.93%	30.54%	23.44%	26.96%	29.12%	29.18%	36.42%	[x] = [t] / [u]

Sources and Notes:

Latest Bloomberg data available as of September 30, 2020

Capital structure from 2nd Quarter, 2020 calculated using respective balance sheet information and 15-day average prices ending at period end

The DCF Capital structure is calculated using 2nd Quarter, 2020 balance sheet information and a 15-trading day average closing price ending on 6/30/2020

Prices are reported in Workpaper #1 to Schedule No. BV-6

[e] = Market Value of GP equity is not estimated here

[o] =

(1): 0 if [m] > 0

(2): The absolute value of [m] if [m] < 0 and |[m]| < [n]

(3): [n] if [m] < 0 and |[m]| > [n]

[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2015 to 2019 10-Ks

Schedule No. BV-3  
Market Value of the Full Sample  
Panel B: Chesapeake Utilities  
(\$MM)

	DCF Capital Structure	2nd Quarter, 2020	2nd Quarter, 2019	2nd Quarter, 2018	2nd Quarter, 2017	2nd Quarter, 2016	2nd Quarter, 2015	Notes
<b>MARKET VALUE OF COMMON EQUITY</b>								
Book Value, Common Shareholder's Equity	\$593	\$593	\$544	\$508	\$462	\$380	\$351	[a]
Shares Outstanding (in millions) - Common	16	16	16	16	16	15	15	[b]
Price per Share - Common	\$78	\$85	\$94	\$78	\$75	\$61	\$54	[c]
Market Value of Common Equity	\$1,286	\$1,396	\$1,538	\$1,271	\$1,225	\$933	\$824	[d] = [b] x [c]
Market Value of GP Equity	\$0	\$0	\$0	\$0	\$0	\$0	\$0	[e] = See Sources and Notes
Total Market Value of Equity	\$1,286	\$1,396	\$1,538	\$1,271	\$1,225	\$933	\$824	[f] = [d] + [e]
Market to Book Value of Common Equity	2.17	2.35	2.83	2.50	2.65	2.46	2.35	[g] = [f] / [a]
<b>MARKET VALUE OF PREFERRED EQUITY</b>								
Book Value of Preferred Equity	\$0	\$0	\$0	\$0	\$0	\$0	\$0	[h]
Market Value of Preferred Equity	\$0	\$0	\$0	\$0	\$0	\$0	\$0	[i] = [h]
<b>MARKET VALUE OF DEBT</b>								
Current Assets	\$99	\$99	\$124	\$116	\$102	\$87	\$79	[j]
Current Liabilities	\$430	\$430	\$512	\$389	\$272	\$284	\$200	[k]
Current Portion of Long-Term Debt	\$17	\$17	\$77	\$10	\$12	\$12	\$9	[l]
Net Working Capital	(\$314)	(\$314)	(\$311)	(\$263)	(\$157)	(\$185)	(\$112)	[m] = [j] - ([k] - [l])
Notes Payable (Short-Term Debt)	\$286	\$286	\$301	\$235	\$146	\$180	\$95	[n]
Adjusted Short-Term Debt	\$286	\$286	\$301	\$235	\$146	\$180	\$95	[o] = See Sources and Notes
Long-Term Debt	\$440	\$440	\$287	\$242	\$202	\$144	\$156	[p]
Book Value of Long-Term Debt	\$744	\$744	\$665	\$487	\$359	\$336	\$260	[q] = [l] + [o] + [p]
Adjustment to Book Value of Long-Term Debt	\$18	\$18	(\$3)	\$10	\$16	\$11	\$19	[r] = See Sources and Notes
Market Value of Long-Term Debt	\$762	\$762	\$662	\$497	\$375	\$347	\$279	[s] = [q] + [r]
Market Value of Debt	\$762	\$762	\$662	\$497	\$375	\$347	\$279	[t] = [s]
<b>MARKET VALUE OF FIRM</b>								
	\$2,048	\$2,158	\$2,200	\$1,768	\$1,600	\$1,281	\$1,103	[u] = [f] + [i] + [t]
<b>DEBT AND EQUITY TO MARKET VALUE RATIOS</b>								
Common Equity - Market Value Ratio	62.78%	64.68%	69.92%	71.88%	76.57%	72.88%	74.68%	[v] = [f] / [u]
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	-	[w] = [i] / [u]
Debt - Market Value Ratio	37.22%	35.32%	30.08%	28.12%	23.43%	27.12%	25.32%	[x] = [t] / [u]

Sources and Notes:

Latest Bloomberg data available as of September 30, 2020

Capital structure from 2nd Quarter, 2020 calculated using respective balance sheet information and 15-day average prices ending at period end

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[e] = Market Value of GP equity is not estimated here

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(1): 0 if [m] > 0

(2): The absolute value of [m] if [m] < 0 and |[m]| < [n]

(3): [n] if [m] < 0 and |[m]| > [n]

[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2015 to 2019 10-Ks

Schedule No. BV-3  
Market Value of the Full Sample  
Panel C: New Jersey Resources  
(\$MM)

	DCF Capital Structure	2nd Quarter, 2020	2nd Quarter, 2019	2nd Quarter, 2018	2nd Quarter, 2017	2nd Quarter, 2016	2nd Quarter, 2015	Notes
<b>MARKET VALUE OF COMMON EQUITY</b>								
Book Value, Common Shareholder's Equity	\$1,839	\$1,839	\$1,572	\$1,450	\$1,285	\$1,171	\$1,123	[a]
Shares Outstanding (in millions) - Common	96	96	90	88	86	86	85	[b]
Price per Share - Common	\$27	\$32	\$50	\$43	\$42	\$37	\$28	[c]
Market Value of Common Equity	\$2,624	\$3,056	\$4,491	\$3,815	\$3,610	\$3,186	\$2,389	[d] = [b] x [c]
Market Value of GP Equity	\$0	\$0	\$0	\$0	\$0	\$0	\$0	[e] = See Sources and Notes
Total Market Value of Equity	\$2,624	\$3,056	\$4,491	\$3,815	\$3,610	\$3,186	\$2,389	[f] = [d] + [e]
Market to Book Value of Common Equity	1.43	1.66	2.86	2.63	2.81	2.72	2.13	[g] = [f] / [a]
<b>MARKET VALUE OF PREFERRED EQUITY</b>								
Book Value of Preferred Equity	\$0	\$0	\$0	\$0	\$0	\$0	\$0	[h]
Market Value of Preferred Equity	\$0	\$0	\$0	\$0	\$0	\$0	\$0	[i] = [h]
<b>MARKET VALUE OF DEBT</b>								
Current Assets	\$521	\$521	\$510	\$737	\$638	\$605	\$562	[j]
Current Liabilities	\$902	\$902	\$582	\$507	\$776	\$601	\$403	[k]
Current Portion of Long-Term Debt	\$30	\$30	\$125	\$41	\$186	\$11	\$36	[l]
Net Working Capital	(\$351)	(\$351)	\$53	\$270	\$48	\$15	\$195	[m] = [j] - ([k] - [l])
Notes Payable (Short-Term Debt)	\$553	\$553	\$99	\$57	\$263	\$245	\$0	[n]
Adjusted Short-Term Debt	\$351	\$351	\$0	\$0	\$0	\$0	\$0	[o] = See Sources and Notes
Long-Term Debt	\$1,838	\$1,838	\$1,212	\$1,220	\$898	\$968	\$848	[p]
Book Value of Long-Term Debt	\$2,219	\$2,219	\$1,336	\$1,261	\$1,084	\$979	\$884	[q] = [l] + [o] + [p]
Adjustment to Book Value of Long-Term Debt	\$91	\$91	(\$3)	\$1	\$24	\$1	\$29	[r] = See Sources and Notes
Market Value of Long-Term Debt	\$2,311	\$2,311	\$1,334	\$1,262	\$1,108	\$981	\$913	[s] = [q] + [r]
Market Value of Debt	\$2,311	\$2,311	\$1,334	\$1,262	\$1,108	\$981	\$913	[t] = [s]
<b>MARKET VALUE OF FIRM</b>								
	\$4,934	\$5,366	\$5,825	\$5,077	\$4,718	\$4,167	\$3,302	[u] = [f] + [i] + [t]
<b>DEBT AND EQUITY TO MARKET VALUE RATIOS</b>								
Common Equity - Market Value Ratio	53.17%	56.94%	77.11%	75.15%	76.52%	76.47%	72.36%	[v] = [f] / [u]
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	-	[w] = [i] / [u]
Debt - Market Value Ratio	46.83%	43.06%	22.89%	24.85%	23.48%	23.53%	27.64%	[x] = [t] / [u]

Sources and Notes:

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(3): [n] if [m] < 0 and |[m]| > [n]

[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2015 to 2019 10-Ks

Schedule No. BV-3  
Market Value of the Full Sample

Panel D: NiSource Inc.

(\$MM)

	DCF Capital Structure	2nd Quarter, 2020	2nd Quarter, 2019	2nd Quarter, 2018	2nd Quarter, 2017	2nd Quarter, 2016	2nd Quarter, 2015	Notes
<b>MARKET VALUE OF COMMON EQUITY</b>								
Book Value, Common Shareholder's Equity	\$4,782	\$4,782	\$5,096	\$5,069	\$4,123	\$3,811	\$6,506	[a]
Shares Outstanding (in millions) - Common	383	383	373	363	326	322	318	[b]
Price per Share - Common	\$22	\$23	\$29	\$25	\$26	\$25	\$18	[c]
Market Value of Common Equity	\$8,438	\$8,852	\$10,787	\$9,006	\$8,423	\$8,165	\$5,852	[d] = [b] x [c]
Market Value of GP Equity	\$0	\$0	\$0	\$0	\$0	\$0	\$0	[e] = See Sources and Notes
Total Market Value of Equity	\$8,438	\$8,852	\$10,787	\$9,006	\$8,423	\$8,165	\$5,852	[f] = [d] + [e]
Market to Book Value of Common Equity	1.76	1.85	2.12	1.78	2.04	2.14	0.90	[g] = [f] / [a]
<b>MARKET VALUE OF PREFERRED EQUITY</b>								
Book Value of Preferred Equity	\$880	\$880	\$880	\$394	\$0	\$0	\$0	[h]
Market Value of Preferred Equity	\$880	\$880	\$880	\$394	\$0	\$0	\$0	[i] = [h]
<b>MARKET VALUE OF DEBT</b>								
Current Assets	\$2,860	\$2,860	\$1,578	\$1,316	\$1,281	\$1,260	\$2,336	[j]
Current Liabilities	\$3,228	\$3,228	\$3,814	\$2,560	\$2,778	\$2,696	\$2,524	[k]
Current Portion of Long-Term Debt	\$16	\$16	\$20	\$598	\$561	\$312	\$443	[l]
Net Working Capital	(\$353)	(\$353)	(\$2,216)	(\$647)	(\$936)	(\$1,125)	\$254	[m] = [j] - ([k] - [l])
Notes Payable (Short-Term Debt)	\$1,164	\$1,164	\$2,081	\$600	\$901	\$1,101	\$162	[n]
Adjusted Short-Term Debt	\$353	\$353	\$2,081	\$600	\$901	\$1,101	\$0	[o] = See Sources and Notes
Long-Term Debt	\$8,810	\$8,810	\$7,159	\$7,093	\$6,777	\$5,857	\$8,881	[p]
Book Value of Long-Term Debt	\$9,178	\$9,178	\$9,260	\$8,290	\$8,240	\$7,270	\$9,324	[q] = [l] + [o] + [p]
Adjustment to Book Value of Long-Term Debt	\$895	\$895	\$73	\$807	\$643	\$594	\$1,088	[r] = See Sources and Notes
Market Value of Long-Term Debt	\$10,073	\$10,073	\$9,333	\$9,097	\$8,883	\$7,863	\$10,411	[s] = [q] + [r]
Market Value of Debt	\$10,073	\$10,073	\$9,333	\$9,097	\$8,883	\$7,863	\$10,411	[t] = [s]
<b>MARKET VALUE OF FIRM</b>								
	\$19,392	\$19,805	\$21,000	\$18,497	\$17,306	\$16,028	\$16,263	[u] = [f] + [i] + [t]
<b>DEBT AND EQUITY TO MARKET VALUE RATIOS</b>								
Common Equity - Market Value Ratio	43.52%	44.69%	51.37%	48.69%	48.67%	50.94%	35.98%	[v] = [f] / [u]
Preferred Equity - Market Value Ratio	4.54%	4.44%	4.19%	2.13%	-	-	-	[w] = [i] / [u]
Debt - Market Value Ratio	51.95%	50.86%	44.44%	49.18%	51.33%	49.06%	64.02%	[x] = [t] / [u]

Sources and Notes:

Latest Bloomberg data available as of September 30, 2020

Capital structure from 2nd Quarter, 2020 calculated using respective balance sheet information and 15-day average prices ending at period end

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[e] = Market Value of GP equity is not estimated here

[o] =

(1): 0 if [m] > 0

(2): The absolute value of [m] if [m] < 0 and |[m]| < [n]

(3): [n] if [m] < 0 and |[m]| > [n]

[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2015 to 2019 10-Ks

Schedule No. BV-3  
Market Value of the Full Sample  
Panel E: Northwest Natural  
(\$MM)

	DCF Capital Structure	2nd Quarter, 2020	2nd Quarter, 2019	2nd Quarter, 2018	2nd Quarter, 2017	2nd Quarter, 2016	2nd Quarter, 2015	Notes
<b>MARKET VALUE OF COMMON EQUITY</b>								
Book Value, Common Shareholder's Equity	\$884	\$884	\$877	\$760	\$865	\$800	\$777	[a]
Shares Outstanding (in millions) - Common	31	31	30	29	29	28	27	[b]
Price per Share - Common	\$45	\$56	\$69	\$61	\$62	\$61	\$43	[c]
Market Value of Common Equity	\$1,378	\$1,724	\$2,094	\$1,770	\$1,766	\$1,684	\$1,176	[d] = [b] x [c]
Market Value of GP Equity	\$0	\$0	\$0	\$0	\$0	\$0	\$0	[e] = See Sources and Notes
Total Market Value of Equity	\$1,378	\$1,724	\$2,094	\$1,770	\$1,766	\$1,684	\$1,176	[f] = [d] + [e]
Market to Book Value of Common Equity	1.56	1.95	2.39	2.33	2.04	2.10	1.51	[g] = [f] / [a]
<b>MARKET VALUE OF PREFERRED EQUITY</b>								
Book Value of Preferred Equity	\$0	\$0	\$0	\$0	\$0	\$0	\$0	[h]
Market Value of Preferred Equity	\$0	\$0	\$0	\$0	\$0	\$0	\$0	[i] = [h]
<b>MARKET VALUE OF DEBT</b>								
Current Assets	\$316	\$316	\$239	\$181	\$192	\$202	\$234	[j]
Current Liabilities	\$487	\$487	\$307	\$298	\$235	\$314	\$328	[k]
Current Portion of Long-Term Debt	\$36	\$36	\$109	\$75	\$62	\$25	\$0	[l]
Net Working Capital	(\$134)	(\$134)	\$41	(\$42)	\$19	(\$87)	(\$94)	[m] = [j] - ([k] - [l])
Notes Payable (Short-Term Debt)	\$233	\$233	\$20	\$47	\$0	\$153	\$190	[n]
Adjusted Short-Term Debt	\$134	\$134	\$0	\$42	\$0	\$87	\$94	[o] = See Sources and Notes
Long-Term Debt	\$999	\$999	\$807	\$684	\$658	\$570	\$614	[p]
Book Value of Long-Term Debt	\$1,170	\$1,170	\$915	\$801	\$720	\$682	\$707	[q] = [l] + [o] + [p]
Adjustment to Book Value of Long-Term Debt	\$76	\$76	\$26	\$73	\$74	\$65	\$95	[r] = See Sources and Notes
Market Value of Long-Term Debt	\$1,245	\$1,245	\$941	\$874	\$794	\$747	\$802	[s] = [q] + [r]
Market Value of Debt	\$1,245	\$1,245	\$941	\$874	\$794	\$747	\$802	[t] = [s]
<b>MARKET VALUE OF FIRM</b>								
	\$2,624	\$2,969	\$3,035	\$2,644	\$2,560	\$2,431	\$1,979	[u] = [f] + [i] + [t]
<b>DEBT AND EQUITY TO MARKET VALUE RATIOS</b>								
Common Equity - Market Value Ratio	52.53%	58.06%	68.98%	66.93%	68.98%	69.27%	59.45%	[v] = [f] / [u]
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	-	[w] = [i] / [u]
Debt - Market Value Ratio	47.47%	41.94%	31.02%	33.07%	31.02%	30.73%	40.55%	[x] = [t] / [u]

Sources and Notes:

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(2): The absolute value of [m] if [m] < 0 and |[m]| < [n]

(3): [n] if [m] < 0 and |[m]| > [n]

[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2015 to 2019 10-Ks

Schedule No. BV-3  
Market Value of the Full Sample  
Panel F: ONE Gas Inc.  
(\$MM)

	DCF Capital Structure	2nd Quarter, 2020	2nd Quarter, 2019	2nd Quarter, 2018	2nd Quarter, 2017	2nd Quarter, 2016	2nd Quarter, 2015	Notes
<b>MARKET VALUE OF COMMON EQUITY</b>								
Book Value, Common Shareholder's Equity	\$2,192	\$2,192	\$2,108	\$2,022	\$1,933	\$1,876	\$1,819	[a]
Shares Outstanding (in millions) - Common	53	53	53	53	52	52	52	[b]
Price per Share - Common	\$69	\$76	\$91	\$73	\$71	\$63	\$43	[c]
Market Value of Common Equity	\$3,626	\$4,039	\$4,782	\$3,835	\$3,719	\$3,296	\$2,221	[d] = [b] x [c]
Market Value of GP Equity	\$0	\$0	\$0	\$0	\$0	\$0	\$0	[e] = See Sources and Notes
Total Market Value of Equity	\$3,626	\$4,039	\$4,782	\$3,835	\$3,719	\$3,296	\$2,221	[f] = [d] + [e]
Market to Book Value of Common Equity	1.65	1.84	2.27	1.90	1.92	1.76	1.22	[g] = [f] / [a]
<b>MARKET VALUE OF PREFERRED EQUITY</b>								
Book Value of Preferred Equity	\$0	\$0	\$0	\$0	\$0	\$0	\$0	[h]
Market Value of Preferred Equity	\$0	\$0	\$0	\$0	\$0	\$0	\$0	[i] = [h]
<b>MARKET VALUE OF DEBT</b>								
Current Assets	\$347	\$347	\$377	\$351	\$412	\$381	\$478	[j]
Current Liabilities	\$491	\$491	\$578	\$749	\$293	\$218	\$247	[k]
Current Portion of Long-Term Debt	\$6	\$6	\$6	\$300	\$0	\$0	\$0	[l]
Net Working Capital	(\$137)	(\$137)	(\$195)	(\$99)	\$119	\$163	\$231	[m] = [j] - ([k] - [l])
Notes Payable (Short-Term Debt)	\$231	\$231	\$293	\$185	\$79	\$0	\$0	[n]
Adjusted Short-Term Debt	\$137	\$137	\$195	\$99	\$0	\$0	\$0	[o] = See Sources and Notes
Long-Term Debt	\$1,582	\$1,582	\$1,317	\$894	\$1,193	\$1,192	\$1,201	[p]
Book Value of Long-Term Debt	\$1,725	\$1,725	\$1,518	\$1,292	\$1,193	\$1,192	\$1,201	[q] = [l] + [o] + [p]
Adjustment to Book Value of Long-Term Debt	\$214	\$214	\$100	\$100	\$0	\$0	\$100	[r] = See Sources and Notes
Market Value of Long-Term Debt	\$1,939	\$1,939	\$1,618	\$1,392	\$1,193	\$1,192	\$1,301	[s] = [q] + [r]
Market Value of Debt	\$1,939	\$1,939	\$1,618	\$1,392	\$1,193	\$1,192	\$1,301	[t] = [s]
<b>MARKET VALUE OF FIRM</b>								
	\$5,565	\$5,978	\$6,401	\$5,228	\$4,911	\$4,488	\$3,522	[u] = [f] + [i] + [t]
<b>DEBT AND EQUITY TO MARKET VALUE RATIOS</b>								
Common Equity - Market Value Ratio	65.15%	67.56%	74.72%	73.37%	75.71%	73.44%	63.06%	[v] = [f] / [u]
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	-	[w] = [i] / [u]
Debt - Market Value Ratio	34.85%	32.44%	25.28%	26.63%	24.29%	26.56%	36.94%	[x] = [t] / [u]

Sources and Notes:

Latest Bloomberg data available as of September 30, 2020

Capital structure from 2nd Quarter, 2020 calculated using respective balance sheet information and 15-day average prices ending at period end

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Prices are reported in Workpaper #1 to Schedule No. BV-6

[e] = Market Value of GP equity is not estimated here

[o] =

(1): 0 if [m] > 0

(2): The absolute value of [m] if [m] < 0 and |[m]| < [n]

(3): [n] if [m] < 0 and |[m]| > [n]

[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2015 to 2019 10-Ks

Schedule No. BV-3  
Market Value of the Full Sample  
Panel G: South Jersey Inds.

(\$MM)

	DCF Capital Structure	2nd Quarter, 2020	2nd Quarter, 2019	2nd Quarter, 2018	2nd Quarter, 2017	2nd Quarter, 2016	2nd Quarter, 2015	Notes
<b>MARKET VALUE OF COMMON EQUITY</b>								
Book Value, Common Shareholder's Equity	\$1,666	\$1,666	\$1,476	\$1,304	\$1,279	\$1,278	\$970	[a]
Shares Outstanding (in millions) - Common	101	101	92	86	80	79	68	[b]
Price per Share - Common	\$19	\$25	\$33	\$32	\$35	\$30	\$25	[c]
Market Value of Common Equity	\$1,957	\$2,510	\$3,070	\$2,749	\$2,815	\$2,418	\$1,725	[d] = [b] x [c]
Market Value of GP Equity	\$0	\$0	\$0	\$0	\$0	\$0	\$0	[e] = See Sources and Notes
Total Market Value of Equity	\$1,957	\$2,510	\$3,070	\$2,749	\$2,815	\$2,418	\$1,725	[f] = [d] + [e]
Market to Book Value of Common Equity	1.17	1.51	2.08	2.11	2.20	1.89	1.78	[g] = [f] / [a]
<b>MARKET VALUE OF PREFERRED EQUITY</b>								
Book Value of Preferred Equity	\$0	\$0	\$0	\$0	\$0	\$0	\$0	[h]
Market Value of Preferred Equity	\$0	\$0	\$0	\$0	\$0	\$0	\$0	[i] = [h]
<b>MARKET VALUE OF DEBT</b>								
Current Assets	\$423	\$423	\$429	\$2,425	\$356	\$376	\$528	[j]
Current Liabilities	\$926	\$926	\$1,646	\$2,115	\$734	\$758	\$835	[k]
Current Portion of Long-Term Debt	\$119	\$119	\$480	\$1,369	\$16	\$245	\$86	[l]
Net Working Capital	(\$385)	(\$385)	(\$737)	\$1,679	(\$362)	(\$138)	(\$221)	[m] = [j] - ([k] - [l])
Notes Payable (Short-Term Debt)	\$453	\$453	\$680	\$336	\$296	\$145	\$366	[n]
Adjusted Short-Term Debt	\$385	\$385	\$680	\$0	\$296	\$138	\$221	[o] = See Sources and Notes
Long-Term Debt	\$2,567	\$2,567	\$1,799	\$1,404	\$1,067	\$831	\$879	[p]
Book Value of Long-Term Debt	\$3,071	\$3,071	\$2,960	\$2,773	\$1,379	\$1,214	\$1,185	[q] = [l] + [o] + [p]
Adjustment to Book Value of Long-Term Debt	(\$50)	(\$50)	\$2	\$17	\$33	\$43	\$49	[r] = See Sources and Notes
Market Value of Long-Term Debt	\$3,021	\$3,021	\$2,961	\$2,789	\$1,412	\$1,257	\$1,234	[s] = [q] + [r]
Market Value of Debt	\$3,021	\$3,021	\$2,961	\$2,789	\$1,412	\$1,257	\$1,234	[t] = [s]
<b>MARKET VALUE OF FIRM</b>								
	\$4,978	\$5,531	\$6,032	\$5,538	\$4,228	\$3,675	\$2,959	[u] = [f] + [i] + [t]
<b>DEBT AND EQUITY TO MARKET VALUE RATIOS</b>								
Common Equity - Market Value Ratio	39.32%	45.38%	50.90%	49.63%	66.60%	65.79%	58.29%	[v] = [f] / [u]
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	-	[w] = [i] / [u]
Debt - Market Value Ratio	60.68%	54.62%	49.10%	50.37%	33.40%	34.21%	41.71%	[x] = [t] / [u]

Sources and Notes:

Latest Bloomberg data available as of September 30, 2020

Capital structure from 2nd Quarter, 2020 calculated using respective balance sheet information and 15-day average prices ending at period end

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Prices are reported in Workpaper #1 to Schedule No. BV-6

[e] = Market Value of GP equity is not estimated here

[o] =

(1): 0 if [m] > 0

(2): The absolute value of [m] if [m] < 0 and |[m]| < [n]

(3): [n] if [m] < 0 and |[m]| > [n]

[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2015 to 2019 10-Ks

Schedule No. BV-3  
Market Value of the Full Sample  
Panel H: Southwest Gas  
(\$MM)

	DCF Capital Structure	2nd Quarter, 2020	2nd Quarter, 2019	2nd Quarter, 2018	2nd Quarter, 2017	2nd Quarter, 2016	2nd Quarter, 2015	Notes
<b>MARKET VALUE OF COMMON EQUITY</b>								
Book Value, Common Shareholder's Equity	\$2,611	\$2,611	\$2,419	\$1,933	\$1,717	\$1,644	\$1,552	[a]
Shares Outstanding (in millions) - Common	56	56	54	49	48	47	47	[b]
Price per Share - Common	\$62	\$67	\$89	\$76	\$75	\$75	\$54	[c]
Market Value of Common Equity	\$3,477	\$3,767	\$4,830	\$3,729	\$3,576	\$3,568	\$2,519	[d] = [b] x [c]
Market Value of GP Equity	\$0	\$0	\$0	\$0	\$0	\$0	\$0	[e] = See Sources and Notes
Total Market Value of Equity	\$3,477	\$3,767	\$4,830	\$3,729	\$3,576	\$3,568	\$2,519	[f] = [d] + [e]
Market to Book Value of Common Equity	1.33	1.44	2.00	1.93	2.08	2.17	1.62	[g] = [f] / [a]
<b>MARKET VALUE OF PREFERRED EQUITY</b>								
Book Value of Preferred Equity	\$0	\$0	\$0	\$0	\$0	\$0	\$0	[h]
Market Value of Preferred Equity	\$0	\$0	\$0	\$0	\$0	\$0	\$0	[i] = [h]
<b>MARKET VALUE OF DEBT</b>								
Current Assets	\$867	\$867	\$752	\$696	\$484	\$432	\$481	[j]
Current Liabilities	\$918	\$918	\$727	\$664	\$490	\$583	\$466	[k]
Current Portion of Long-Term Debt	\$172	\$172	\$46	\$32	\$27	\$50	\$20	[l]
Net Working Capital	\$121	\$121	\$72	\$64	\$21	(\$101)	\$35	[m] = [j] - ([k] - [l])
Notes Payable (Short-Term Debt)	\$58	\$58	\$0	\$23	\$3	\$0	\$0	[n]
Adjusted Short-Term Debt	\$0	\$0	\$0	\$0	\$0	\$0	\$0	[o] = See Sources and Notes
Long-Term Debt	\$2,639	\$2,639	\$2,430	\$2,038	\$1,686	\$1,428	\$1,522	[p]
Book Value of Long-Term Debt	\$2,811	\$2,811	\$2,476	\$2,070	\$1,713	\$1,477	\$1,542	[q] = [l] + [o] + [p]
Adjustment to Book Value of Long-Term Debt	(\$146)	(\$146)	\$48	\$121	\$130	\$94	\$139	[r] = See Sources and Notes
Market Value of Long-Term Debt	\$2,665	\$2,665	\$2,523	\$2,191	\$1,843	\$1,572	\$1,681	[s] = [q] + [r]
Market Value of Debt	\$2,665	\$2,665	\$2,523	\$2,191	\$1,843	\$1,572	\$1,681	[t] = [s]
<b>MARKET VALUE OF FIRM</b>								
	\$6,143	\$6,432	\$7,353	\$5,920	\$5,419	\$5,140	\$4,200	[u] = [f] + [i] + [t]
<b>DEBT AND EQUITY TO MARKET VALUE RATIOS</b>								
Common Equity - Market Value Ratio	56.61%	58.56%	65.68%	63.00%	65.99%	69.42%	59.98%	[v] = [f] / [u]
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	-	[w] = [i] / [u]
Debt - Market Value Ratio	43.39%	41.44%	34.32%	37.00%	34.01%	30.58%	40.02%	[x] = [t] / [u]

Sources and Notes:

Latest Bloomberg data available as of September 30, 2020

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[e] = Market Value of GP equity is not estimated here

[o] =

(1): 0 if [m] > 0

(2): The absolute value of [m] if [m] < 0 and |[m]| < [n]

(3): [n] if [m] < 0 and |[m]| > [n]

[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2015 to 2019 10-Ks

Schedule No. BV-3  
Market Value of the Full Sample

Panel I: Spire Inc.

(\$MM)

	DCF Capital Structure	2nd Quarter, 2020	2nd Quarter, 2019	2nd Quarter, 2018	2nd Quarter, 2017	2nd Quarter, 2016	2nd Quarter, 2015	Notes
<b>MARKET VALUE OF COMMON EQUITY</b>								
Book Value, Common Shareholder's Equity	\$2,316	\$2,316	\$2,371	\$2,308	\$2,028	\$1,802	\$1,609	[a]
Shares Outstanding (in millions) - Common	51	51	51	51	48	46	43	[b]
Price per Share - Common	\$53	\$67	\$84	\$69	\$71	\$68	\$52	[c]
Market Value of Common Equity	\$2,717	\$3,426	\$4,288	\$3,498	\$3,427	\$3,109	\$2,260	[d] = [b] x [c]
Market Value of GP Equity	\$0	\$0	\$0	\$0	\$0	\$0	\$0	[e] = See Sources and Notes
Total Market Value of Equity	\$2,717	\$3,426	\$4,288	\$3,498	\$3,427	\$3,109	\$2,260	[f] = [d] + [e]
Market to Book Value of Common Equity	1.17	1.48	1.81	1.52	1.69	1.73	1.40	[g] = [f] / [a]
<b>MARKET VALUE OF PREFERRED EQUITY</b>								
Book Value of Preferred Equity	\$242	\$242	\$242	\$0	\$0	\$0	\$0	[h]
Market Value of Preferred Equity	\$242	\$242	\$242	\$0	\$0	\$0	\$0	[i] = [h]
<b>MARKET VALUE OF DEBT</b>								
Current Assets	\$559	\$559	\$650	\$585	\$629	\$453	\$483	[j]
Current Liabilities	\$1,108	\$1,108	\$1,220	\$814	\$910	\$492	\$720	[k]
Current Portion of Long-Term Debt	\$5	\$5	\$165	\$156	\$0	\$0	\$80	[l]
Net Working Capital	(\$543)	(\$543)	(\$405)	(\$74)	(\$281)	(\$38)	(\$157)	[m] = [j] - ([k] - [l])
Notes Payable (Short-Term Debt)	\$478	\$478	\$434	\$191	\$451	\$98	\$211	[n]
Adjusted Short-Term Debt	\$478	\$478	\$405	\$74	\$281	\$38	\$157	[o] = See Sources and Notes
Long-Term Debt	\$2,478	\$2,478	\$2,042	\$2,025	\$1,925	\$1,840	\$1,736	[p]
Book Value of Long-Term Debt	\$2,961	\$2,961	\$2,612	\$2,254	\$2,206	\$1,878	\$1,974	[q] = [l] + [o] + [p]
Adjustment to Book Value of Long-Term Debt	\$251	\$251	(\$2)	\$115	\$173	\$93	\$86	[r] = See Sources and Notes
Market Value of Long-Term Debt	\$3,212	\$3,212	\$2,611	\$2,369	\$2,379	\$1,971	\$2,060	[s] = [q] + [r]
Market Value of Debt	\$3,212	\$3,212	\$2,611	\$2,369	\$2,379	\$1,971	\$2,060	[t] = [s]
<b>MARKET VALUE OF FIRM</b>								
	\$6,172	\$6,880	\$7,141	\$5,867	\$5,807	\$5,080	\$4,320	[u] = [f] + [i] + [t]
<b>DEBT AND EQUITY TO MARKET VALUE RATIOS</b>								
Common Equity - Market Value Ratio	44.03%	49.79%	60.05%	59.62%	59.02%	61.21%	52.31%	[v] = [f] / [u]
Preferred Equity - Market Value Ratio	3.92%	3.52%	3.39%	-	-	-	-	[w] = [i] / [u]
Debt - Market Value Ratio	52.05%	46.69%	36.56%	40.38%	40.98%	38.79%	47.69%	[x] = [t] / [u]

Sources and Notes:

Latest Bloomberg data available as of September 30, 2020

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[e] = Market Value of GP equity is not estimated here

[o] =

(1): 0 if [m] > 0

(2): The absolute value of [m] if [m] < 0 and |[m]| < [n]

(3): [n] if [m] < 0 and |[m]| > [n]

[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2015 to 2019 10-Ks

Schedule No. BV-3  
Market Value of the Full Sample

Panel J: Amer. States Water

(\$MM)

	DCF Capital Structure	2nd Quarter, 2020	2nd Quarter, 2019	2nd Quarter, 2018	2nd Quarter, 2017	2nd Quarter, 2016	2nd Quarter, 2015	Notes
<b>MARKET VALUE OF COMMON EQUITY</b>								
Book Value, Common Shareholder's Equity	\$619	\$619	\$579	\$539	\$513	\$477	\$478	[a]
Shares Outstanding (in millions) - Common	37	37	37	37	37	37	37	[b]
Price per Share - Common	\$73	\$77	\$74	\$57	\$49	\$42	\$37	[c]
Market Value of Common Equity	\$2,699	\$2,849	\$2,735	\$2,095	\$1,779	\$1,523	\$1,390	[d] = [b] x [c]
Market Value of GP Equity	\$0	\$0	\$0	\$0	\$0	\$0	\$0	[e] = See Sources and Notes
Total Market Value of Equity	\$2,699	\$2,849	\$2,735	\$2,095	\$1,779	\$1,523	\$1,390	[f] = [d] + [e]
Market to Book Value of Common Equity	4.36	4.60	4.72	3.89	3.47	3.19	2.91	[g] = [f] / [a]
<b>MARKET VALUE OF PREFERRED EQUITY</b>								
Book Value of Preferred Equity	\$0	\$0	\$0	\$0	\$0	\$0	\$0	[h]
Market Value of Preferred Equity	\$0	\$0	\$0	\$0	\$0	\$0	\$0	[i] = [h]
<b>MARKET VALUE OF DEBT</b>								
Current Assets	\$137	\$137	\$122	\$141	\$150	\$133	\$150	[j]
Current Liabilities	\$159	\$159	\$106	\$130	\$140	\$160	\$95	[k]
Current Portion of Long-Term Debt	\$2	\$2	\$2	\$40	\$0	\$0	\$0	[l]
Net Working Capital	(\$20)	(\$20)	\$18	\$52	\$9	(\$27)	\$55	[m] = [j] - ([k] - [l])
Notes Payable (Short-Term Debt)	\$49	\$49	\$0	\$0	\$44	\$64	\$0	[n]
Adjusted Short-Term Debt	\$20	\$20	\$0	\$0	\$0	\$27	\$0	[o] = See Sources and Notes
Long-Term Debt	\$491	\$491	\$476	\$358	\$321	\$321	\$326	[p]
Book Value of Long-Term Debt	\$513	\$513	\$478	\$398	\$321	\$348	\$326	[q] = [l] + [o] + [p]
Adjustment to Book Value of Long-Term Debt	\$91	\$91	\$63	\$99	\$98	\$78	\$91	[r] = See Sources and Notes
Market Value of Long-Term Debt	\$604	\$604	\$541	\$497	\$419	\$426	\$417	[s] = [q] + [r]
Market Value of Debt	\$604	\$604	\$541	\$497	\$419	\$426	\$417	[t] = [s]
<b>MARKET VALUE OF FIRM</b>								
	\$3,303	\$3,453	\$3,276	\$2,592	\$2,198	\$1,949	\$1,807	[u] = [f] + [i] + [t]
<b>DEBT AND EQUITY TO MARKET VALUE RATIOS</b>								
Common Equity - Market Value Ratio	81.71%	82.50%	83.48%	80.82%	80.93%	78.13%	76.93%	[v] = [f] / [u]
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	-	[w] = [i] / [u]
Debt - Market Value Ratio	18.29%	17.50%	16.52%	19.18%	19.07%	21.87%	23.07%	[x] = [t] / [u]

Sources and Notes:

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Prices are reported in Workpaper #1 to Schedule No. BV-6

[e] = Market Value of GP equity is not estimated here

[o] =

(1): 0 if [m] > 0

(2): The absolute value of [m] if [m] < 0 and |[m]| < [n]

(3): [n] if [m] < 0 and |[m]| > [n]

[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2015 to 2019 10-Ks

Schedule No. BV-3  
Market Value of the Full Sample  
Panel K: Amer. Water Works  
(\$MM)

	DCF Capital Structure	2nd Quarter, 2020	2nd Quarter, 2019	2nd Quarter, 2018	2nd Quarter, 2017	2nd Quarter, 2016	2nd Quarter, 2015	Notes
<b>MARKET VALUE OF COMMON EQUITY</b>								
Book Value, Common Shareholder's Equity	\$6,338	\$6,338	\$6,027	\$5,736	\$5,384	\$5,153	\$5,053	[a]
Shares Outstanding (in millions) - Common	181	181	181	180	178	178	180	[b]
Price per Share - Common	\$142	\$127	\$117	\$83	\$81	\$79	\$50	[c]
Market Value of Common Equity	\$25,687	\$23,036	\$21,123	\$14,903	\$14,362	\$14,130	\$8,984	[d] = [b] x [c]
Market Value of GP Equity	\$0	\$0	\$0	\$0	\$0	\$0	\$0	[e] = See Sources and Notes
Total Market Value of Equity	\$25,687	\$23,036	\$21,123	\$14,903	\$14,362	\$14,130	\$8,984	[f] = [d] + [e]
Market to Book Value of Common Equity	4.05	3.63	3.50	2.60	2.67	2.74	1.78	[g] = [f] / [a]
<b>MARKET VALUE OF PREFERRED EQUITY</b>								
Book Value of Preferred Equity	\$0	\$0	\$0	\$0	\$0	\$0	\$0	[h]
Market Value of Preferred Equity	\$0	\$0	\$0	\$0	\$0	\$0	\$0	[i] = [h]
<b>MARKET VALUE OF DEBT</b>								
Current Assets	\$1,896	\$1,896	\$741	\$833	\$808	\$691	\$890	[j]
Current Liabilities	\$2,113	\$2,113	\$1,317	\$2,951	\$2,661	\$1,740	\$1,512	[k]
Current Portion of Long-Term Debt	\$75	\$75	\$33	\$364	\$686	\$54	\$62	[l]
Net Working Capital	(\$142)	(\$142)	(\$543)	(\$1,754)	(\$1,167)	(\$995)	(\$560)	[m] = [j] - ([k] - [l])
Notes Payable (Short-Term Debt)	\$920	\$920	\$397	\$1,649	\$1,117	\$950	\$821	[n]
Adjusted Short-Term Debt	\$142	\$142	\$397	\$1,649	\$1,117	\$950	\$560	[o] = See Sources and Notes
Long-Term Debt	\$9,677	\$9,677	\$8,745	\$6,352	\$5,659	\$5,861	\$5,448	[p]
Book Value of Long-Term Debt	\$9,894	\$9,894	\$9,175	\$8,365	\$7,462	\$6,865	\$6,070	[q] = [l] + [o] + [p]
Adjustment to Book Value of Long-Term Debt	\$1,106	\$1,106	\$283	\$834	\$724	\$843	\$913	[r] = See Sources and Notes
Market Value of Long-Term Debt	\$11,000	\$11,000	\$9,458	\$9,199	\$8,186	\$7,708	\$6,983	[s] = [q] + [r]
Market Value of Debt	\$11,000	\$11,000	\$9,458	\$9,199	\$8,186	\$7,708	\$6,983	[t] = [s]
<b>MARKET VALUE OF FIRM</b>								
	\$36,687	\$34,036	\$30,581	\$24,102	\$22,548	\$21,838	\$15,967	[u] = [f] + [i] + [t]
<b>DEBT AND EQUITY TO MARKET VALUE RATIOS</b>								
Common Equity - Market Value Ratio	70.02%	67.68%	69.07%	61.83%	63.70%	64.70%	56.27%	[v] = [f] / [u]
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	-	[w] = [i] / [u]
Debt - Market Value Ratio	29.98%	32.32%	30.93%	38.17%	36.30%	35.30%	43.73%	[x] = [t] / [u]

Sources and Notes:

Latest Bloomberg data available as of September 30, 2020

Capital structure from 2nd Quarter, 2020 calculated using respective balance sheet information and 15-day average prices ending at period end

The DCF Capital structure is calculated using 2nd Quarter, 2020 balance sheet information and a 15-trading day average closing price ending on 6/30/2020

Prices are reported in Workpaper #1 to Schedule No. BV-6

[e] = Market Value of GP equity is not estimated here

[o] =

(1): 0 if [m] > 0

(2): The absolute value of [m] if [m] < 0 and |[m]| < [n]

(3): [n] if [m] < 0 and |[m]| > [n]

[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2015 to 2019 10-Ks

Schedule No. BV-3  
Market Value of the Full Sample  
Panel L: California Water  
(\$MM)

	DCF Capital Structure	2nd Quarter, 2020	2nd Quarter, 2019	2nd Quarter, 2018	2nd Quarter, 2017	2nd Quarter, 2016	2nd Quarter, 2015	Notes
<b>MARKET VALUE OF COMMON EQUITY</b>								
Book Value, Common Shareholder's Equity	\$782	\$782	\$723	\$686	\$662	\$637	\$623	[a]
Shares Outstanding (in millions) - Common	49	49	48	48	48	48	48	[b]
Price per Share - Common	\$43	\$46	\$50	\$39	\$37	\$33	\$23	[c]
Market Value of Common Equity	\$2,124	\$2,287	\$2,414	\$1,898	\$1,760	\$1,569	\$1,117	[d] = [b] x [c]
Market Value of GP Equity	\$0	\$0	\$0	\$0	\$0	\$0	\$0	[e] = See Sources and Notes
Total Market Value of Equity	\$2,124	\$2,287	\$2,414	\$1,898	\$1,760	\$1,569	\$1,117	[f] = [d] + [e]
Market to Book Value of Common Equity	2.72	2.92	3.34	2.77	2.66	2.46	1.79	[g] = [f] / [a]
<b>MARKET VALUE OF PREFERRED EQUITY</b>								
Book Value of Preferred Equity	\$0	\$0	\$0	\$0	\$0	\$0	\$0	[h]
Market Value of Preferred Equity	\$0	\$0	\$0	\$0	\$0	\$0	\$0	[i] = [h]
<b>MARKET VALUE OF DEBT</b>								
Current Assets	\$267	\$267	\$206	\$190	\$171	\$159	\$150	[j]
Current Liabilities	\$578	\$578	\$331	\$622	\$361	\$202	\$270	[k]
Current Portion of Long-Term Debt	\$22	\$22	\$7	\$105	\$36	\$6	\$7	[l]
Net Working Capital	(\$289)	(\$289)	(\$119)	(\$328)	(\$154)	(\$37)	(\$114)	[m] = [j] - ([k] - [l])
Notes Payable (Short-Term Debt)	\$375	\$375	\$165	\$325	\$190	\$75	\$127	[n]
Adjusted Short-Term Debt	\$289	\$289	\$119	\$325	\$154	\$37	\$114	[o] = See Sources and Notes
Long-Term Debt	\$785	\$785	\$821	\$415	\$520	\$556	\$417	[p]
Book Value of Long-Term Debt	\$1,096	\$1,096	\$946	\$845	\$710	\$599	\$537	[q] = [l] + [o] + [p]
Adjustment to Book Value of Long-Term Debt	\$64	\$64	\$35	\$76	\$73	\$82	\$108	[r] = See Sources and Notes
Market Value of Long-Term Debt	\$1,160	\$1,160	\$981	\$920	\$783	\$680	\$645	[s] = [q] + [r]
Market Value of Debt	\$1,160	\$1,160	\$981	\$920	\$783	\$680	\$645	[t] = [s]
<b>MARKET VALUE OF FIRM</b>								
	\$3,284	\$3,447	\$3,395	\$2,818	\$2,543	\$2,249	\$1,762	[u] = [f] + [i] + [t]
<b>DEBT AND EQUITY TO MARKET VALUE RATIOS</b>								
Common Equity - Market Value Ratio	64.68%	66.35%	71.12%	67.34%	69.21%	69.75%	63.38%	[v] = [f] / [u]
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	-	[w] = [i] / [u]
Debt - Market Value Ratio	35.32%	33.65%	28.88%	32.66%	30.79%	30.25%	36.62%	[x] = [t] / [u]

Sources and Notes:

Latest Bloomberg data available as of September 30, 2020

Capital structure from 2nd Quarter, 2020 calculated using respective balance sheet information and 15-day average prices ending at period end

The DCF Capital structure is calculated using 2nd Quarter, 2020 balance sheet information and a 15-trading day average closing price ending on 6/30/2020

Prices are reported in Workpaper #1 to Schedule No. BV-6

[e] = Market Value of GP equity is not estimated here

[o] =

(1): 0 if [m] > 0

(2): The absolute value of [m] if [m] < 0 and |[m]| < [n]

(3): [n] if [m] < 0 and |[m]| > [n]

[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2015 to 2019 10-Ks

Schedule No. BV-3  
Market Value of the Full Sample  
Panel M: Middlesex Water  
(\$MM)

	DCF Capital Structure	2nd Quarter, 2020	2nd Quarter, 2019	2nd Quarter, 2018	2nd Quarter, 2017	2nd Quarter, 2016	2nd Quarter, 2015	Notes
<b>MARKET VALUE OF COMMON EQUITY</b>								
Book Value, Common Shareholder's Equity	\$333	\$333	\$263	\$236	\$222	\$212	\$201	[a]
Shares Outstanding (in millions) - Common	17	17	17	16	16	16	16	[b]
Price per Share - Common	\$62	\$67	\$60	\$43	\$40	\$40	\$22	[c]
Market Value of Common Equity	\$1,088	\$1,170	\$992	\$699	\$652	\$656	\$362	[d] = [b] x [c]
Market Value of GP Equity	\$0	\$0	\$0	\$0	\$0	\$0	\$0	[e] = See Sources and Notes
Total Market Value of Equity	\$1,088	\$1,170	\$992	\$699	\$652	\$656	\$362	[f] = [d] + [e]
Market to Book Value of Common Equity	3.26	3.51	3.77	2.96	2.93	3.09	1.80	[g] = [f] / [a]
<b>MARKET VALUE OF PREFERRED EQUITY</b>								
Book Value of Preferred Equity	\$2	\$2	\$2	\$2	\$2	\$2	\$2	[h]
Market Value of Preferred Equity	\$2	\$2	\$2	\$2	\$2	\$2	\$2	[i] = [h]
<b>MARKET VALUE OF DEBT</b>								
Current Assets	\$44	\$44	\$32	\$31	\$30	\$28	\$29	[j]
Current Liabilities	\$84	\$84	\$103	\$82	\$55	\$39	\$49	[k]
Current Portion of Long-Term Debt	\$8	\$8	\$8	\$7	\$6	\$6	\$6	[l]
Net Working Capital	(\$32)	(\$32)	(\$62)	(\$43)	(\$20)	(\$5)	(\$15)	[m] = [j] - ([k] - [l])
Notes Payable (Short-Term Debt)	\$38	\$38	\$59	\$39	\$17	\$11	\$18	[n]
Adjusted Short-Term Debt	\$32	\$32	\$59	\$39	\$17	\$5	\$15	[o] = See Sources and Notes
Long-Term Debt	\$243	\$243	\$170	\$142	\$136	\$131	\$136	[p]
Book Value of Long-Term Debt	\$284	\$284	\$237	\$188	\$160	\$142	\$156	[q] = [l] + [o] + [p]
Adjustment to Book Value of Long-Term Debt	\$10	\$10	\$1	\$3	\$2	\$3	\$1	[r] = See Sources and Notes
Market Value of Long-Term Debt	\$294	\$294	\$238	\$191	\$162	\$145	\$158	[s] = [q] + [r]
Market Value of Debt	\$294	\$294	\$238	\$191	\$162	\$145	\$158	[t] = [s]
<b>MARKET VALUE OF FIRM</b>								
	\$1,384	\$1,465	\$1,233	\$892	\$816	\$803	\$522	[u] = [f] + [i] + [t]
<b>DEBT AND EQUITY TO MARKET VALUE RATIOS</b>								
Common Equity - Market Value Ratio	78.64%	79.82%	80.46%	78.32%	79.89%	81.68%	69.29%	[v] = [f] / [u]
Preferred Equity - Market Value Ratio	0.15%	0.14%	0.20%	0.27%	0.30%	0.30%	0.47%	[w] = [i] / [u]
Debt - Market Value Ratio	21.21%	20.04%	19.34%	21.41%	19.81%	18.02%	30.24%	[x] = [t] / [u]

Sources and Notes:

Latest Bloomberg data available as of September 30, 2020

Capital structure from 2nd Quarter, 2020 calculated using respective balance sheet information and 15-day average prices ending at period end

The DCF Capital structure is calculated using 2nd Quarter, 2020 balance sheet information and a 15-trading day average closing price ending on 6/30/2020

Prices are reported in Workpaper #1 to Schedule No. BV-6

[e] = Market Value of GP equity is not estimated here

[o] =

(1): 0 if [m] > 0

(2): The absolute value of [m] if [m] < 0 and |[m]| < [n]

(3): [n] if [m] < 0 and |[m]| > [n]

[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2015 to 2019 10-Ks

Schedule No. BV-3  
Market Value of the Full Sample

Panel N: SJW Group

(\$MM)

	DCF Capital Structure	2nd Quarter, 2020	2nd Quarter, 2019	2nd Quarter, 2018	2nd Quarter, 2017	2nd Quarter, 2016	2nd Quarter, 2015	Notes
<b>MARKET VALUE OF COMMON EQUITY</b>								
Book Value, Common Shareholder's Equity	\$895	\$895	\$894	\$465	\$436	\$396	\$365	[a]
Shares Outstanding (in millions) - Common	29	29	28	21	21	20	20	[b]
Price per Share - Common	\$60	\$62	\$61	\$67	\$51	\$38	\$31	[c]
Market Value of Common Equity	\$1,722	\$1,758	\$1,740	\$1,378	\$1,048	\$771	\$628	[d] = [b] x [c]
Market Value of GP Equity	\$0	\$0	\$0	\$0	\$0	\$0	\$0	[e] = See Sources and Notes
Total Market Value of Equity	\$1,722	\$1,758	\$1,740	\$1,378	\$1,048	\$771	\$628	[f] = [d] + [e]
Market to Book Value of Common Equity	1.92	1.96	1.95	2.96	2.40	1.95	1.72	[g] = [f] / [a]
<b>MARKET VALUE OF PREFERRED EQUITY</b>								
Book Value of Preferred Equity	\$0	\$0	\$0	\$0	\$0	\$0	\$0	[h]
Market Value of Preferred Equity	\$0	\$0	\$0	\$0	\$0	\$0	\$0	[i] = [h]
<b>MARKET VALUE OF DEBT</b>								
Current Assets	\$146	\$146	\$504	\$73	\$73	\$93	\$70	[j]
Current Liabilities	\$258	\$258	\$127	\$125	\$70	\$120	\$59	[k]
Current Portion of Long-Term Debt	\$22	\$22	\$0	\$0	\$0	\$12	\$1	[l]
Net Working Capital	(\$90)	(\$90)	\$377	(\$51)	\$2	(\$16)	\$12	[m] = [j] - ([k] - [l])
Notes Payable (Short-Term Debt)	\$147	\$147	\$55	\$59	\$0	\$56	\$20	[n]
Adjusted Short-Term Debt	\$90	\$90	\$0	\$51	\$0	\$16	\$0	[o] = See Sources and Notes
Long-Term Debt	\$1,316	\$1,316	\$511	\$431	\$431	\$364	\$384	[p]
Book Value of Long-Term Debt	\$1,428	\$1,428	\$511	\$483	\$431	\$392	\$385	[q] = [l] + [o] + [p]
Adjustment to Book Value of Long-Term Debt	\$112	\$112	\$59	\$107	\$69	\$119	\$76	[r] = See Sources and Notes
Market Value of Long-Term Debt	\$1,541	\$1,541	\$569	\$590	\$500	\$511	\$460	[s] = [q] + [r]
Market Value of Debt	\$1,541	\$1,541	\$569	\$590	\$500	\$511	\$460	[t] = [s]
<b>MARKET VALUE OF FIRM</b>								
	\$3,263	\$3,299	\$2,310	\$1,968	\$1,548	\$1,282	\$1,088	[u] = [f] + [i] + [t]
<b>DEBT AND EQUITY TO MARKET VALUE RATIOS</b>								
Common Equity - Market Value Ratio	52.78%	53.29%	75.35%	70.04%	67.73%	60.15%	57.70%	[v] = [f] / [u]
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	-	[w] = [i] / [u]
Debt - Market Value Ratio	47.22%	46.71%	24.65%	29.96%	32.27%	39.85%	42.30%	[x] = [t] / [u]

Sources and Notes:

Latest Bloomberg data available as of September 30, 2020

Capital structure from 2nd Quarter, 2020 calculated using respective balance sheet information and 15-day average prices ending at period end

The DCF Capital structure is calculated using 2nd Quarter, 2020 balance sheet information and a 15-trading day average closing price ending on 6/30/2020

Prices are reported in Workpaper #1 to Schedule No. BV-6

[e] = Market Value of GP equity is not estimated here

[o] =

(1): 0 if [m] > 0

(2): The absolute value of [m] if [m] < 0 and |[m]| < [n]

(3): [n] if [m] < 0 and |[m]| > [n]

[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2015 to 2019 10-Ks

Schedule No. BV-3  
Market Value of the Full Sample  
Panel O: York Water Co. (The)  
(\$MM)

	DCF Capital Structure	2nd Quarter, 2020	2nd Quarter, 2019	2nd Quarter, 2018	2nd Quarter, 2017	2nd Quarter, 2016	2nd Quarter, 2015	Notes
<b>MARKET VALUE OF COMMON EQUITY</b>								
Book Value, Common Shareholder's Equity	\$139	\$139	\$129	\$122	\$115	\$112	\$107	[a]
Shares Outstanding (in millions) - Common	13	13	13	13	13	13	13	[b]
Price per Share - Common	\$43	\$46	\$35	\$32	\$37	\$30	\$22	[c]
Market Value of Common Equity	\$556	\$600	\$453	\$413	\$474	\$391	\$283	[d] = [b] x [c]
Market Value of GP Equity	\$0	\$0	\$0	\$0	\$0	\$0	\$0	[e] = See Sources and Notes
Total Market Value of Equity	\$556	\$600	\$453	\$413	\$474	\$391	\$283	[f] = [d] + [e]
Market to Book Value of Common Equity	4.01	4.33	3.51	3.38	4.11	3.49	2.63	[g] = [f] / [a]
<b>MARKET VALUE OF PREFERRED EQUITY</b>								
Book Value of Preferred Equity	\$0	\$0	\$0	\$0	\$0	\$0	\$0	[h]
Market Value of Preferred Equity	\$0	\$0	\$0	\$0	\$0	\$0	\$0	[i] = [h]
<b>MARKET VALUE OF DEBT</b>								
Current Assets	\$10	\$10	\$9	\$9	\$8	\$13	\$10	[j]
Current Liabilities	\$16	\$16	\$10	\$19	\$10	\$6	\$7	[k]
Current Portion of Long-Term Debt	\$7	\$7	\$0	\$11	\$0	\$0	\$0	[l]
Net Working Capital	\$0	\$0	(\$1)	\$1	(\$1)	\$7	\$3	[m] = [j] - ([k] - [l])
Notes Payable (Short-Term Debt)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	[n]
Adjusted Short-Term Debt	\$0	\$0	\$0	\$0	\$0	\$0	\$0	[o] = See Sources and Notes
Long-Term Debt	\$97	\$97	\$96	\$81	\$88	\$85	\$85	[p]
Book Value of Long-Term Debt	\$103	\$103	\$96	\$92	\$88	\$85	\$85	[q] = [l] + [o] + [p]
Adjustment to Book Value of Long-Term Debt	\$11	\$11	\$9	\$15	\$12	\$14	\$15	[r] = See Sources and Notes
Market Value of Long-Term Debt	\$114	\$114	\$105	\$107	\$100	\$99	\$100	[s] = [q] + [r]
Market Value of Debt	\$114	\$114	\$105	\$107	\$100	\$99	\$100	[t] = [s]
<b>MARKET VALUE OF FIRM</b>								
	\$670	\$714	\$558	\$521	\$574	\$490	\$383	[u] = [f] + [i] + [t]
<b>DEBT AND EQUITY TO MARKET VALUE RATIOS</b>								
Common Equity - Market Value Ratio	82.98%	84.03%	81.14%	79.41%	82.62%	79.78%	73.87%	[v] = [f] / [u]
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	-	[w] = [i] / [u]
Debt - Market Value Ratio	17.02%	15.97%	18.86%	20.59%	17.38%	20.22%	26.13%	[x] = [t] / [u]

Sources and Notes:

Latest Bloomberg data available as of September 30, 2020

Capital structure from 2nd Quarter, 2020 calculated using respective balance sheet information and 15-day average prices ending at period end

The DCF Capital structure is calculated using 2nd Quarter, 2020 balance sheet information and a 15-trading day average closing price ending on 6/30/2020

Prices are reported in Workpaper #1 to Schedule No. BV-6

[e] = Market Value of GP equity is not estimated here

[o] =

(1): 0 if [m] > 0

(2): The absolute value of [m] if [m] < 0 and |[m]| < [n]

(3): [n] if [m] < 0 and |[m]| > [n]

[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2015 to 2019 10-Ks

**Schedule No. BV-4**

**Full Sample**

**Capital Structure Summary of the Full Sample**

Company	DCF Capital Structure			5-Year Average Capital Structure		
	Common Equity - Value Ratio	Preferred Equity - Value Ratio	Debt - Value Ratio	Common Equity - Value Ratio	Preferred Equity - Value Ratio	Debt - Value Ratio
	[1]	[2]	[3]	[4]	[5]	[6]
Atmos Energy	0.68	0.00	0.32	0.72	0.00	0.28
Chesapeake Utilities	0.63	0.00	0.37	0.72	0.00	0.28
New Jersey Resources	0.53	0.00	0.47	0.74	0.00	0.26
NiSource Inc.	0.44	0.05	0.52	0.48	0.02	0.50
Northwest Natural	0.53	0.00	0.47	0.67	0.00	0.33
ONE Gas Inc.	0.65	0.00	0.35	0.73	0.00	0.27
South Jersey Inds.	0.39	0.00	0.61	0.57	0.00	0.43
Southwest Gas	0.57	0.00	0.43	0.65	0.00	0.35
Spire Inc.	0.44	0.04	0.52	0.58	0.01	0.41
Amer. States Water	0.82	0.00	0.18	0.81	0.00	0.19
Amer. Water Works	0.70	0.00	0.30	0.64	0.00	0.36
California Water	0.65	0.00	0.35	0.68	0.00	0.32
Middlesex Water	0.79	0.00	0.21	0.79	0.00	0.21
SJW Group	0.53	0.00	0.47	0.66	0.00	0.34
York Water Co. (The)	0.83	0.00	0.17	0.80	0.00	0.20
Full Sample Average	0.61	0.01	0.38	0.68	0.00	0.32
Gas Sample Average	0.54	0.01	0.45	0.65	0.00	0.35
Water Sample Average	0.72	0.00	0.28	0.73	0.00	0.27

Sources and Notes:

[1], [4]:Workpaper #1 to Schedule No. BV-4.

[2], [5]:Workpaper #2 to Schedule No. BV-4.

[3], [6]:Workpaper #3 to Schedule No. BV-4.

Values in this table may not add up exactly to 1.0 because of rounding.

**Schedule No. BV-5**

**Full Sample**

**Estimated Growth Rates of the Full Sample**

Company	Thomson Reuters IBES Estimate		Value Line		Annualized Growth Rate	Combined Growth Rate
	Long-Term Growth Rate	Number of Estimates	EPS Year 2020 Estimate	EPS Year 2023-2025 Estimate		
	[1]	[2]	[3]	[4]	[5]	[6]
Atmos Energy	7.3%	2	4.70	6.00	6.3%	6.9%
Chesapeake Utilities	0.0%	0	3.90	5.50	9.0%	9.0%
New Jersey Resources	6.0%	2	1.90	2.40	6.0%	6.0%
NiSource Inc.	1.8%	1	1.30	2.05	12.1%	6.9%
Northwest Natural	3.9%	1	2.35	3.20	8.0%	6.0%
ONE Gas Inc.	5.0%	1	3.50	4.75	7.9%	6.5%
South Jersey Inds.	10.7%	1	1.50	2.50	13.6%	12.2%
Southwest Gas	5.0%	2	3.85	6.25	12.9%	7.6%
Spire Inc.	4.5%	3	1.10	5.15	47.1%	15.1%
Amer. States Water	5.3%	1	2.30	2.90	6.0%	5.6%
Amer. Water Works	8.3%	1	3.85	4.90	6.2%	7.3%
California Water	11.5%	1	0.85	2.00	23.9%	17.7%
Middlesex Water	0.0%	0	2.15	2.50	3.8%	3.8%
SJW Group	14.1%	1	2.05	3.65	15.5%	14.8%
York Water Co. (The)	0.0%	0	1.30	1.60	5.3%	5.3%

Sources and Notes:

[1] - [2]: Thomson Reuters as of September 30, 2020.

[3] - [4]: From Valueline Investment Analyzer as of September 30, 2020.

[5]:  $([4] / [3])^{(1/4)} - 1$ .

[6]:  $([1] \times [2] + [5]) / ([2] + 1)$ .

Weighted average growth rate. If information is missing from one source, the weighted average is based solely on the other source.

**Schedule No. BV-6**  
**DCF Cost of Equity of the Full Sample**  
**Panel A: Simple DCF Method (Quarterly)**

Company	Stock Price	Most Recent Dividend	Quarterly	Combined Long-Term Growth Rate	Quarterly Growth Rate	DCF Cost of Equity
			Dividend Yield (t+1)			
	[1]	[2]	[3]	[4]	[5]	[6]
Atmos Energy	\$93.73	\$0.58	0.62%	6.9%	1.7%	9.6%
Chesapeake Utilities	\$78.09	\$0.44	0.58%	9.0%	2.2%	11.5%
New Jersey Resources	\$27.38	\$0.33	1.23%	6.0%	1.5%	11.2%
NiSource Inc.	\$22.04	\$0.21	0.97%	6.9%	1.7%	11.1%
Northwest Natural	\$45.12	\$0.48	1.07%	6.0%	1.5%	10.5%
ONE Gas Inc.	\$68.52	\$0.54	0.80%	6.5%	1.6%	9.9%
South Jersey Inds.	\$19.46	\$0.30	1.56%	12.2%	2.9%	19.1%
Southwest Gas	\$62.19	\$0.57	0.93%	7.6%	1.9%	11.6%
Spire Inc.	\$52.79	\$0.62	1.22%	15.1%	3.6%	20.7%
Amer. States Water	\$73.17	\$0.34	0.46%	5.6%	1.4%	7.6%
Amer. Water Works	\$141.76	\$0.55	0.39%	7.3%	1.8%	8.9%
California Water	\$43.00	\$0.21	0.51%	17.7%	4.2%	20.0%
Middlesex Water	\$62.31	\$0.26	0.42%	3.8%	0.9%	5.6%
SJW Group	\$60.38	\$0.32	0.55%	14.8%	3.5%	17.3%
York Water Co. (The)	\$42.68	\$0.18	0.43%	5.3%	1.3%	7.1%

Sources and Notes:

[1]: Workpaper #1 to Schedule No. BV-6.

[2]: Workpaper #2 to Schedule No. BV-6.

[3]:  $([2] / [1]) \times (1 + [5])$ .

[4]: Schedule No. BV-5, [6].

[5]:  $\{(1 + [4])^{(1/4)}\} - 1$ .

[6]:  $\{([3] + [5] + 1)^4\} - 1$ .

Schedule No. BV-6

DCF Cost of Equity of the Full Sample

Panel B: Multi-Stage DCF (Using Blue Chip Long-Term GDP Growth Forecast as the Perpetual Rate)

Company	Stock Price	Most Recent Dividend	Combined Long-Term Growth Rate	Growth Rate: Year 6	Growth Rate: Year 7	Growth Rate: Year 8	Growth Rate: Year 9	Growth Rate: Year 10	GDP Long-Term Growth Rate	DCF Cost of Equity
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
Atmos Energy	\$93.73	\$0.58	6.9%	6.5%	6.0%	5.5%	5.0%	4.6%	4.1%	7.2%
Chesapeake Utilities	\$78.09	\$0.44	9.0%	8.2%	7.3%	6.5%	5.7%	4.9%	4.1%	7.3%
New Jersey Resources	\$27.38	\$0.33	6.0%	5.7%	5.4%	5.1%	4.7%	4.4%	4.1%	9.9%
NiSource Inc.	\$22.04	\$0.21	6.9%	6.5%	6.0%	5.5%	5.0%	4.6%	4.1%	8.9%
Northwest Natural	\$45.12	\$0.48	6.0%	5.7%	5.3%	5.0%	4.7%	4.4%	4.1%	9.1%
ONE Gas Inc.	\$68.52	\$0.54	6.5%	6.1%	5.7%	5.3%	4.9%	4.5%	4.1%	8.0%
South Jersey Inds.	\$19.46	\$0.30	12.2%	10.8%	9.5%	8.1%	6.8%	5.4%	4.1%	14.1%
Southwest Gas	\$62.19	\$0.57	7.6%	7.0%	6.5%	5.9%	5.3%	4.7%	4.1%	8.9%
Spire Inc.	\$52.79	\$0.62	15.1%	13.3%	11.5%	9.6%	7.8%	5.9%	4.1%	13.2%
Amer. States Water	\$73.17	\$0.34	5.6%	5.4%	5.1%	4.9%	4.6%	4.4%	4.1%	6.2%
Amer. Water Works	\$141.76	\$0.55	7.3%	6.7%	6.2%	5.7%	5.2%	4.6%	4.1%	6.1%
California Water	\$43.00	\$0.21	17.7%	15.4%	13.2%	10.9%	8.6%	6.4%	4.1%	8.8%
Middlesex Water	\$62.31	\$0.26	3.8%	3.9%	3.9%	4.0%	4.0%	4.1%	4.1%	5.8%
SJW Group	\$60.38	\$0.32	14.8%	13.0%	11.2%	9.5%	7.7%	5.9%	4.1%	8.4%
York Water Co. (The)	\$42.68	\$0.18	5.3%	5.1%	4.9%	4.7%	4.5%	4.3%	4.1%	6.0%

Sources and Notes:

[1]: Workpaper #1 to Schedule No. BV-6.

[2]: Workpaper #2 to Schedule No. BV-6.

[3]: Schedule No. BV-5, [6].

[4]: [3] -  $\{([3] - [9]) / 6\}$ .

[5]: [4] -  $\{([3] - [9]) / 6\}$ .

[6]: [5] -  $\{([3] - [9]) / 6\}$ .

[7]: [6] -  $\{([3] - [9]) / 6\}$ .

[8]: [7] -  $\{([3] - [9]) / 6\}$ .

[9]: BlueChip Economic Indicators, October 2020 This number is assumed to be the perpetual growth rate.

[10]: Workpaper #3 to Schedule No. BV-6.

Schedule No. BV-7

Overall After-Tax DCF Cost of Capital of the Full Sample

Panel A: Simple DCF Method (Quarterly)

Company	2nd Quarter, 2020 S&P Bond Rating	2nd Quarter, 2020 Preferred Equity Rating	2nd Quarter, 2020 DCF Cost of Equity	DCF Common Equity to Market Value Ratio	Cost of Preferred Equity	DCF Preferred Equity to Market Value Ratio	DCF Cost of Debt	DCF Debt to Market Value Ratio	Northwest Natural's Representative Income Tax Rate	Overall Weighted After-Tax Cost of Capital
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
Atmos Energy	A	-	9.6%	0.68	-	0.00	2.7%	0.32	26.5%	7.1%
Chesapeake Utilities	A	-	11.5%	0.63	-	0.00	2.7%	0.37	26.5%	7.9%
New Jersey Resources	AA	-	11.2%	0.53	-	0.00	2.5%	0.47	26.5%	6.8%
NiSource Inc.	BBB	BBB	11.1%	0.44	3.0%	0.05	3.0%	0.52	26.5%	6.1%
Northwest Natural	BBB	-	10.5%	0.53	-	0.00	3.0%	0.47	26.5%	6.6%
ONE Gas Inc.	A	-	9.9%	0.65	-	0.00	2.7%	0.35	26.5%	7.1%
South Jersey Inds.	BBB	-	19.1%	0.39	-	0.00	3.0%	0.61	26.5%	8.9%
Southwest Gas	BBB	-	11.6%	0.57	-	0.00	3.0%	0.43	26.5%	7.5%
Spire Inc.	A	A	20.7%	0.44	2.7%	0.04	2.7%	0.52	26.5%	10.2%
Amer. States Water	A	-	7.6%	0.82	-	0.00	2.7%	0.18	26.5%	6.6%
Amer. Water Works	A	-	8.9%	0.70	-	0.00	2.7%	0.30	26.5%	6.8%
California Water	A	-	20.0%	0.65	-	0.00	2.7%	0.35	26.5%	13.6%
Middlesex Water	A	A	5.6%	0.79	2.7%	0.00	2.7%	0.21	26.5%	4.8%
SJW Group	A	-	17.3%	0.53	-	0.00	2.7%	0.47	26.5%	10.0%
York Water Co. (The)	A	-	7.1%	0.83	-	0.00	2.7%	0.17	26.5%	6.2%
Simple Full Sample Average			12.1%	0.61	2.8%	0.01	2.7%	0.38	26.5%	7.8%
Simple Gas Sample Average			12.8%	0.54	2.8%	0.01	2.8%	0.45	26.5%	7.6%
Simple Water Sample Average			11.1%	0.72	2.7%	0.00	2.7%	0.28	26.5%	8.0%

Sources and Notes:

[1]: Latest Bloomberg data available as of September 30, 2020.

[2]: Preferred ratings were assumed equal to debt ratings.

[3]: Schedule No. BV-6; Panel A, [6].

[4]: Schedule No. BV-4, [1].

[5]: Workpaper #2 to Schedule No. BV-11, Panel C.

[6]: Schedule No. BV-4, [2].

[7]: Workpaper #2 to Schedule No. BV-11, Panel B.

[8]: Schedule No. BV-4, [3].

[9]: Provided by Northwest Natural.

[10]:  $([3] \times [4]) + ([5] \times [6]) + \{[7] \times [8] \times (1 - [9])\}$ . A strikethrough indicates the utility was excluded from the full sample average calculation as a result of its cost of equity not exceeding its cost of debt by 150 basis points

Schedule No. BV-7

Overall After-Tax DCF Cost of Capital of the Full Sample

Panel B: Multi-Stage DCF (Using Blue Chip Long-Term GDP Growth Forecast as the Perpetual Rate)

Company	2nd Quarter, 2020 S&P Bond Rating	2nd Quarter, 2020 Preferred Equity Rating	DCF Cost of Equity	DCF Common Equity to Market Value Ratio	Cost of Preferred Equity	DCF Preferred Equity to Market Value Ratio	DCF Cost of Debt	DCF Debt to Market Value Ratio	Northwest Natural's Representative Income Tax Rate	Overall Weighted After-Tax Cost of Capital
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
Atmos Energy	A	-	7.2%	0.68	-	0.00	2.7%	0.32	26.5%	5.5%
Chesapeake Utilities	A	-	7.3%	0.63	-	0.00	2.7%	0.37	26.5%	5.3%
New Jersey Resources	AA	-	9.9%	0.53	-	0.00	2.5%	0.47	26.5%	6.1%
NiSource Inc.	BBB	BBB	8.9%	0.44	3.0%	0.05	3.0%	0.52	26.5%	5.2%
Northwest Natural	BBB	-	9.1%	0.53	-	0.00	3.0%	0.47	26.5%	5.8%
ONE Gas Inc.	A	-	8.0%	0.65	-	0.00	2.7%	0.35	26.5%	5.9%
South Jersey Inds.	BBB	-	14.1%	0.39	-	0.00	3.0%	0.61	26.5%	6.9%
Southwest Gas	BBB	-	8.9%	0.57	-	0.00	3.0%	0.43	26.5%	6.0%
Spire Inc.	A	A	13.2%	0.44	2.7%	0.04	2.7%	0.52	26.5%	7.0%
Amer. States Water	A	-	6.2%	0.82	-	0.00	2.7%	0.18	26.5%	5.4%
Amer. Water Works	A	-	6.1%	0.70	-	0.00	2.7%	0.30	26.5%	4.9%
California Water	A	-	8.8%	0.65	-	0.00	2.7%	0.35	26.5%	6.4%
Middlesex Water	A	A	5.8%	0.79	2.7%	0.00	2.7%	0.21	26.5%	5.0%
SJW Group	A	-	8.4%	0.53	-	0.00	2.7%	0.47	26.5%	5.4%
York Water Co. (The)	A	-	6.0%	0.83	-	0.00	2.7%	0.17	26.5%	5.3%
Multi-Stage Full Sample Average			8.5%	0.61	2.8%	0.01	2.7%	0.38	26.5%	5.7%
Multi-Stage Gas Sample Average			9.6%	0.54	2.8%	0.01	2.8%	0.45	26.5%	6.0%
Multi-Stage Water Sample Average			6.9%	0.72	2.7%	0.00	2.7%	0.28	26.5%	5.4%

Sources and Notes:

[1]: Latest Bloomberg data available as of September 30, 2020.

[2]: Preferred ratings were assumed equal to debt ratings.

[3]: Schedule No. BV-6, Panel B, [10].

[4]: Schedule No. BV-4, [1].

[5]: Workpaper #2 to Schedule No. BV-11, Panel C.

[6]: Schedule No. BV-4, [2].

[7]: Workpaper #2 to Schedule No. BV-11, Panel B.

[8]: Schedule No. BV-4, [3].

[9]: Provided by Northwest Natural.

[10]:  $([3] \times [4]) + ([5] \times [6]) + \{[7] \times [8] \times (1 - [9])\}$ . A strikethrough indicates the utility was excluded from the full sample average calculation as a result of its cost of equity not exceeding its cost of debt by 150 basis points

**Schedule No. BV-8**  
**DCF Cost of Equity at Northwest Natural's Proposed Capital Structure**

**Full Sample**

	Overall After - Tax Cost of Capital	Northwest Natural's Representative Regulatory % Debt	Representative Cost of BBB Rated Utility Debt	Northwest Natural's Representative Income Tax Rate	Northwest Natural's Representative Regulatory % Equity	Estimated Return on Equity
	[1]	[2]	[3]	[4]	[5]	[6]
<b>Full Sample</b>						
Simple DCF Quarterly	7.8%	51.0%	3.0%	26.5%	49.0%	13.5%
Multi-Stage DCF - Using the Blue Chip Economic Indicator Long-Term GDP Growth Forecast as the Perpetual Rate	5.7%	51.0%	3.0%	26.5%	49.0%	9.4%
<b>Gas Sample</b>						
Simple DCF Quarterly	7.6%	51.0%	3.0%	26.5%	49.0%	13.2%
Multi-Stage DCF - Using the Blue Chip Economic Indicator Long-Term GDP Growth Forecast as the Perpetual Rate	6.0%	51.0%	3.0%	26.5%	49.0%	9.9%
<b>Water Sample</b>						
Simple DCF Quarterly	8.0%	51.0%	3.0%	26.5%	49.0%	14.0%
Multi-Stage DCF - Using the Blue Chip Economic Indicator Long-Term GDP Growth Forecast as the Perpetual Rate	5.4%	51.0%	3.0%	26.5%	49.0%	8.7%

Sources and Notes:

- [1]: Schedule No. BV-7; Panels A-B, [10]
- [2]: Provided by Northwest Natural
- [3]: Based on a BBB rating Bloomberg as of September 30, 2020
- [4]: Provided by Northwest Natural
- [5]: Provided by Northwest Natural
- [6]:  $\{[1] - ([2] \times [3] \times (1 - [4]))\} / [5]$

### Schedule No. BV-9 Risk-Free Rates

<b>BCEI Forecast of 10 year U.S. Treasury Yield</b>	<b>[a]</b>	<b>1.40%</b>
Long-run Average of 20 year U.S. Treasury Yield	[b]	4.77%
Long-run Average of 10 year U.S. Treasury Yield	[c]	4.27%
<b>Maturity Premium</b>	<b>[d] = [b] - [c]</b>	<b>0.50%</b>
<b>Base Projection of 20 year U.S. Treasury Yield</b>	<b>[e] = [a] + [d]</b>	<b>1.90%</b>

Sources and Notes:

[a]: Blue Chip Economic Indicators, October 2020. Projection of 2022 Yield.

[b], [c]: Bloomberg as of 9/30/2020, see Workpaper #1 to Schedule No. BV-9.

**Schedule No. BV-10**

**Risk Positioning Cost of Equity of the Full Sample (Using Value Line Betas)**

**Panel A: Scenario 1 - Long-Term Risk Free Rate of 2.15%, Long-Term Market Risk Premium of 7.15%**

Company	Long-Term Risk-Free Rate [1]	Value Line Betas [2]	Long-Term Market Risk Premium [3]	CAPM Cost of Equity [4]	ECAPM (1.5%) Cost of Equity [5]
Atmos Energy	2.15%	0.80	7.15%	7.9%	8.2%
Chesapeake Utilities	2.15%	0.75	7.15%	7.5%	7.9%
New Jersey Resources	2.15%	0.90	7.15%	8.6%	8.7%
NiSource Inc.	2.15%	0.85	7.15%	8.2%	8.5%
Northwest Natural	2.15%	0.80	7.15%	7.9%	8.2%
ONE Gas Inc.	2.15%	0.80	7.15%	7.9%	8.2%
South Jersey Inds.	2.15%	1.00	7.15%	9.3%	9.3%
Southwest Gas	2.15%	0.90	7.15%	8.6%	8.7%
Spire Inc.	2.15%	0.80	7.15%	7.9%	8.2%
Amer. States Water	2.15%	0.65	7.15%	6.8%	7.3%
Amer. Water Works	2.15%	0.85	7.15%	8.2%	8.5%
California Water	2.15%	0.65	7.15%	6.8%	7.3%
Middlesex Water	2.15%	0.70	7.15%	7.2%	7.6%
SJW Group	2.15%	0.80	7.15%	7.9%	8.2%
York Water Co. (The)	2.15%	0.80	7.15%	7.9%	8.2%

Sources and Notes:

[1], [3]: Villadsen Direct Testimony.

[2]: From Valueline Investment Analyzer as of September 30, 2020.

[4]: [1] + ([2] x [3]).

[5]: ([1] + 1.5%) + [2] x ([3] - 1.5%).

**Schedule No. BV-10**

**Risk Positioning Cost of Equity of the Full Sample (Using Value Line Betas)**

**Panel B: Scenario 2 - Long-Term Risk Free Rate of 1.90%, Long-Term Market Risk Premium of 7.47%**

Company	Long-Term Risk-Free Rate [1]	Value Line Betas [2]	Long-Term Market Risk Premium [3]	CAPM Cost of Equity [4]	ECAPM (1.5%) Cost of Equity [5]
Atmos Energy	1.90%	0.80	7.47%	7.9%	8.2%
Chesapeake Utilities	1.90%	0.75	7.47%	7.5%	7.9%
New Jersey Resources	1.90%	0.90	7.47%	8.6%	8.8%
NiSource Inc.	1.90%	0.85	7.47%	8.3%	8.5%
Northwest Natural	1.90%	0.80	7.47%	7.9%	8.2%
ONE Gas Inc.	1.90%	0.80	7.47%	7.9%	8.2%
South Jersey Inds.	1.90%	1.00	7.47%	9.4%	9.4%
Southwest Gas	1.90%	0.90	7.47%	8.6%	8.8%
Spire Inc.	1.90%	0.80	7.47%	7.9%	8.2%
Amer. States Water	1.90%	0.65	7.47%	6.8%	7.3%
Amer. Water Works	1.90%	0.85	7.47%	8.3%	8.5%
California Water	1.90%	0.65	7.47%	6.8%	7.3%
Middlesex Water	1.90%	0.70	7.47%	7.1%	7.6%
SJW Group	1.90%	0.80	7.47%	7.9%	8.2%
York Water Co. (The)	1.90%	0.80	7.47%	7.9%	8.2%

Sources and Notes:

[1], [3]: Villadsen Direct Testimony.

[2]: From Valueline Investment Analyzer as of September 30, 2020.

[4]: [1] + ([2] x [3]).

[5]: ([1] + 1.5%) + [2] x ([3] - 1.5%).

Schedule No. BV-11

Overall After-Tax Risk Positioning Cost of Capital of the Full Sample (Using Value Line Betas)

Panel A: CAPM Cost of Equity Scenario 1 - Long-Term Risk Free Rate of 2.15%, Long-Term Market Risk Premium of 7.15%

Company	CAPM Cost of Equity	ECAPM (1.5%) Cost of Equity	5-Year Average Common Equity to Market Value Ratio	Weighted - Average Cost of Preferred Equity	5-Year Average Preferred Equity to Market Value Ratio	Weighted- Average Cost of Debt	5-Year Average Debt to Market Value Ratio	Northwest Natural's Representative Income Tax Rate	Overall After-Tax Cost of Capital (CAPM)	Overall After-Tax Cost of Capital (ECAPM 1.5%)
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
Atmos Energy	7.9%	8.2%	0.72	-	0.00	2.7%	0.28	26.5%	6.2%	6.4%
Chesapeake Utilities	7.5%	7.9%	0.72	-	0.00	2.7%	0.28	26.5%	6.0%	6.2%
New Jersey Resources	8.6%	8.7%	0.74	-	0.00	2.5%	0.26	26.5%	6.8%	6.9%
NiSource Inc.	8.2%	8.5%	0.48	3.0%	0.02	3.0%	0.50	26.5%	5.1%	5.2%
Northwest Natural	7.9%	8.2%	0.67	-	0.00	2.7%	0.33	26.5%	5.9%	6.1%
ONE Gas Inc.	7.9%	8.2%	0.73	-	0.00	2.7%	0.27	26.5%	6.2%	6.5%
South Jersey Inds.	9.3%	9.3%	0.57	-	0.00	3.0%	0.43	26.5%	6.3%	6.3%
Southwest Gas	8.6%	8.7%	0.65	-	0.00	3.0%	0.35	26.5%	6.3%	6.4%
Spire Inc.	7.9%	8.2%	0.58	2.7%	0.01	2.7%	0.41	26.5%	5.4%	5.6%
Amer. States Water	6.8%	7.3%	0.81	-	0.00	2.7%	0.19	26.5%	5.9%	6.3%
Amer. Water Works	8.2%	8.5%	0.64	-	0.00	2.7%	0.36	26.5%	6.0%	6.1%
California Water	6.8%	7.3%	0.68	-	0.00	2.7%	0.32	26.5%	5.3%	5.6%
Middlesex Water	7.2%	7.6%	0.79	2.7%	0.00	2.7%	0.21	26.5%	6.1%	6.4%
SJW Group	7.9%	8.2%	0.66	-	0.00	2.7%	0.34	26.5%	5.8%	6.0%
York Water Co. (The)	7.9%	8.2%	0.80	-	0.00	2.7%	0.20	26.5%	6.7%	6.9%
Full Sample Average	7.9%	8.2%	0.68	2.8%	0.00	2.7%	0.32	26.5%	6.0%	6.2%
Gas Sample Average	8.2%	8.4%	0.65	2.8%	0.00	2.8%	0.35	26.5%	6.0%	6.2%
Water Sample Average	7.5%	7.8%	0.73	2.7%	0.00	2.7%	0.27	26.5%	6.0%	6.2%

Sources and Notes:

[1]: Schedule No. BV-10; Panel A, [4].

[7]: Schedule No. BV-4, [6].

[2]: Schedule No. BV-10; Panel A, [5].

[8]: Provided by Northwest Natural.

[3]: Schedule No. BV-4, [4].

[9] = [1] x [3] + [4] x [5] + [6] x [7] x (1 - [8])

[4]: Workpaper #2 to Schedule No. BV-11, Panel C.

[10] = [2] x [3] + [4] x [5] + [6] x [7] x (1 - [8])

[5]: Schedule No. BV-4, [5].

[6]: Workpaper #2 to Schedule No. BV-11, Panel B.

Schedule No. BV-11

Overall After-Tax Risk Positioning Cost of Capital of the Full Sample (Using Value Line Betas)

Panel B: CAPM Cost of Equity Scenario 2 - Long-Term Risk Free Rate of 1.90%, Long-Term Market Risk Premium of 7.47%

Company	CAPM Cost of Equity	ECAPM (1.5%) Cost of Equity	5-Year Average Common Equity to Market Value Ratio	Weighted - Average Cost of Preferred Equity	5-Year Average Preferred Equity to Market Value Ratio	Weighted- Average Cost of Debt	5-Year Average Debt to Market Value Ratio	Northwest Natural's Representative Income Tax Rate	Overall After-Tax Cost of Capital (CAPM)	Overall After-Tax Cost of Capital (ECAPM 1.5%)
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
Atmos Energy	7.9%	8.2%	0.72	-	0.00	2.7%	0.28	26.5%	6.2%	6.4%
Chesapeake Utilities	7.5%	7.9%	0.72	-	0.00	2.7%	0.28	26.5%	6.0%	6.2%
New Jersey Resources	8.6%	8.8%	0.74	-	0.00	2.5%	0.26	26.5%	6.9%	7.0%
NiSource Inc.	8.3%	8.5%	0.48	3.0%	0.02	3.0%	0.50	26.5%	5.1%	5.2%
Northwest Natural	7.9%	8.2%	0.67	-	0.00	2.7%	0.33	26.5%	5.9%	6.1%
ONE Gas Inc.	7.9%	8.2%	0.73	-	0.00	2.7%	0.27	26.5%	6.2%	6.5%
South Jersey Inds.	9.4%	9.4%	0.57	-	0.00	3.0%	0.43	26.5%	6.3%	6.3%
Southwest Gas	8.6%	8.8%	0.65	-	0.00	3.0%	0.35	26.5%	6.4%	6.5%
Spire Inc.	7.9%	8.2%	0.58	2.7%	0.01	2.7%	0.41	26.5%	5.4%	5.6%
Amer. States Water	6.8%	7.3%	0.81	-	0.00	2.7%	0.19	26.5%	5.8%	6.2%
Amer. Water Works	8.3%	8.5%	0.64	-	0.00	2.7%	0.36	26.5%	6.0%	6.1%
California Water	6.8%	7.3%	0.68	-	0.00	2.7%	0.32	26.5%	5.2%	5.6%
Middlesex Water	7.1%	7.6%	0.79	2.7%	0.00	2.7%	0.21	26.5%	6.0%	6.4%
SJW Group	7.9%	8.2%	0.66	-	0.00	2.7%	0.34	26.5%	5.8%	6.0%
York Water Co. (The)	7.9%	8.2%	0.80	-	0.00	2.7%	0.20	26.5%	6.7%	7.0%
Full Sample Average	7.9%	8.2%	0.68	2.8%	0.00	2.7%	0.32	26.5%	6.0%	6.2%
Gas Sample Average	8.2%	8.4%	0.65	2.8%	0.00	2.8%	0.35	26.5%	6.0%	6.2%
Water Sample Average	7.4%	7.8%	0.73	2.7%	0.00	2.7%	0.27	26.5%	5.9%	6.2%

Sources and Notes:

[1]: Schedule No. BV-10; Panel B, [4].

[7]: Schedule No. BV-4, [6].

[2]: Schedule No. BV-10; Panel B, [5].

[8]: Provided by Northwest Natural.

[3]: Schedule No. BV-4, [4].

[9] = [1] x [3] + [4] x [5] + [6] x [7] x (1 - [8])

[4]: Workpaper #2 to Schedule No. BV-11, Panel C.

[10] = [2] x [3] + [4] x [5] + [6] x [7] x (1 - [8])

[5]: Schedule No. BV-4, [5].

[6]: Workpaper #2 to Schedule No. BV-11, Panel B.

**Schedule No. BV-12**  
**Risk Positioning Cost of Equity at Northwest Natural's Proposed Capital Structure**  
**Full Sample**  
**Using Value Line Betas**

	Overall After-Tax Cost of Capital (Scenario 1)	Overall After-Tax Cost of Capital (Scenario 2)	Northwest Natural's Representative Regulatory % Debt	Representative Cost of BBB-Rated Utility Debt	Northwest Natural's Representative Income Tax Rate	Northwest Natural's Representative Regulatory % Equity	Estimated Return on Equity (Scenario 1)	Estimated Return on Equity (Scenario 2)
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
<b>Full Sample</b>								
CAPM using Value Line Betas	6.0%	6.0%	51.0%	3.0%	26.5%	49.0%	9.9%	9.9%
ECAPM (1.50%) using Value Line Betas	6.2%	6.2%	51.0%	3.0%	26.5%	49.0%	10.3%	10.4%
<b>Gas Sample</b>								
CAPM using Value Line Betas	6.0%	6.0%	51.0%	3.0%	26.5%	49.0%	10.0%	10.0%
ECAPM (1.50%) using Value Line Betas	6.2%	6.2%	51.0%	3.0%	26.5%	49.0%	10.3%	10.3%
<b>Water Sample</b>								
CAPM using Value Line Betas	6.0%	5.9%	51.0%	3.0%	26.5%	49.0%	9.8%	9.8%
ECAPM (1.50%) using Value Line Betas	6.2%	6.2%	51.0%	3.0%	26.5%	49.0%	10.4%	10.4%

Sources and Notes:

[1]: Schedule No. BV-11; Panel A, [9] - [10]

Scenario 1: Long-Term Risk Free Rate of 2.15%, Long-Term Market Risk Premium of 7.15%

[2]: Schedule No. BV-11; Panel B, [9] - [10]

Scenario 2: Long-Term Risk Free Rate of 1.90%, Long-Term Market Risk Premium of 7.47%

[3]: Provided by Northwest Natural

[4]: Based on a BBB Latest Bloomberg data available as of September 30, 2020 used for yield

[5]: Provided by Northwest Natural

[6]: Provided by Northwest Natural

[7]:  $\{[1] - ([3] \times [4] \times (1 - [5]))\} / [6]$

[8]:  $\{[2] - ([3] \times [4] \times (1 - [5]))\} / [6]$

**Schedule No. BV-13**  
**Hamada Adjustment to Obtain Unlevered Asset Beta**

Company	Value Line Betas	Debt Beta	5-Year Average Common Equity to Market Value Ratio	5-Year Average Preferred Equity to Market Value Ratio	5-Year Average Debt to Market Value Ratio	Northwest Natural's Representative Income Tax Rate	Asset Beta: Without Taxes	Asset Beta: With Taxes
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Atmos Energy	0.80	0.05	0.72	0.00	0.28	26.5%	0.59	0.63
Chesapeake Utilities	0.75	0.05	0.72	0.00	0.28	26.5%	0.56	0.60
New Jersey Resources	0.90	0.05	0.74	0.00	0.26	26.5%	0.68	0.73
NiSource Inc	0.85	0.10	0.48	0.02	0.50	26.5%	0.46	0.52
Northwest Natural	0.80	0.06	0.67	0.00	0.33	26.5%	0.55	0.60
ONE Gas Inc	0.80	0.05	0.73	0.00	0.27	26.5%	0.59	0.64
South Jersey Inds	1.00	0.10	0.57	0.00	0.43	26.5%	0.61	0.68
Southwest Gas	0.90	0.10	0.65	0.00	0.35	26.5%	0.62	0.67
Spire Inc	0.80	0.05	0.58	0.01	0.41	26.5%	0.49	0.54
Amer States Water	0.65	0.05	0.81	0.00	0.19	26.5%	0.53	0.56
Amer Water Works	0.85	0.05	0.64	0.00	0.36	26.5%	0.56	0.62
California Water	0.65	0.05	0.68	0.00	0.32	26.5%	0.46	0.50
Middlesex Water	0.70	0.05	0.79	0.00	0.21	26.5%	0.56	0.59
SJW Group	0.80	0.05	0.66	0.00	0.34	26.5%	0.54	0.59
York Water Co (The)	0.80	0.05	0.80	0.00	0.20	26.5%	0.65	0.69
Full Sample Average	0.80	0.06	0.68	0.00	0.32	0.27	0.56	0.61
Gas Sample Average	0.84	0.07	0.65	0.00	0.35	0.27	0.57	0.62
Water Sample Average	0.74	0.05	0.73	0.00	0.27	0.27	0.55	0.59

Sources and Notes:

[1]: Workpaper # 1 to Schedule No BV-10, [1]

[2]: Workpaper #1 to Schedule No BV-13, [7]

[3]: Schedule No BV-4, [4]

[4]: Schedule No BV-4, [5]

[5]: Schedule No BV-4, [6]

[6]: Northwest Natural's Representative Tax Rate

[7]:  $[1] * [3] + [2] * ([4] + [5])$

[8]:  $\{ [1] * [3] + [2] * ([4] + [5] * (1 - [6])) \} / \{ [3] + [4] + [5] * (1 - [6]) \}$

**Schedule No. BV-14**

**Full Sample Average Asset Beta Relevered at Northwest Natural's Proposed Capital Structure**

	Asset Beta	Assumed Debt Beta	Northwest Natural's Representative Regulatory % Debt	Northwest Natural's Representative Income Tax Rate	Northwest Natural's Representative Regulatory % Equity	Estimated Equity Beta
	[1]	[2]	[3]	[4]	[5]	[6]
<b>Full Sample</b>						
Asset Beta Without Taxes	0.56	0.10	51.0%	26.5%	49.0%	1.05
Asset Beta With Taxes	0.61	0.10	51.0%	26.5%	49.0%	1.00
<b>Gas Sample</b>						
Asset Beta Without Taxes	0.57	0.10	51.0%	26.5%	49.0%	1.06
Asset Beta With Taxes	0.62	0.10	51.0%	26.5%	49.0%	1.02
<b>Water Sample</b>						
Asset Beta Without Taxes	0.55	0.10	51.0%	26.5%	49.0%	1.02
Asset Beta With Taxes	0.59	0.10	51.0%	26.5%	49.0%	0.97

Sources and Notes:

[1]: Schedule No. BV-13, [7] - [8].

[2]: Villadsen Testimony.

[3]: Provided by Northwest Natural.

[4]: Northwest Natural's Representative Tax Rate.

[5]: Provided by Northwest Natural.

[6]:  $[1] + [3]/[5]*([1] - [2])$  without taxes,  $[1] + [3]*(1 - [4])/[5]*([1] - [2])$  with taxes.

**Schedule No. BV-15**

**Risk-Positioning Cost of Equity using Hamada-Adjusted Betas**

**Panel A: Scenario 1 - Long-Term Risk Free Rate of 2.15%, Long-Term Market Risk Premium of 7.15%**

Company	Long-Term Risk-Free Rate	Hamada Adjusted Equity Betas	Long-Term Market Risk Premium	CAPM Cost of Equity	ECAPM (1.5%) Cost of Equity
	[1]	[2]	[3]	[4]	[5]
<b><u>Full Sample</u></b>					
Asset Beta Without Taxes	2.15%	1.05	7.15%	9.6%	9.6%
Asset Beta With Taxes	2.15%	1.00	7.15%	9.3%	9.3%
<b><u>Gas Sample</u></b>					
Asset Beta Without Taxes	2.15%	1.06	7.15%	9.7%	9.7%
Asset Beta With Taxes	2.15%	1.02	7.15%	9.4%	9.4%
<b><u>Water Sample</u></b>					
Asset Beta Without Taxes	2.15%	1.02	7.15%	9.5%	9.4%
Asset Beta With Taxes	2.15%	0.97	7.15%	9.1%	9.1%

Sources and Notes:

[1]: Villadsen Direct Testimony.

[2]: Schedule No. BV-14, [6].

[3]: Villadsen Direct Testimony.

[4]: [1] + ([2] x [3]).

[5]: ([1] + 1.5%) + [2] x ([3] - 1.5%).

**Schedule No. BV-15**

**Risk-Positioning Cost of Equity using Hamada-Adjusted Betas**

**Panel B: Scenario 2 - Long-Term Risk Free Rate of 1.90%, Long-Term Market Risk Premium of 7.47%**

Company	Long-Term Risk-Free Rate	Hamada Adjusted Equity Betas	Long-Term Market Risk Premium	CAPM Cost of Equity	ECAPM (1.5%) Cost of Equity
	[1]	[2]	[3]	[4]	[5]
<b><u>Full Sample</u></b>					
Asset Beta Without Taxes	1.90%	1.05	7.47%	9.7%	9.7%
Asset Beta With Taxes	1.90%	1.00	7.47%	9.4%	9.4%
<b><u>Gas Sample</u></b>					
Asset Beta Without Taxes	1.90%	1.06	7.47%	9.8%	9.7%
Asset Beta With Taxes	1.90%	1.02	7.47%	9.5%	9.5%
<b><u>Water Sample</u></b>					
Asset Beta Without Taxes	1.90%	1.02	7.47%	9.6%	9.5%
Asset Beta With Taxes	1.90%	0.97	7.47%	9.1%	9.2%

Sources and Notes:

[1]: Villadsen Direct Testimony.

[2]: Schedule No. BV-14, [6].

[3]: Villadsen Direct Testimony.

[4]: [1] + ([2] x [3]).

[5]: ([1] + 1.5%) + [2] x ([3] - 1.5%).

**Schedule No. BV-16, Panel A**  
**Risk Premiums Determined by Relationship Between**  
**Authorized ROEs<sup>[1]</sup> and Long-term Treasury Bond Rates**  
**During the Period 1990 - 2020**  
**Excludes Utility Yield Spread Adjustment**  
**Natural Gas Utilities**

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$$\text{Risk Premium} = A_0 + (A_1 \times \text{Treasury Bond Rate})$$


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R Squared	0.874
Estimate of Intercept ( $A_0$ )	8.52%
Estimate of Slope ( $A_1$ )	-0.565

<b>Predicted Risk Premium</b> 7.45%	+	<b>Exp. Treasury Bond Rate<sup>[2]</sup></b> 1.90%	=	<b>Est. Cost of Equity for All Natural Gas Utilities</b> 9.3%
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Sources and Notes:

[1]: Authorized ROE Data from S&P Market Intelligence as of 09/30/2020.

[2]: October 2020 Blue Chip consensus forecast for 2022 10 year T-bill yield + maturity premium between 10 year and 20 year U.S. Government bonds.

See Regression Results for derivation of regression coefficients  $A_0$  and  $A_1$

**Schedule No. BV-16, Panel B**  
**Risk Premiums Determined by Relationship Between**  
**Authorized ROEs<sup>[1]</sup> and Long-term Treasury Bond Rates**  
**During the Period 1990 - 2020**  
**Includes Utility Yield Spread Adjustment**  
**Natural Gas Utilities**

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$$\text{Risk Premium} = A_0 + (A_1 \times \text{Treasury Bond Rate})$$


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R Squared	0.874
Estimate of Intercept ( $A_0$ )	8.52%
Estimate of Slope ( $A_1$ )	-0.565

<b>Predicted Risk Premium</b> 7.31%	+	<b>Exp. Treasury Bond Rate</b> 2.15%	=	<b>Est. Cost of Equity for All Natural Gas Utilities</b> 9.5%
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Sources and Notes:

[1]: Authorized ROE Data from S&P Market Intelligence as of 09/30/2020.

[2]: October 2020 Blue Chip consensus forecast for 2022 10 year T-bill yield + maturity premium between 10 year and 20 year U.S. Government bonds + utility yield spread adjustment.

See Regression Results for derivation of regression coefficients  $A_0$  and  $A_1$

Schedule No. BV-17: Estimation of S&P 500 Cost of Equity -DDM

Company	Market Cap (\$Millions)	VL Indicated Annual Dividend (\$)	VL Stock Price (\$)	Annual Dividend Yield, calculated	Growth Rate	Growth Rate Filtered Between 0 and 20%	Dividend Yield for companies with valid GR
	[1]	[2]	[3]	[4] = [2] / [3]	[5]	[6]	[7]
<b>Market Cap Weighted Average</b>						<b>8.80%</b>	<b>2.10%</b>
3M Company	\$92,267	\$5.88	\$160.36	3.67%	2.7%	2.7%	3.7%
Abbott Labs.	\$192,687	\$1.44	\$106.50	1.35%	14.9%	14.9%	1.4%
AbbVie Inc.	\$154,534	\$4.72	\$86.12	5.48%	8.0%	8.0%	5.5%
ABIOMED Inc.	\$12,480	\$0.00	\$261.99	n/a	n/a	n/a	n/a
Accenture Plc	\$143,854	\$3.52	\$222.40	1.58%	9.5%	9.5%	1.6%
Activision Blizzard	\$62,470	\$0.45	\$78.30	0.57%	24.4%	n/a	n/a
Adobe Inc.	\$235,406	\$0.00	\$478.99	n/a	n/a	n/a	n/a
Advance Auto Parts	\$10,613	\$1.00	\$155.50	0.64%	11.9%	11.9%	0.6%
Advanced Micro Dev.	\$96,256	\$0.00	\$81.80	n/a	n/a	n/a	n/a
AES Corp.	\$12,042	\$0.57	\$18.54	3.07%	7.7%	7.7%	3.1%
Aflac Inc.	\$25,951	\$1.15	\$36.88	3.12%	1.6%	1.6%	3.1%
Agilent Technologies	\$31,148	\$0.72	\$100.01	0.72%	9.4%	9.4%	0.7%
Air Products & Chem.	\$65,796	\$5.36	\$296.04	1.81%	10.3%	10.3%	1.8%
Akamai Technologies	\$17,977	\$0.00	\$108.61	n/a	n/a	n/a	n/a
Alaska Air Group	\$4,529	\$0.00	\$37.52	n/a	n/a	n/a	n/a
Albemarle Corp.	\$9,494	\$1.54	\$89.29	1.72%	15.0%	15.0%	1.7%
Alexandria Real Estate	\$17,762	\$4.24	\$164.71	2.57%	0.1%	0.1%	2.6%
Alexion Pharmac.	\$25,072	\$0.00	\$111.55	n/a	n/a	n/a	n/a
Align Techn.	\$25,790	\$0.00	\$314.89	n/a	n/a	n/a	n/a
Alllegion plc	\$9,123	\$1.28	\$98.82	1.30%	-0.4%	n/a	n/a
Alliant Energy	\$12,894	\$1.52	\$53.09	2.86%	5.3%	5.3%	2.9%
Allstate Corp.	\$29,466	\$2.16	\$93.02	2.32%	6.4%	6.4%	2.3%
Alphabet Inc.	\$1,001,114	\$0.00	\$1,458.42	n/a	n/a	n/a	n/a
Alphabet Inc. 'A'	\$1,002,429	\$0.00	\$1,455.60	n/a	n/a	n/a	n/a
Altria Group	\$71,808	\$3.44	\$38.97	8.83%	6.1%	6.1%	8.8%
Amazon.com	\$1,577,514	\$0.00	\$3,125.00	n/a	n/a	n/a	n/a
Amcort plc	\$17,890	\$0.55	\$11.01	5.00%	5.4%	5.4%	5.0%
Amer. Airlines	\$6,250	\$0.00	\$13.00	n/a	n/a	n/a	n/a
Amer. Elec. Power	\$40,539	\$2.96	\$85.30	3.47%	5.6%	5.6%	3.5%
Amer. Express	\$80,701	\$1.72	\$101.61	1.69%	9.4%	9.4%	1.7%
Amer. Int'l Group	\$23,715	\$1.28	\$28.22	4.54%	4.0%	4.0%	4.5%
Amer. Tower 'A'	\$107,222	\$4.81	\$243.30	1.98%	14.9%	14.9%	2.0%
Amer. Water Works	\$26,252	\$2.30	\$148.96	1.54%	8.3%	8.3%	1.5%
Ameren Corp.	\$19,541	\$2.08	\$79.81	2.61%	6.0%	6.0%	2.6%
Ameriprise Fin'l	\$18,587	\$4.16	\$158.85	2.62%	7.8%	7.8%	2.6%
AmerisourceBergen	\$19,768	\$1.68	\$95.38	1.76%	8.2%	8.2%	1.8%
AMETEK Inc.	\$22,825	\$0.72	\$100.78	0.71%	-1.2%	n/a	n/a
Amgen	\$149,039	\$6.85	\$245.41	2.79%	6.9%	6.9%	2.8%
Amphenol Corp.	\$32,297	\$1.00	\$109.36	0.91%	3.0%	3.0%	0.9%
Analog Devices	\$43,096	\$2.48	\$114.01	2.18%	8.4%	8.4%	2.2%
ANSYS Inc.	\$28,056	\$0.00	\$321.58	n/a	n/a	n/a	n/a
Anthem Inc.	\$67,718	\$4.10	\$275.01	1.49%	14.5%	14.5%	1.5%
Aon plc	\$47,758	\$1.80	\$205.52	0.88%	6.8%	6.8%	0.9%
Apache Corp.	\$3,575	\$0.10	\$9.74	1.03%	-24.0%	n/a	n/a
Apartment Investment	\$5,146	\$1.64	\$36.25	4.52%	7.1%	7.1%	4.5%
Apple Inc.	\$1,984,492	\$0.85	\$113.02	0.75%	12.5%	12.5%	0.8%
Applied Materials	\$54,295	\$0.89	\$58.21	1.53%	20.1%	n/a	n/a
Apiv PLC	\$24,756	\$0.00	\$93.56	n/a	n/a	n/a	n/a
Archer Daniels Mid'l'd	\$25,848	\$1.44	\$46.74	3.08%	-8.8%	n/a	n/a
Arista Networks	\$15,719	\$0.00	\$203.90	n/a	n/a	n/a	n/a
Assurant Inc.	\$7,227	\$2.52	\$123.43	2.04%	19.4%	19.4%	2.0%
AT&T Inc.	\$203,143	\$2.11	\$28.68	7.36%	0.3%	0.3%	7.4%
Atmos Energy	\$11,791	\$2.46	\$96.02	2.56%	7.3%	7.3%	2.6%
Autodesk Inc.	\$50,661	\$0.00	\$225.56	n/a	n/a	n/a	n/a
Automatic Data Proc.	\$59,953	\$3.70	\$138.67	2.67%	10.6%	10.6%	2.7%

Schedule No. BV-17: Estimation of S&P 500 Cost of Equity -DDM

Company	Market Cap (\$Millions)	VL Indicated Annual Dividend (\$)	VL Stock Price (\$)	Annual Dividend Yield, calculated	Growth Rate	Growth Rate Filtered Between 0 and 20%	Dividend Yield for companies with valid GR
	[1]	[2]	[3]	[4] = [2] / [3]	[5]	[6]	[7]
AutoZone Inc.	\$27,496	\$0.00	\$1,176.99	n/a	n/a	n/a	n/a
AvalonBay Communities	\$21,004	\$6.51	\$157.94	4.12%	2.5%	2.5%	4.1%
Avery Dennison	\$10,668	\$2.38	\$124.33	1.91%	7.8%	7.8%	1.9%
Baker Hughes	\$8,705	\$0.72	\$12.65	5.69%	2.5%	2.5%	5.7%
Ball Corp.	\$27,129	\$0.60	\$82.67	0.73%	10.5%	10.5%	0.7%
Bank of America	\$208,718	\$0.72	\$24.21	2.97%	2.4%	2.4%	3.0%
Bank of New York Mellon	\$30,421	\$1.24	\$34.74	3.57%	2.8%	2.8%	3.6%
Baxter Int'l Inc.	\$41,029	\$0.98	\$78.83	1.24%	10.0%	10.0%	1.2%
Becton Dickinson	\$67,447	\$3.22	\$232.66	1.38%	6.4%	6.4%	1.4%
Berkley (W.R.)	\$10,881	\$0.48	\$61.27	0.78%	6.2%	6.2%	0.8%
Berkshire Hathaway 'B'	\$0	\$0.00	\$211.18	n/a	n/a	n/a	n/a
Best Buy Co.	\$28,713	\$2.20	\$112.42	1.96%	7.4%	7.4%	2.0%
Bio-Rad Labs. 'A'	\$15,298	\$0.00	\$510.68	n/a	n/a	n/a	n/a
Biogen	\$44,907	\$0.00	\$277.64	n/a	n/a	n/a	n/a
BlackRock Inc.	\$85,919	\$14.52	\$570.12	2.55%	7.7%	7.7%	2.5%
Block (H&R)	\$3,142	\$1.05	\$16.49	6.37%	10.0%	10.0%	6.4%
Boeing	\$93,276	\$0.00	\$168.08	n/a	n/a	n/a	n/a
Booking Holdings	\$70,051	\$0.00	\$1,710.71	n/a	n/a	n/a	n/a
BorgWarner	\$8,029	\$0.68	\$39.20	1.73%	1.8%	1.8%	1.7%
Boston Properties	\$12,430	\$3.92	\$85.27	4.60%	7.0%	7.0%	4.6%
Boston Scientific	\$54,666	\$0.00	\$38.48	n/a	n/a	n/a	n/a
Bristol-Myers Squibb	\$135,890	\$1.80	\$58.72	3.07%	22.2%	n/a	n/a
Broadcom Inc.	\$147,185	\$13.00	\$356.83	3.64%	7.9%	7.9%	3.6%
Broadridge Fin'l	\$15,114	\$2.30	\$133.41	1.72%	10.0%	10.0%	1.7%
Brown-Forman 'B'	\$36,036	\$0.72	\$75.63	0.95%	-	n/a	n/a
C.H. Robinson	\$13,767	\$2.04	\$100.87	2.02%	3.8%	3.8%	2.0%
Cabot Oil & Gas 'A'	\$6,919	\$0.45	\$17.01	2.65%	26.1%	n/a	n/a
Cadence Design Sys.	\$29,728	\$0.00	\$105.32	n/a	n/a	n/a	n/a
Campbell Soup	\$14,608	\$1.40	\$48.81	2.87%	8.6%	8.6%	2.9%
Capital One Fin'l	\$32,792	\$0.40	\$74.94	0.53%	8.0%	8.0%	0.5%
Cardinal Health	\$13,709	\$1.94	\$46.30	4.19%	4.7%	4.7%	4.2%
CarMax Inc.	\$14,959	\$0.00	\$95.55	n/a	n/a	n/a	n/a
Carnival Corp.	\$11,506	\$0.00	\$15.16	n/a	n/a	n/a	n/a
Carrier Global	\$26,453	\$0.32	\$31.23	1.02%	-8.7%	n/a	n/a
Caterpillar Inc.	\$80,766	\$4.12	\$149.94	2.75%	-3.3%	n/a	n/a
Cboe Global Markets	\$9,542	\$1.68	\$87.49	1.92%	2.6%	2.6%	1.9%
CBRE Group	\$15,746	\$0.00	\$48.07	n/a	n/a	n/a	n/a
CDW Corp.	\$17,045	\$1.52	\$123.49	1.23%	9.1%	9.1%	1.2%
Celanese Corp.	\$12,710	\$2.48	\$108.25	2.29%	1.7%	1.7%	2.3%
Centene Corp.	\$33,793	\$0.00	\$59.98	n/a	n/a	n/a	n/a
CenterPoint Energy	\$9,718	\$0.63	\$19.93	3.16%	-6.6%	n/a	n/a
CenturyLink Inc.	\$11,070	\$1.00	\$10.03	9.97%	-	n/a	n/a
Cerner Corp.	\$22,068	\$0.72	\$71.18	1.01%	10.5%	10.5%	1.0%
CF Industries	\$6,568	\$1.27	\$30.57	4.15%	-5.2%	n/a	n/a
Charter Communic.	\$127,927	\$0.00	\$620.23	n/a	n/a	n/a	n/a
Chevron Corp.	\$134,443	\$5.16	\$71.19	7.25%	-3.7%	n/a	n/a
Chipotle Mex. Grill	\$34,779	\$0.00	\$1,254.80	n/a	n/a	n/a	n/a
Chubb Ltd.	\$49,111	\$3.12	\$116.56	2.68%	1.8%	1.8%	2.7%
Church & Dwight	\$23,145	\$0.96	\$91.17	1.05%	9.5%	9.5%	1.1%
Cigna Corp.	\$62,207	\$0.05	\$167.23	0.03%	10.9%	10.9%	0.0%
Cincinnati Financial	\$12,538	\$2.40	\$77.78	3.09%	-4.6%	n/a	n/a
Cintas Corp.	\$34,420	\$2.90	\$335.05	0.87%	12.0%	12.0%	0.9%
Cisco Systems	\$166,226	\$1.46	\$38.27	3.81%	6.2%	6.2%	3.8%
Citigroup Inc.	\$89,749	\$2.04	\$43.66	4.67%	-3.3%	n/a	n/a
Citizens Fin'l Group	\$10,790	\$1.56	\$26.21	5.95%	-8.6%	n/a	n/a
Citrix Sys.	\$17,010	\$1.40	\$134.89	1.04%	9.4%	9.4%	1.0%
Clorox Co.	\$26,523	\$4.44	\$209.22	2.12%	4.6%	4.6%	2.1%

Schedule No. BV-17: Estimation of S&P 500 Cost of Equity -DDM

Company	Market Cap (\$Millions)	VL Indicated Annual Dividend (\$)	VL Stock Price (\$)	Annual Dividend Yield, calculated	Growth Rate	Growth Rate Filtered Between 0 and 20%	Dividend Yield for companies with valid GR
	[1]	[2]	[3]	[4] = [2] / [3]	[5]	[6]	[7]
CME Group	\$59,851	\$3.40	\$168.49	2.02%	4.2%	4.2%	2.0%
CMS Energy Corp.	\$17,582	\$1.71	\$61.66	2.77%	7.1%	7.1%	2.8%
Coca-Cola	\$212,044	\$1.68	\$49.36	3.40%	2.9%	2.9%	3.4%
Cognizant Technology	\$37,626	\$0.88	\$68.86	1.28%	2.8%	2.8%	1.3%
Colgate-Palmolive	\$66,148	\$1.76	\$77.40	2.27%	5.9%	5.9%	2.3%
Comcast Corp.	\$211,320	\$0.92	\$45.15	2.04%	5.2%	5.2%	2.0%
Comerica Inc.	\$5,318	\$2.72	\$39.33	6.92%	-33.6%	n/a	n/a
Conagra Brands	\$17,394	\$0.87	\$36.88	2.36%	7.0%	7.0%	2.4%
Concho Resources	\$8,679	\$0.80	\$43.07	1.86%	32.5%	n/a	n/a
ConocoPhillips	\$35,223	\$1.68	\$33.07	5.08%	-1.3%	n/a	n/a
Consol. Edison	\$25,985	\$3.11	\$79.77	3.90%	2.5%	2.5%	3.9%
Constellation Brands	\$36,232	\$3.10	\$185.60	1.67%	7.8%	7.8%	1.7%
Cooper Cos.	\$16,553	\$0.06	\$335.43	0.02%	10.0%	10.0%	0.0%
Copart Inc.	\$24,681	\$0.00	\$107.34	n/a	n/a	n/a	n/a
Coming Inc.	\$24,599	\$0.88	\$32.81	2.68%	1.3%	1.3%	2.7%
Corteva Inc.	\$21,564	\$0.57	\$29.37	1.94%	5.3%	5.3%	1.9%
Costco Wholesale	\$156,741	\$2.80	\$355.01	0.79%	7.0%	7.0%	0.8%
Coty Inc.	\$2,060	\$0.00	\$2.91	n/a	n/a	n/a	n/a
Crown Castle Int'l	\$69,431	\$4.96	\$168.62	2.94%	18.9%	18.9%	2.9%
CSX Corp.	\$59,422	\$1.04	\$77.15	1.35%	3.8%	3.8%	1.3%
Cummins Inc.	\$31,167	\$5.24	\$210.34	2.49%	-3.4%	n/a	n/a
CVS Health	\$76,329	\$2.00	\$57.83	3.46%	6.3%	6.3%	3.5%
Danaher Corp.	\$152,712	\$0.72	\$212.50	0.34%	13.0%	13.0%	0.3%
Darden Restaurants	\$13,086	\$1.20	\$104.21	1.15%	29.8%	n/a	n/a
DaVita Inc.	\$10,448	\$0.00	\$84.29	n/a	n/a	n/a	n/a
Deere & Co.	\$69,453	\$3.04	\$224.79	1.35%	8.5%	8.5%	1.4%
Delta Air Lines	\$19,506	\$0.00	\$31.75	n/a	n/a	n/a	n/a
Dentsply Sirona	\$9,551	\$0.40	\$43.66	0.92%	4.3%	4.3%	0.9%
Devon Energy	\$3,623	\$0.44	\$9.60	4.58%	-35.9%	n/a	n/a
DexCom Inc.	\$39,327	\$0.00	\$384.52	n/a	n/a	n/a	n/a
Diamondback Energy	\$4,754	\$1.50	\$30.47	4.92%	13.5%	13.5%	4.9%
Digital Realty Trust	\$30,658	\$4.63	\$149.35	3.10%	16.7%	16.7%	3.1%
Discover Finl Svcs.	\$17,705	\$1.76	\$60.92	2.89%	0.7%	0.7%	2.9%
Discovery Commun. 'C'	\$10,234	\$0.00	\$19.39	n/a	n/a	n/a	n/a
Discovery Inc.	\$11,037	\$0.00	\$21.50	n/a	n/a	n/a	n/a
Dish Network 'A'	\$15,228	\$0.00	\$28.55	n/a	n/a	n/a	n/a
Disney (Walt)	\$220,987	\$0.00	\$122.55	n/a	n/a	n/a	n/a
Dollar General	\$52,203	\$1.44	\$211.52	0.68%	14.8%	14.8%	0.7%
Dollar Tree Inc.	\$21,675	\$0.00	\$90.76	n/a	n/a	n/a	n/a
Dominion Energy	\$66,312	\$2.82	\$79.80	3.53%	2.7%	2.7%	3.5%
Domino's Pizza	\$16,734	\$3.12	\$433.78	0.72%	15.3%	15.3%	0.7%
Dover Corp.	\$15,598	\$1.98	\$110.05	1.80%	1.2%	1.2%	1.8%
Dow Inc.	\$35,472	\$2.95	\$47.31	6.24%	-10.4%	n/a	n/a
DTE Energy	\$22,163	\$4.34	\$114.16	3.80%	5.9%	5.9%	3.8%
Duke Energy	\$65,092	\$3.88	\$91.58	4.24%	1.6%	1.6%	4.2%
Duke Realty Corp.	\$13,577	\$0.94	\$38.44	2.45%	6.0%	6.0%	2.4%
DuPont de Nemours	\$40,712	\$1.26	\$54.77	2.30%	1.6%	1.6%	2.3%
DXC Technology	\$4,576	\$0.00	\$18.36	n/a	n/a	n/a	n/a
E*Trade Finl	\$11,066	\$0.56	\$49.26	1.14%	-9.8%	n/a	n/a
Eastman Chemical	\$10,570	\$2.64	\$78.17	3.38%	3.3%	3.3%	3.4%
Eaton Corp. plc	\$40,822	\$2.92	\$102.65	2.84%	-0.4%	n/a	n/a
eBay Inc.	\$36,731	\$0.66	\$51.68	1.28%	15.9%	15.9%	1.3%
Ecolab Inc.	\$57,031	\$1.88	\$198.06	0.95%	8.1%	8.1%	0.9%
Edison Int'l	\$19,228	\$2.60	\$51.50	5.05%	1.4%	1.4%	5.0%
Edwards Lifesciences	\$49,600	\$0.00	\$78.81	n/a	n/a	n/a	n/a
Electronic Arts	\$37,689	\$0.00	\$129.07	n/a	n/a	n/a	n/a
Emerson Electric	\$40,063	\$2.01	\$65.54	3.07%	1.0%	1.0%	3.1%

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Company	Market Cap (\$Millions)	VL Indicated Annual Dividend (\$)	VL Stock Price (\$)	Annual Dividend Yield, calculated	Growth Rate	Growth Rate Filtered Between 0 and 20%	Dividend Yield for companies with valid GR
	[1]	[2]	[3]	[4] = [2] / [3]	[5]	[6]	[7]
Entergy Corp.	\$19,727	\$3.80	\$103.65	3.67%	5.4%	5.4%	3.7%
EOG Resources	\$20,926	\$1.52	\$34.81	4.37%	-3.0%	n/a	n/a
Equifax Inc.	\$19,063	\$1.56	\$158.96	0.98%	6.4%	6.4%	1.0%
Equinix Inc.	\$65,144	\$11.18	\$778.00	1.44%	15.7%	15.7%	1.4%
Equity Residential	\$19,078	\$2.41	\$55.09	4.37%	2.7%	2.7%	4.4%
Essex Property Trust	\$13,271	\$8.48	\$212.10	4.00%	7.9%	7.9%	4.0%
Everest Re Group Ltd.	\$7,896	\$6.20	\$198.66	3.12%	4.7%	4.7%	3.1%
Evergy Inc.	\$11,527	\$2.14	\$51.98	4.12%	6.8%	6.8%	4.1%
Eversource Energy	\$28,287	\$2.34	\$87.05	2.69%	6.4%	6.4%	2.7%
Exelon Corp.	\$34,848	\$1.57	\$35.94	4.37%	-3.5%	n/a	n/a
Expedia Group	\$12,948	\$0.00	\$92.09	n/a	n/a	n/a	n/a
Expeditors Int'l	\$15,100	\$1.04	\$89.65	1.16%	6.6%	6.6%	1.2%
Extra Space Storage	\$13,859	\$3.60	\$112.39	3.20%	6.0%	6.0%	3.2%
Exxon Mobil Corp.	\$145,147	\$3.48	\$32.98	10.55%	12.8%	12.8%	10.6%
F5 Networks	\$7,509	\$0.00	\$122.50	n/a	n/a	n/a	n/a
Facebook Inc.	\$746,415	\$0.00	\$259.94	n/a	n/a	n/a	n/a
Fastenal Co.	\$25,862	\$1.00	\$44.54	2.25%	9.1%	9.1%	2.2%
Federal Rlty. Inv. Trust	\$5,548	\$4.24	\$78.43	5.41%	5.0%	5.0%	5.4%
FedEx Corp.	\$66,047	\$2.60	\$255.20	1.02%	26.1%	n/a	n/a
Fidelity Nat'l Info.	\$90,976	\$1.40	\$145.15	0.96%	12.5%	12.5%	1.0%
Fifth Third Bancorp	\$15,184	\$1.08	\$21.89	4.93%	-3.0%	n/a	n/a
First Republic Bank	\$18,769	\$0.80	\$112.94	0.71%	7.2%	7.2%	0.7%
FirstEnergy Corp.	\$15,564	\$1.59	\$29.52	5.39%	-2.4%	n/a	n/a
Fiserv Inc.	\$68,982	\$0.00	\$101.65	n/a	n/a	n/a	n/a
FleetCor Technologies	\$20,012	\$0.00	\$234.46	n/a	n/a	n/a	n/a
FLIR Systems	\$4,700	\$0.68	\$35.49	1.92%	6.0%	6.0%	1.9%
Flowserve Corp.	\$3,546	\$0.80	\$27.23	2.94%	2.5%	2.5%	2.9%
FMC Corp.	\$13,722	\$1.88	\$103.61	1.81%	9.5%	9.5%	1.8%
Ford Motor	\$26,496	\$0.00	\$6.89	n/a	n/a	n/a	n/a
Fortinet Inc.	\$19,062	\$0.00	\$116.38	n/a	n/a	n/a	n/a
Fortive Corp.	\$25,683	\$0.28	\$77.40	0.36%	5.1%	5.1%	0.4%
Fortune Brands Home	\$11,953	\$0.96	\$87.52	1.10%	7.3%	7.3%	1.1%
Fox Corp. 'A'	\$16,802	\$0.46	\$28.08	1.64%	-2.3%	n/a	n/a
Fox Corp. 'B'	\$0	\$0.46	\$28.17	1.63%	-2.3%	n/a	n/a
Franklin Resources	\$10,081	\$1.11	\$20.52	5.41%	-5.7%	n/a	n/a
Freep't-McMoRan Inc.	\$22,709	\$0.00	\$15.94	n/a	n/a	n/a	n/a
Gallagher (Arthur J.)	\$20,219	\$1.80	\$106.21	1.69%	11.5%	11.5%	1.7%
Gap (The) Inc.	\$6,369	\$0.00	\$18.35	n/a	n/a	n/a	n/a
Garmin Ltd.	\$18,139	\$2.56	\$94.93	2.70%	4.3%	4.3%	2.7%
Gartner Inc.	\$11,165	\$0.00	\$125.34	n/a	n/a	n/a	n/a
Gen'l Dynamics	\$39,720	\$4.40	\$140.49	3.13%	3.9%	3.9%	3.1%
Gen'l Electric	\$54,533	\$0.04	\$6.39	0.63%	-8.4%	n/a	n/a
Gen'l Mills	\$37,705	\$2.04	\$62.52	3.26%	5.1%	5.1%	3.3%
Gen'l Motors	\$42,346	\$0.00	\$30.46	n/a	n/a	n/a	n/a
Genuine Parts	\$13,729	\$3.16	\$95.85	3.30%	-1.3%	n/a	n/a
Gilead Sciences	\$79,240	\$2.72	\$62.17	4.38%	0.2%	0.2%	4.4%
Global Payments	\$53,140	\$0.78	\$178.43	0.44%	17.0%	17.0%	0.4%
Globe Life Inc.	\$8,505	\$0.75	\$80.79	0.93%	5.1%	5.1%	0.9%
Goldman Sachs	\$69,121	\$5.00	\$199.90	2.50%	6.3%	6.3%	2.5%
Grainger (W.W.)	\$19,113	\$6.12	\$359.39	1.70%	5.6%	5.6%	1.7%
Halliburton Co.	\$10,568	\$0.18	\$11.31	1.59%	-10.8%	n/a	n/a
Hanesbrands Inc.	\$5,483	\$0.60	\$16.15	3.72%	0.7%	0.7%	3.7%
Hartford Fin'l Svcs.	\$13,200	\$1.30	\$37.56	3.46%	-2.8%	n/a	n/a
Hasbro Inc.	\$11,335	\$2.72	\$82.97	3.28%	8.4%	8.4%	3.3%
HCA Healthcare	\$42,137	\$0.45	\$127.05	0.35%	10.9%	10.9%	0.4%
Healthpeak Properties	\$13,717	\$1.48	\$28.50	5.19%	2.5%	2.5%	5.2%
Henry (Jack) & Assoc.	\$12,456	\$1.72	\$161.56	1.06%	7.0%	7.0%	1.1%

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Hershey Co.	\$29,812	\$3.25	\$142.92	2.27%	6.8%	6.8%	2.3%
Hess Corp.	\$12,571	\$1.00	\$37.71	2.65%	-23.4%	n/a	n/a
Hewlett Packard Ent.	\$12,050	\$0.48	\$9.42	5.10%	-2.6%	n/a	n/a
Hilton Worldwide Hldgs.	\$23,660	\$0.00	\$87.96	n/a	n/a	n/a	n/a
HollyFrontier Corp.	\$3,191	\$1.44	\$19.60	7.35%	-23.1%	n/a	n/a
Hologic Inc.	\$17,199	\$0.00	\$66.88	n/a	n/a	n/a	n/a
Home Depot	\$298,816	\$6.15	\$279.31	2.20%	6.0%	6.0%	2.2%
Honeywell Int'l	\$115,523	\$3.72	\$165.61	2.25%	2.4%	2.4%	2.2%
Hormel Foods	\$26,371	\$1.00	\$49.02	2.04%	3.0%	3.0%	2.0%
Horton D.R.	\$27,502	\$0.72	\$77.89	0.92%	18.6%	18.6%	0.9%
Host Hotels & Resorts	\$7,698	\$0.00	\$11.29	n/a	n/a	n/a	n/a
Howmet Aerospace	\$7,292	\$0.00	\$17.88	n/a	n/a	n/a	n/a
HP Inc.	\$26,083	\$0.70	\$19.09	3.67%	9.3%	9.3%	3.7%
Humana Inc.	\$54,754	\$2.65	\$408.31	0.65%	12.4%	12.4%	0.6%
Hunt (J.B.)	\$13,334	\$1.09	\$127.49	0.85%	10.1%	10.1%	0.9%
Huntington Bancshs.	\$9,329	\$0.60	\$9.33	6.43%	-0.9%	n/a	n/a
Huntington Ingalls	\$5,700	\$4.12	\$144.13	2.86%	2.3%	2.3%	2.9%
IDEX Corp.	\$13,767	\$2.00	\$179.92	1.11%	13.0%	13.0%	1.1%
IDEXX Labs.	\$33,434	\$0.00	\$383.85	n/a	n/a	n/a	n/a
IHS Markit	\$31,153	\$0.68	\$78.52	0.87%	11.1%	11.1%	0.9%
Illinois Tool Works	\$61,093	\$4.56	\$191.85	2.38%	0.4%	0.4%	2.4%
Illumina Inc.	\$45,126	\$0.00	\$308.43	n/a	n/a	n/a	n/a
Incyte Corp.	\$19,570	\$0.00	\$88.75	n/a	n/a	n/a	n/a
Ingersoll Rand Inc.	\$14,844	\$0.00	\$36.08	n/a	n/a	n/a	n/a
Int'l Business Mach.	\$108,357	\$6.52	\$120.57	5.41%	2.6%	2.6%	5.4%
Int'l Flavors & Frag.	\$13,094	\$3.12	\$119.17	2.62%	0.4%	0.4%	2.6%
Int'l Paper	\$15,936	\$2.05	\$40.48	5.06%	0.0%	0.0%	5.1%
Intel Corp.	\$220,220	\$1.32	\$51.01	2.59%	8.6%	8.6%	2.6%
Intercontinental Exch.	\$54,427	\$1.20	\$101.34	1.18%	9.2%	9.2%	1.2%
Interpublic Group	\$6,495	\$1.02	\$17.41	5.86%	1.1%	1.1%	5.9%
Intuit Inc.	\$85,059	\$2.36	\$321.89	0.73%	9.1%	9.1%	0.7%
Intuitive Surgical	\$83,016	\$0.00	\$696.28	n/a	n/a	n/a	n/a
Invesco Ltd.	\$5,239	\$0.62	\$11.85	5.23%	-11.0%	n/a	n/a
IPG Photonics	\$9,039	\$0.00	\$168.83	n/a	n/a	n/a	n/a
IQVIA Holdings	\$30,155	\$0.00	\$156.83	n/a	n/a	n/a	n/a
Iron Mountain	\$7,719	\$2.48	\$27.34	9.07%	8.0%	8.0%	9.1%
Jacobs Engineering	\$12,077	\$0.76	\$94.24	0.81%	10.5%	10.5%	0.8%
Johnson & Johnson	\$391,908	\$4.04	\$146.24	2.76%	5.1%	5.1%	2.8%
Johnson Ctrls. Int'l plc	\$30,394	\$1.04	\$41.59	2.50%	12.9%	12.9%	2.5%
JPMorgan Chase	\$293,393	\$3.60	\$97.89	3.68%	-1.4%	n/a	n/a
Juniper Networks	\$7,132	\$0.82	\$21.32	3.85%	1.8%	1.8%	3.8%
Kansas City South'n	\$17,057	\$1.60	\$180.92	0.88%	9.4%	9.4%	0.9%
Kellogg	\$22,154	\$2.30	\$64.71	3.55%	1.8%	1.8%	3.6%
KeyCorp	\$11,643	\$0.74	\$12.22	6.06%	-12.6%	n/a	n/a
Keysight Technologies	\$18,485	\$0.00	\$98.27	n/a	n/a	n/a	n/a
Kimberly-Clark	\$50,356	\$4.28	\$147.43	2.90%	6.4%	6.4%	2.9%
Kimco Realty	\$4,862	\$0.40	\$11.90	3.36%	4.6%	4.6%	3.4%
Kinder Morgan Inc.	\$27,884	\$1.05	\$12.31	8.53%	-0.6%	n/a	n/a
KLA Corp.	\$30,039	\$3.60	\$191.96	1.88%	9.3%	9.3%	1.9%
Kohl's Corp.	\$2,928	\$0.00	\$19.96	n/a	n/a	n/a	n/a
Kraft Heinz Co.	\$36,629	\$1.60	\$30.47	5.25%	-3.6%	n/a	n/a
Kroger Co.	\$26,280	\$0.72	\$34.07	2.11%	8.0%	8.0%	2.1%
L Brands	\$8,843	\$0.00	\$33.13	n/a	n/a	n/a	n/a
L3Harris Technologies	\$36,838	\$3.40	\$173.07	1.96%	13.4%	13.4%	2.0%
Laboratory Corp.	\$18,319	\$0.00	\$187.99	n/a	n/a	n/a	n/a
Lam Research	\$48,214	\$5.20	\$328.71	1.58%	16.2%	16.2%	1.6%
Lamb Weston Holdings	\$9,678	\$0.92	\$67.93	1.35%	7.0%	7.0%	1.4%

Schedule No. BV-17: Estimation of S&P 500 Cost of Equity -DDM

Company	Market Cap (\$Millions)	VL Indicated Annual Dividend (\$)	VL Stock Price (\$)	Annual Dividend Yield, calculated	Growth Rate	Growth Rate Filtered Between 0 and 20%	Dividend Yield for companies with valid GR
	[1]	[2]	[3]	[4] = [2] / [3]	[5]	[6]	[7]
Las Vegas Sands	\$35,648	\$0.00	\$46.15	n/a	n/a	n/a	n/a
Lauder (Estee)	\$78,567	\$2.12	\$218.76	0.97%	13.3%	13.3%	1.0%
Leggett & Platt	\$5,451	\$1.60	\$42.66	3.75%	5.2%	5.2%	3.8%
Leidos Hldgs.	\$12,659	\$1.36	\$90.39	1.50%	11.4%	11.4%	1.5%
Lennar Corp.	\$25,504	\$0.50	\$83.86	0.60%	11.4%	11.4%	0.6%
Lilly (Eli)	\$141,576	\$2.96	\$145.21	2.04%	13.1%	13.1%	2.0%
Lincoln Nat'l Corp.	\$6,054	\$1.69	\$32.64	5.18%	9.9%	9.9%	5.2%
Linde plc	\$125,104	\$4.17	\$232.15	1.80%	10.8%	10.8%	1.8%
Live Nation Entertain.	\$11,706	\$0.00	\$54.73	n/a	n/a	n/a	n/a
LKQ Corp.	\$8,431	\$0.00	\$28.51	n/a	n/a	n/a	n/a
Lockheed Martin	\$107,143	\$10.40	\$380.58	2.73%	9.1%	9.1%	2.7%
Loews Corp.	\$9,745	\$0.25	\$35.50	0.70%	14.0%	14.0%	0.7%
Lowe's Cos.	\$125,390	\$2.40	\$166.49	1.44%	21.8%	n/a	n/a
LyondellBasell Inds.	\$23,532	\$4.20	\$72.24	5.81%	-4.6%	n/a	n/a
M&T Bank Corp.	\$11,815	\$4.40	\$93.53	4.70%	-8.9%	n/a	n/a
Marathon Oil Corp.	\$3,231	\$0.00	\$4.12	n/a	n/a	n/a	n/a
Marathon Petroleum	\$19,071	\$2.32	\$28.27	8.21%	-7.4%	n/a	n/a
MarketAxess Holdings	\$18,271	\$2.40	\$482.52	0.50%	17.5%	17.5%	0.5%
Marriott Int'l	\$30,024	\$0.00	\$95.25	n/a	n/a	n/a	n/a
Marsh & McLennan	\$58,082	\$1.86	\$114.56	1.62%	4.9%	4.9%	1.6%
Martin Marietta	\$14,663	\$2.30	\$240.55	0.96%	5.0%	5.0%	1.0%
Masco Corp.	\$14,356	\$0.57	\$55.29	1.03%	14.3%	14.3%	1.0%
MasterCard Inc.	\$339,523	\$1.60	\$338.83	0.47%	11.3%	11.3%	0.5%
Maxim Integrated	\$18,090	\$1.92	\$66.38	2.89%	6.0%	6.0%	2.9%
McCormick & Co.	\$25,895	\$2.50	\$192.84	1.30%	4.8%	4.8%	1.3%
McDonald's Corp.	\$163,323	\$5.00	\$222.67	2.25%	3.9%	3.9%	2.2%
McKesson Corp.	\$24,127	\$1.68	\$146.98	1.14%	8.1%	8.1%	1.1%
Medtronic plc	\$139,598	\$2.32	\$101.96	2.28%	9.4%	9.4%	2.3%
Merck & Co.	\$209,795	\$2.44	\$80.80	3.02%	6.3%	6.3%	3.0%
MetLife Inc.	\$33,736	\$1.84	\$37.63	4.89%	2.9%	2.9%	4.9%
Mettler-Toledo Int'l	\$23,150	\$0.00	\$966.92	n/a	n/a	n/a	n/a
MGM Resorts Int'l	\$10,729	\$0.01	\$21.66	0.05%	-11.6%	n/a	n/a
Microchip Technology	\$25,942	\$1.48	\$103.76	1.43%	7.0%	7.0%	1.4%
Micron Technology	\$52,220	\$0.00	\$46.55	n/a	n/a	n/a	n/a
Microsoft Corp.	\$1,592,408	\$2.04	\$206.19	0.99%	15.2%	15.2%	1.0%
Mid-America Apartment	\$13,247	\$4.00	\$123.71	3.23%	7.0%	7.0%	3.2%
Mohawk Inds.	\$6,948	\$0.00	\$102.19	n/a	n/a	n/a	n/a
Molson Coors Beverage	\$7,269	\$0.00	\$34.04	n/a	n/a	n/a	n/a
Mondelez Int'l	\$82,042	\$1.26	\$56.86	2.22%	6.4%	6.4%	2.2%
Monster Beverage	\$42,294	\$0.00	\$79.55	n/a	n/a	n/a	n/a
Moody's Corp.	\$54,404	\$2.24	\$293.96	0.76%	8.6%	8.6%	0.8%
Morgan Stanley	\$76,205	\$1.40	\$47.97	2.92%	2.5%	2.5%	2.9%
Mosaic Company	\$6,926	\$0.24	\$18.31	1.31%	7.0%	7.0%	1.3%
Motorola Solutions	\$26,642	\$2.60	\$156.91	1.66%	10.3%	10.3%	1.7%
MSCI Inc.	\$29,839	\$3.12	\$348.16	0.90%	13.1%	13.1%	0.9%
Mylan N.V.	\$7,666	\$0.00	\$14.89	n/a	n/a	n/a	n/a
Nasdaq Inc.	\$20,155	\$1.96	\$123.54	1.59%	8.9%	8.9%	1.6%
National Oilwell Varco	\$3,518	\$0.00	\$9.06	n/a	n/a	n/a	n/a
NetApp Inc.	\$9,733	\$2.00	\$42.76	4.68%	3.9%	3.9%	4.7%
Netflix Inc.	\$220,521	\$0.00	\$503.06	n/a	n/a	n/a	n/a
Newell Brands	\$7,279	\$0.92	\$17.38	5.29%	-1.4%	n/a	n/a
Newmont Corp.	\$51,204	\$1.00	\$62.29	1.61%	35.6%	n/a	n/a
News Corp. 'A'	\$8,250	\$0.20	\$14.22	1.41%	39.0%	n/a	n/a
News Corp. 'B'	\$8,151	\$0.20	\$14.17	1.41%	39.0%	n/a	n/a
NextEra Energy	\$135,907	\$5.88	\$281.17	2.09%	8.1%	8.1%	2.1%
Nielsen Hldgs. plc	\$5,059	\$0.24	\$14.29	1.68%	-2.8%	n/a	n/a
NIKE Inc. 'B'	\$195,215	\$0.98	\$126.64	0.77%	25.1%	n/a	n/a

Schedule No. BV-17: Estimation of S&P 500 Cost of Equity -DDM

Company	Market Cap (\$Millions)	VL Indicated Annual Dividend (\$)	VL Stock Price (\$)	Annual Dividend Yield, calculated	Growth Rate	Growth Rate Filtered Between 0 and 20%	Dividend Yield for companies with valid GR
	[1]	[2]	[3]	[4] = [2] / [3]	[5]	[6]	[7]
NiSource Inc.	\$8,424	\$0.84	\$22.14	3.79%	1.8%	1.8%	3.8%
Noble Energy	\$4,147	\$0.08	\$8.46	0.95%	5.0%	5.0%	0.9%
Norfolk Southern	\$54,591	\$3.76	\$212.66	1.77%	5.2%	5.2%	1.8%
Northern Trust Corp.	\$16,225	\$2.80	\$78.41	3.57%	-5.6%	n/a	n/a
Northrop Grumman	\$52,595	\$5.80	\$313.95	1.85%	8.6%	8.6%	1.8%
NortonLifeLock Inc.	\$12,316	\$0.50	\$20.56	2.43%	5.0%	5.0%	2.4%
Norwegian Cruise Line	\$4,386	\$0.00	\$17.27	n/a	n/a	n/a	n/a
NRG Energy	\$7,505	\$1.20	\$31.06	3.86%	-12.8%	n/a	n/a
Nucor Corp.	\$13,543	\$1.61	\$46.04	3.50%	-5.9%	n/a	n/a
NVIDIA Corp.	\$333,933	\$0.64	\$522.49	0.12%	17.4%	17.4%	0.1%
NVR Inc.	\$15,063	\$0.00	\$4,194.98	n/a	n/a	n/a	n/a
O'Reilly Automotive	\$34,165	\$0.00	\$458.24	n/a	n/a	n/a	n/a
Occidental Petroleum	\$9,191	\$0.04	\$9.87	0.41%	-15.6%	n/a	n/a
Old Dominion Freight	\$21,228	\$0.61	\$184.56	0.33%	10.1%	10.1%	0.3%
Omnicom Group	\$10,636	\$2.60	\$51.33	5.07%	1.4%	1.4%	5.1%
ONEOK Inc.	\$11,540	\$3.82	\$26.53	14.40%	-1.4%	n/a	n/a
Oracle Corp.	\$179,936	\$0.96	\$58.83	1.63%	9.2%	9.2%	1.6%
Otis Worldwide	\$27,034	\$0.80	\$63.16	1.27%	4.7%	4.7%	1.3%
PACCAR Inc.	\$29,490	\$2.30	\$84.99	2.71%	-4.4%	n/a	n/a
Packaging Corp.	\$10,338	\$3.25	\$108.42	3.00%	-10.4%	n/a	n/a
Parker-Hannifin	\$26,012	\$3.52	\$207.30	1.70%	7.5%	7.5%	1.7%
Paychex Inc.	\$28,622	\$2.52	\$79.43	3.17%	3.3%	3.3%	3.2%
Paycom Software	\$17,927	\$0.00	\$331.53	n/a	n/a	n/a	n/a
PayPal Holdings	\$231,116	\$0.00	\$191.91	n/a	n/a	n/a	n/a
Pentair plc	\$7,594	\$0.76	\$45.91	1.66%	3.9%	3.9%	1.7%
People's United Fin'l	\$4,378	\$0.72	\$10.53	6.84%	13.7%	13.7%	6.8%
PepsiCo Inc.	\$191,961	\$4.09	\$138.06	2.96%	5.5%	5.5%	3.0%
PerkinElmer Inc.	\$13,995	\$0.28	\$124.56	0.22%	17.0%	17.0%	0.2%
Perrigo Co. plc	\$6,267	\$0.98	\$44.85	2.19%	10.0%	10.0%	2.2%
Pfizer Inc.	\$203,832	\$1.52	\$36.38	4.18%	5.4%	5.4%	4.2%
Philip Morris Int'l	\$116,781	\$4.80	\$74.46	6.45%	5.3%	5.3%	6.4%
Phillips 66	\$22,642	\$3.70	\$51.06	7.25%	-12.8%	n/a	n/a
Pinnacle West Capital	\$8,394	\$3.27	\$77.86	4.20%	3.8%	3.8%	4.2%
Pioneer Natural Res.	\$14,126	\$2.20	\$86.54	2.54%	11.2%	11.2%	2.5%
PNC Financial Serv.	\$46,712	\$4.60	\$112.16	4.10%	-7.1%	n/a	n/a
PPG Inds.	\$28,808	\$2.16	\$123.27	1.75%	4.7%	4.7%	1.8%
PPL Corp.	\$20,919	\$1.67	\$28.21	5.92%	-16.2%	n/a	n/a
Price (T. Rowe) Group	\$29,105	\$3.70	\$129.09	2.87%	8.0%	8.0%	2.9%
Principal Fin'l Group	\$11,034	\$2.24	\$41.05	5.46%	6.1%	6.1%	5.5%
Procter & Gamble	\$344,660	\$3.16	\$138.12	2.29%	7.2%	7.2%	2.3%
Progressive Corp.	\$55,420	\$0.40	\$94.21	0.42%	0.9%	0.9%	0.4%
Prologis	\$63,571	\$2.44	\$104.22	2.34%	-6.1%	n/a	n/a
Prudential Fin'l	\$25,066	\$4.40	\$63.88	6.89%	3.8%	3.8%	6.9%
Public Serv. Enterprise	\$27,675	\$2.00	\$55.95	3.57%	1.5%	1.5%	3.6%
Public Storage	\$38,847	\$8.00	\$230.59	3.47%	17.0%	17.0%	3.5%
PulteGroup Inc.	\$12,414	\$0.50	\$47.53	1.05%	2.0%	2.0%	1.1%
PVH Corp.	\$4,240	\$0.00	\$62.12	n/a	n/a	n/a	n/a
Qorvo Inc.	\$14,753	\$0.00	\$130.57	n/a	n/a	n/a	n/a
Qualcomm Inc.	\$132,743	\$2.60	\$115.47	2.25%	26.8%	n/a	n/a
Quanta Services	\$7,280	\$0.20	\$55.20	0.36%	10.0%	10.0%	0.4%
Quest Diagnostics	\$15,342	\$2.24	\$113.87	1.97%	11.7%	11.7%	2.0%
Ralph Lauren	\$4,969	\$0.00	\$69.93	n/a	n/a	n/a	n/a
Raymond James Fin'l	\$9,970	\$1.70	\$74.52	2.28%	-4.7%	n/a	n/a
Raytheon Technologies	\$87,901	\$1.92	\$59.34	3.24%	-13.2%	n/a	n/a
Realty Income Corp.	\$20,267	\$2.88	\$63.86	4.51%	5.5%	5.5%	4.5%
Regency Centers Corp.	\$6,371	\$2.38	\$40.20	5.92%	9.1%	9.1%	5.9%
Regeneron Pharmac.	\$59,353	\$0.00	\$564.80	n/a	n/a	n/a	n/a

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	[1]	[2]	[3]	[4] = [2] / [3]	[5]	[6]	[7]
Regions Financial	\$11,070	\$0.62	\$11.95	5.19%	-21.6%	n/a	n/a
Republic Services	\$29,704	\$1.70	\$93.32	1.82%	7.1%	7.1%	1.8%
ResMed Inc.	\$24,799	\$1.56	\$167.50	0.93%	21.1%	n/a	n/a
Robert Half Int'l	\$6,069	\$1.42	\$54.57	2.60%	5.9%	5.9%	2.6%
Rockwell Automation	\$25,599	\$4.08	\$223.43	1.83%	1.7%	1.7%	1.8%
Rollins Inc.	\$17,761	\$0.32	\$54.47	0.59%	8.2%	8.2%	0.6%
Roper Tech.	\$41,372	\$2.05	\$395.72	0.52%	1.0%	1.0%	0.5%
Ross Stores	\$33,223	\$0.00	\$96.22	n/a	n/a	n/a	n/a
Royal Caribbean	\$13,554	\$0.00	\$65.26	n/a	n/a	n/a	n/a
S&P Global	\$86,905	\$2.85	\$362.98	0.79%	9.9%	9.9%	0.8%
salesforce.com	\$228,701	\$0.00	\$247.85	n/a	n/a	n/a	n/a
SBA Communications	\$35,644	\$2.18	\$318.12	0.69%	44.7%	n/a	n/a
Schein (Henry)	\$8,373	\$0.00	\$57.97	n/a	n/a	n/a	n/a
Schlumberger Ltd.	\$21,599	\$0.50	\$15.57	3.21%	-5.6%	n/a	n/a
Schwab (Charles)	\$46,682	\$0.75	\$37.67	1.99%	-5.0%	n/a	n/a
Seagate Technology	\$12,649	\$2.65	\$48.74	5.44%	7.9%	7.9%	5.4%
Sealed Air	\$6,042	\$0.64	\$40.35	1.59%	6.5%	6.5%	1.6%
Sempra Energy	\$34,680	\$4.34	\$120.50	3.60%	6.3%	6.3%	3.6%
ServiceNow Inc.	\$93,024	\$0.00	\$493.15	n/a	n/a	n/a	n/a
Sherwin-Williams	\$63,438	\$5.54	\$688.98	0.80%	9.3%	9.3%	0.8%
Simon Property Group	\$19,848	\$5.20	\$68.20	7.62%	8.6%	8.6%	7.6%
Skyworks Solutions	\$24,313	\$2.00	\$146.83	1.36%	12.7%	12.7%	1.4%
SL Green Realty	\$3,722	\$1.18	\$49.36	2.39%	-10.8%	n/a	n/a
Smith (A.O.)	\$8,523	\$0.96	\$53.53	1.79%	8.0%	8.0%	1.8%
Smucker (J.M.)	\$13,179	\$3.60	\$116.47	3.09%	0.7%	0.7%	3.1%
Snap-on Inc.	\$8,013	\$4.92	\$148.12	3.32%	10.0%	10.0%	3.3%
Southern Co.	\$57,263	\$2.60	\$56.26	4.62%	4.6%	4.6%	4.6%
Southwest Airlines	\$22,120	\$0.00	\$38.76	n/a	n/a	n/a	n/a
Stanley Black & Decker	\$25,900	\$2.80	\$164.81	1.70%	3.7%	3.7%	1.7%
Starbucks Corp.	\$100,432	\$1.80	\$86.57	2.08%	2.7%	2.7%	2.1%
State Street Corp.	\$20,907	\$2.08	\$59.68	3.49%	1.7%	1.7%	3.5%
STERIS plc	\$14,987	\$1.60	\$172.67	0.93%	10.0%	10.0%	0.9%
Stryker Corp.	\$78,264	\$2.30	\$208.30	1.10%	7.9%	7.9%	1.1%
SVB Finl Group	\$12,450	\$0.00	\$245.65	n/a	n/a	n/a	n/a
Synchrony Financial	\$15,276	\$0.88	\$27.46	3.20%	-14.9%	n/a	n/a
Synopsys Inc.	\$32,473	\$0.00	\$212.05	n/a	n/a	n/a	n/a
Sysco Corp.	\$31,624	\$1.80	\$63.17	2.85%	22.1%	n/a	n/a
T-Mobile US	\$141,502	\$0.00	\$113.41	n/a	n/a	n/a	n/a
Take-Two Interactive	\$18,879	\$0.00	\$160.15	n/a	n/a	n/a	n/a
Tapestry Inc.	\$4,315	\$0.00	\$16.15	n/a	n/a	n/a	n/a
Target Corp.	\$78,750	\$2.72	\$159.10	1.71%	7.1%	7.1%	1.7%
TE Connectivity	\$32,253	\$1.92	\$98.36	1.95%	11.0%	11.0%	2.0%
TechnipFMC plc	\$2,835	\$0.00	\$6.38	n/a	n/a	n/a	n/a
Teledyne Technologies	\$11,433	\$0.00	\$309.81	n/a	n/a	n/a	n/a
Teleflex Inc.	\$15,816	\$1.36	\$335.90	0.40%	13.0%	13.0%	0.4%
Texas Instruments	\$130,737	\$4.08	\$141.09	2.89%	10.0%	10.0%	2.9%
Textron Inc.	\$8,227	\$0.08	\$35.72	0.22%	-4.8%	n/a	n/a
Thermo Fisher Sci.	\$174,661	\$0.88	\$435.06	0.20%	13.4%	13.4%	0.2%
Tiffany & Co.	\$14,064	\$2.32	\$116.11	2.00%	-0.8%	n/a	n/a
TJX Companies	\$66,728	\$0.00	\$57.63	n/a	n/a	n/a	n/a
Tractor Supply	\$16,653	\$1.60	\$140.62	1.14%	16.7%	16.7%	1.1%
Trane Technologies plc	\$29,022	\$2.12	\$123.86	1.71%	-0.1%	n/a	n/a
TransDigm Group	\$25,743	\$0.00	\$485.58	n/a	n/a	n/a	n/a
Travelers Cos.	\$27,394	\$3.40	\$108.58	3.13%	3.1%	3.1%	3.1%
Truist Finl	\$51,277	\$1.80	\$39.98	4.50%	-9.1%	n/a	n/a
Twitter Inc.	\$35,174	\$0.00	\$46.12	n/a	n/a	n/a	n/a
Tyler Technologies	\$16,783	\$0.00	\$350.72	n/a	n/a	n/a	n/a

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Tyson Foods 'A'	\$21,710	\$1.74	\$59.31	2.93%	8.7%	8.7%	2.9%
U.S. Bancorp	\$54,003	\$1.68	\$36.77	4.57%	2.5%	2.5%	4.6%
UDR Inc.	\$9,605	\$1.49	\$34.74	4.29%	-34.2%	n/a	n/a
Ulta Beauty	\$12,615	\$0.00	\$228.68	n/a	n/a	n/a	n/a
Under Armour 'A'	\$5,101	\$0.00	\$12.06	n/a	n/a	n/a	n/a
Under Armour 'C'	\$4,468	\$0.00	\$10.54	n/a	n/a	n/a	n/a
Union Pacific	\$133,618	\$3.88	\$196.35	1.98%	6.5%	6.5%	2.0%
United Airlines Hldgs.	\$10,112	\$0.00	\$36.01	n/a	n/a	n/a	n/a
United Parcel Serv.	\$143,735	\$4.04	\$166.96	2.42%	7.3%	7.3%	2.4%
United Rentals	\$12,578	\$0.00	\$185.02	n/a	n/a	n/a	n/a
UnitedHealth Group	\$296,182	\$5.00	\$311.98	1.60%	12.7%	12.7%	1.6%
Universal Health 'B'	\$9,092	\$0.00	\$109.15	n/a	n/a	n/a	n/a
Unum Group	\$3,425	\$1.14	\$17.68	6.45%	9.0%	9.0%	6.4%
V.F. Corp.	\$27,372	\$1.92	\$72.53	2.65%	5.0%	5.0%	2.6%
Valero Energy	\$17,664	\$3.92	\$40.73	9.62%	-2.8%	n/a	n/a
Varian Medical Sys.	\$15,635	\$0.00	\$171.93	n/a	n/a	n/a	n/a
Ventas Inc.	\$15,643	\$1.80	\$44.61	4.03%	-0.5%	n/a	n/a
VeriSign Inc.	\$23,560	\$0.00	\$202.16	n/a	n/a	n/a	n/a
Verisk Analytics	\$30,117	\$1.10	\$182.10	0.60%	9.7%	9.7%	0.6%
Verizon Communic.	\$246,173	\$2.51	\$59.24	4.24%	1.6%	1.6%	4.2%
Vertex Pharmac.	\$70,785	\$0.00	\$260.80	n/a	n/a	n/a	n/a
ViacomCBS Inc.	\$17,254	\$0.96	\$27.97	3.43%	1.4%	1.4%	3.4%
Visa Inc.	\$388,542	\$1.23	\$201.46	0.61%	8.8%	8.8%	0.6%
Vornado R'ty Trust	\$6,444	\$2.12	\$35.71	5.94%	17.3%	17.3%	5.9%
Vulcan Materials	\$17,952	\$1.36	\$136.80	0.99%	8.7%	8.7%	1.0%
Wabtec Corp.	\$11,776	\$0.48	\$62.72	0.77%	7.3%	7.3%	0.8%
Walgreens Boots	\$32,441	\$1.87	\$35.77	5.23%	-5.2%	n/a	n/a
Walmart Inc.	\$396,505	\$2.18	\$140.50	1.55%	6.4%	6.4%	1.6%
Waste Management	\$47,776	\$2.18	\$113.89	1.91%	-1.3%	n/a	n/a
Waters Corp.	\$12,116	\$0.00	\$195.89	n/a	n/a	n/a	n/a
WEC Energy Group	\$30,566	\$2.66	\$97.71	2.72%	5.9%	5.9%	2.7%
Wells Fargo	\$96,851	\$0.40	\$23.99	1.67%	3.7%	3.7%	1.7%
Welltower Inc.	\$22,601	\$2.44	\$57.94	4.21%	13.0%	13.0%	4.2%
West Pharmac. Svcs.	\$20,288	\$0.64	\$273.85	0.23%	15.0%	15.0%	0.2%
Western Digital	\$11,038	\$0.00	\$35.96	n/a	n/a	n/a	n/a
Western Union	\$8,808	\$0.90	\$21.40	4.21%	8.7%	8.7%	4.2%
WestRock Co.	\$9,015	\$0.80	\$35.02	2.28%	-1.9%	n/a	n/a
Weyerhaeuser Co.	\$21,283	\$0.00	\$29.11	n/a	n/a	n/a	n/a
Whirlpool Corp.	\$11,401	\$4.80	\$184.21	2.61%	4.4%	4.4%	2.6%
Williams Cos.	\$23,836	\$1.60	\$19.09	8.38%	3.7%	3.7%	8.4%
Willis Towers Wat. plc	\$26,888	\$2.72	\$209.61	1.30%	4.9%	4.9%	1.3%
Wynn Resorts	\$7,746	\$0.00	\$73.20	n/a	n/a	n/a	n/a
Xcel Energy Inc.	\$36,244	\$1.77	\$70.48	2.51%	5.9%	5.9%	2.5%
Xerox Holdings	\$3,998	\$1.00	\$19.05	5.25%	-7.0%	n/a	n/a
Xilinx Inc.	\$25,354	\$1.52	\$102.59	1.48%	7.5%	7.5%	1.5%
Xylem Inc.	\$15,142	\$1.04	\$84.43	1.23%	-1.9%	n/a	n/a
Yum! Brands	\$27,518	\$1.88	\$95.17	1.98%	6.6%	6.6%	2.0%
Zebra Techn. 'A'	\$13,462	\$0.00	\$258.81	n/a	n/a	n/a	n/a
Zimmer Biomet Hldgs.	\$28,167	\$0.96	\$137.69	0.70%	3.7%	3.7%	0.7%
Zions Bancorp.	\$4,791	\$1.36	\$29.85	4.56%	-32.4%	n/a	n/a

Sources and Notes:

[1] - [3]: Value Line Investment Analyzer as of 9/30/2020.

[5]: Thomson Reuters as of 9/30/2020.

[6],[7]: Excludes non-dividend paying companies from Market Cap Weighted Averages.

### Schedule No. BV-18 Market Risk Premium Summary

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Dividend Yield	[a]	2.10%
Growth Rate	[b]	8.80%
Estimated Cost of Equity	[c] = [a] + [b]	10.90%
Risk Free Rate	[d]	1.90%
<b>Market Risk Premium</b>	<b>[e] = [c] - [d]</b>	<b>9.00%</b>

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Sources and Notes:

[a],[b]: See Schedule No. BV-17.