

**Water and Wastewater Cost of Capital
First Quarter 2018 (1-1-2018)**

As a Investor-Owned Utility

Weighted Cost of Capital (Discount Rate)

(1)	(2)	(2a)	(3)	(3a)	(4)	(4a)	(5)
	Portion of Capital AUS Input	Type of Data	Capital Cost AUS Input	Type of Data	Tax Rate	Tax affect on cost of capital	After-tax Market Capital Cost (2)*(3)*(4a)
Debt	28%	Market	3.60%	Market	28.89%	71.11%	0.72%
Equity	72%	Market	8.99%	Market	0.0%	100.0%	6.47%
Total Capital r	100.0%						7.19%
Growth (g)							1.44%
Rate without Growth: [(1+r)/(1+g)]-1							5.67%

Weighted Cost of Capital (Capitlization Rate)

(1)	(2)	(2a)	(3)	(3a)	(4)	(4a)	(5)
	Portion of Capital AUS Input	Type of Data	Capital Cost AUS Input	Type of Data	Tax Rate	Tax affect on cost of capital	After-tax Market Capital Cost (2)*(3)
Debt	28%	Market	3.62%	Market	Not Applicable	Not Applicable	1.01%
Equity	72%	Market	8.99%	Market	Not Applicable	Not Applicable	6.47%
Total Capital r	100.0%						7.48%
Growth (g)							1.44%
Rate without Growth: [(1+r)/(1+g)]-1							5.96%

Weighted Cost of Capital (Rate of Return on Rate Base)

(1)	(2)	(2a)	(3)	(3a)	(4)	(4a)	(5)
	Portion of Capital AUS Input	Type of Data	Capital Cost AUS Input	Type of Data	Tax Rate	Tax affect on cost of capital	After-tax Market Capital Cost (2)*(3)
Debt	40%	Embedded	3.80%	Embedded	Not Applicable	Not Applicable	1.52%
Equity	60%	Embedded	8.99%	Market	Not Applicable	Not Applicable	5.39%
Total Capital r	100.0%						6.91%
Growth (g)							0.00% Not Applicable
Rate without Growth: [(1+r)/(1+g)]-1							6.91%

**Value Line Investment Surveys
Water Industry
As of First Quarter 2018 (1-1-2018)**

S&P
Debt
Rating

Long Term
Debt

Long Term
Interest

Long Term
Interest
Rate
(embedde
d)

Input Value Line Input Value Linc (41) / (3)

American States Water		321.0	21.3	6.64%
American Water	A	6,672.0	349.0	5.23%
Aqua American		1,952.5	80.0	4.10%
California Water		519.7	35.0	6.73%
Connecticut Water		255.2	8.5	3.33%
Consolidated Water Company		-	-	-
Middlesex Water		135.8	6.0	4.42%
SJW Corporation		431.0	20.0	4.64%
York Water		88.9	5.4	6.07%
		10,376.1	525.2	5.06%
Minimum				3.33%
wtd Mean				5.06%
Mean				5.15%
Median				4.94%
Maximum				6.73%

Debt Rating and Cost of Debt

Embedded 5.06% wtd mean col 5

Rating (S&P) A Input
Market Cost of Debt @ S&P Rating 4.58% Input

Use 4.58% Input

Value Line Investment Surveys
Water Industry
As of First Quarter 2018 (1-1-2018)

Company	Exchange	Ticker	ValueLine No.	Issue	Beta	Dividend	Revenues		Cash Flows		Earnings		Dividends		Book Value			
							Past 10 Yrs	Est'd 14-16 to 20-22	Past 10 Yrs	Est'd 14-16 to 20-22	Past 10 Yrs	Est'd 14-16 to 20-22	Past 10 Yrs	Est'd 14-16 to 20-22	Past 10 Yrs	Est'd 14-16 to 20-22		
			Input Value Line	Input Value Line	Input Value Line	Input Value Line	Input Value Line	Input Value Line	Input Value Line	Input Value Line	Input Value Line	Input Value Line	Input Value Line	Input Value Line	Input Value Line	Input Value Line		
American States Water	NYSE	AWR	1794	1/12/2018	0.8	1.9%	5.5%	4.5%	7.5%	10.0%	6.0%	6.5%	7.0%	10.5%	7.5%	5.0%	4.0%	
American Water	NYSE	AWK	1785	1/12/2018	0.65	2.0%	3.0%	3.5%	23.0%	8.5%	6.5%	8.5%	9.0%	10.0%	10.0%	1.5%	4.0%	5.5%
Aqua American	NYSE	WTR	1786	1/12/2018	0.75	2.2%	4.0%	2.0%	7.5%	7.0%	6.0%	7.0%	8.0%	8.0%	9.0%	7.0%	7.5%	6.5%
California Water	NYSE	CWT	1787	1/12/2018	0.8	1.6%	4.0%	3.0%	5.0%	4.0%	5.5%	3.0%	2.0%	2.0%	7.5%	5.0%	3.5%	3.5%
Connecticut Water	NYSE	CWS	1788	1/12/2018	0.65	2.1%	4.0%	3.0%	6.5%	3.5%	4.5%	3.0%	1.5%	3.0%	5.5%	6.0%	9.0%	5.0%
Consolidated Water Company	NYSE	CWCO	1789	1/12/2018	1	2.7%	7.5%	1.5%	3.0%	1.5%	13.5%	21.0%	2.5%	3.0%	7.0%	7.5%	2.5%	4.0%
Middlesex Water	NYSE	MSEX	1790	1/12/2018	0.8	2.3%	2.0%	3.0%	4.5%	8.0%	5.0%	9.0%	1.5%	1.5%	5.0%	4.0%	3.0%	4.5%
SIW Corporation	NYSE	SIW	1791	1/12/2018	0.7	1.4%	5.0%	5.0%	12.0%	8.0%	4.5%	20.5%	4.0%	4.0%	7.0%	5.5%	6.5%	4.5%
York Water	NYSE	YORW	1792	1/12/2018	0.8	2.0%	4.0%	3.5%	6.5%	5.5%	8.0%	6.0%	3.5%	3.0%	6.0%	5.0%	3.5%	4.5%
Minimum					0.65	1.40%	2.00%	1.50%	3.00%	3.00%	4.50%	6.50%	1.50%	0.50%	5.00%	1.50%	2.50%	3.50%
Mean					0.77	2.02%	4.33%	3.00%	6.11%	7.83%	6.94%	8.39%	4.06%	4.50%	7.39%	5.22%	5.11%	4.67%
Median					0.80	2.00%	4.00%	3.00%	6.50%	6.50%	6.00%	6.75%	3.75%	3.00%	7.50%	5.50%	5.00%	4.50%
Maximum					1.00	2.70%	7.50%	5.50%	16.00%	23.00%	13.50%	20.50%	8.00%	10.50%	10.00%	7.50%	9.00%	6.50%

Cost of Equity Capital Asset Pricing Model (CAPM)

2.02% mean Col 7

Cost of Equity Dividend Growth Model

5.50% Input

Growth	Past 10 Yrs		Est'd 13-15 to 19-21		Beta
	Yrs	Past 5 Yrs	Yrs	Past 5 Yrs	
Revenues	4.33%	3.00%	6.11%	6.11%	
Cash Flow	6.50%	6.50%	6.94%	6.94%	
Earnings	6.00%	8.39%	9.44%	9.44%	
Dividends	3.75%	4.50%	7.39%	7.39%	
Book Value	5.50%	5.11%	4.67%	4.67%	
Mean	5.22%	5.50%	6.91%	6.91%	
Growth	5.50%	Input	5.50%	Input	

Cost of Equity Dividend Growth Model

2.02%

5.50%

7.52%

Cost of Equity

10 year pressure per PA PUC

Beta

0.77

Risk Premium

7.07%

Input SBI

7.07%

Input

10 year pressure per PA PUC

Micro

3.88%

Input SBI

1.88%

Input SBI

1.12%

Input SBI

Large

0.00%

Input SBI

Size Premium

0.00%

Input

10.45%

Cost of Equity

8.99%

Input

5.50%

Input

Cost of Equity

7.52%

Dividend Growth Model

10.45%

Capital Asset Pricing Model (CAPM)

8.99%

Mean

8.99%

Cost of Equity

8.99%

Input

5.50%

Input

Growth

Value Line Investment Surveys
 Water Industry
 As of First Quarter 2018 (1-1-2018)

Company	Exchange	Ticker	Valueline No.	Valueline Issue	Tax Rate	2016		2017		2018		20-22	
						Input Value Line	Input Value Line	Input Value Line	Input Value Line	Input Value Line	Input Value Line	Input Value Line	Input Value Line
American States Water	NYSE	AWR	1784	1/12/2018		36.8%	36.5%	21.0%	21.0%	21.0%	21.0%	21.0%	21.0%
American Water	NYSE	AWK	1785	1/12/2018		39.2%	40.0%	21.0%	21.0%	21.0%	21.0%	21.0%	21.0%
Aqua American	NYSE	WTR	1786	1/12/2018		8.2%	9.0%	9.0%	9.0%	10.0%	10.0%	10.0%	10.0%
California Water	NYSE	CWT	1787	1/12/2018		35.5%	35.0%	21.0%	21.0%	21.0%	21.0%	21.0%	21.0%
Connecticut Water	NDQ	CTWS	1788	1/12/2018		9.9%	19.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%
Consolidated Water Company	NDQ	CWCO	1789	1/12/2018									
Middlesex Water	NDQ	MSEX	1790	1/12/2018		34.0%	32.0%	21.0%	21.0%	21.0%	21.0%	21.0%	21.0%
SJW Corporation	NYSE	SJW	1791	1/12/2018		38.8%	38.0%	21.0%	21.0%	21.0%	21.0%	21.0%	21.0%
York Water	NDQ	YORW	1792	1/12/2018		31.3%	24.0%	21.0%	21.0%	21.0%	21.0%	21.0%	21.0%
Minimum						8.20%	9.00%	9.00%	9.00%	10.00%	10.00%	10.00%	10.00%
wtd Mean													
Mean						29.21%	29.19%	19.38%	19.38%	19.50%	19.50%	19.50%	19.50%
Median						34.75%	33.50%	21.00%	21.00%	21.00%	21.00%	21.00%	21.00%
Maximum						39.20%	40.00%	21.00%	21.00%	21.00%	21.00%	21.00%	21.00%
Historical						34.00% Median							
Marginal						35.00% AUS Input	21.00% AUS Input						
US 50-state average						4.91% AUS Input	4.91% AUS Input						
Pennsylvania						9.99% AUS Input	9.99% AUS Input						
Tax Rate						41.49% Calculated	28.89% Calculated						

Value Line Investment Surveys
Water Industry
As of First Quarter 2018 (1-1-2018)

Company	Exchange	Ticker	Valueline No.	Valueline Issue	Total Debt	Market Debt	Long Term Debt	Long Term Interest	Long Term Interest Rate	Proportion of Debt	Book Debt	Book Equity	Preferred Stock	% Preferred	Shares Outstanding	Price per Share	Market Equity	Portion Market Equity	Total Market Capital
Input Value Line	Input Value Line	Input Value Line	Input Value Line	Input Value Line	Input Value Line	Input Value Line	Input Value Line	Input Value Line	Input Value Line	Input Value Line	Input Value Line	Input Value Line	Input Value Line	Input Value Line	Input Value Line	Input Value Line	Input Value Line	Input Value Line	Input Value Line
					(\$ Million)	(%)	(\$ Million)	(\$ Million)	(%)	(%)	(\$ Million)	(%)	(\$ Million)	(%)	Million	\$/Share	(\$ Million)	(%)	(\$ Million)
American States Water	NYSE	AWR	1784	1/12/2018	367.3	15.08%	321.0	21.3	6.64%	38.0%	40.0%	60.0%	-	0.00%	36.67917500	56.4	2,068.7	84.92%	2,436.0
American Water	NYSE	AWK	1785	1/12/2018	7,462.0	31.94%	6,672.0	349.0	5.23%	55.0%	53.5%	46.5%	9.0	0.04%	178.37540000	89.08	15,889.7	68.02%	23,360.7
Aqua American	NYSE	WTR	1786	1/12/2018	2,058.2	23.06%	1,952.5	80.0	4.10%	50.0%	47.0%	53.0%	-	0.00%	177.69059800	38.65	6,867.7	76.94%	8,925.9
California Water	NYSE	CWT	1787	1/12/2018	750.8	25.92%	519.7	35.0	6.73%	44.0%	43.0%	57.0%	-	0.00%	48.01500000	44.70	2,146.3	74.08%	2,897.1
Connecticut Water	NDQ	CTWS	1788	1/12/2018	263.2	27.60%	255.2	8.5	3.33%	47.0%	46.5%	53.5%	0.8	0.08%	12.06829900	57.13	689.5	72.31%	953.5
Consolidated Water Company	NDQ	CWCO	1789	1/12/2018	0.4	0.21%	-	-	-	0.0%	0.0%	100.0%	-	0.00%	14.90171100	12.60	187.8	99.79%	188.2
Middlesex Water	NDQ	MSEX	1790	1/12/2018	166.8	20.64%	135.8	6.0	4.42%	38.0%	37.5%	62.0%	2.4	0.30%	16.34603600	39.09	639.0	79.06%	808.2
SIW Corporation	NYSE	SIW	1791	1/12/2018	431.0	24.86%	431.0	20.0	4.64%	49.0%	49.0%	51.0%	-	0.00%	20.52085600	63.47	1,302.5	75.14%	1,733.5
York Water	NDQ	YORW	1792	1/12/2018	88.9	17.17%	88.9	5.4	6.07%	43.0%	43.0%	57.0%	-	0.00%	12.85943200	33.35	428.9	82.83%	517.8
Total					11,588.6	27.71%	10,376.1	525.2	5.06%				12.2	0.03%			30,219.9	72.26%	41,820.7
Minimum						0.21%			3.33%	0.00%	0.00%	46.50%		0.00%				68.02%	
wtd Mean						27.71%			5.06%					0.03%				72.26%	
Mean						20.72%			5.15%	40.44%	39.94%	60.00%		0.05%				79.23%	
Median						23.06%			4.94%	44.00%	43.00%	57.00%		0.00%				76.94%	
Maximum						31.94%			6.73%	55.00%	53.50%	100.00%		0.30%				99.79%	

Capital Structure	Market	Proportion	Reference	Embedded	Proportion	Reference
Debt	wtd mean col 7	27.71%		40.44%	mean col 11	
Preferred	wtd mean col 15	0.03%		0.05%	mean col 15	
Equity	wtd mean col 19	72.26%		60.00%	mean col 13	
Total	100.00%			100.49%		
Use						
Debt	28%	Input		40%	Input	
Equity	72%	Input		60%	Input	
Total	100%			100%		

Source: Ibbotson S&P 1963 Valuation Yearbook

Year	A-1		A-2		A-3		A-4		A-5		A-6		A-7		A-8		A-9		A-10		A-11		A-12		A-13		A-14		A-15		A-16	
	Large Company Stocks		Large Company Stocks		Large Company Stocks Capital		Small Company Stocks		Long-Term Corporate Bonds		Long-Term Government Bonds		Long-Term Government Bonds		Long-Term Government Bonds		Long-Term Government Bonds		Intermediate-Term Government Bonds		Intermediate-Term Government Bonds		Intermediate-Term Government Bonds Capital		Intermediate-Term Government Bonds		U.S. Treasury Bills		Inflation		Risk Premia	
	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *
1926	0.1162	0.0541	0.0572	0.0028	0.0737	0.0777	0.0373	0.0391	0.0354	0.0538	0.0378	0.0151	0.0361	0.0327	-0.0149	0.0789																
1927	0.3749	0.0571	0.3091	0.2210	0.0744	0.0893	0.0341	0.0540	0.0316	0.0452	0.0349	0.0096	0.0340	0.0312	-0.0208	0.3408																
1928	0.4361	0.0481	0.3788	0.3969	0.0284	0.0010	0.0322	-0.0312	0.0340	0.0092	0.0364	-0.0273	0.0401	0.0356	-0.0097	0.4039																
1929	-0.0842	0.0398	-0.1191	-0.5136	0.0327	0.0342	0.0347	-0.0020	0.0340	-0.0601	0.0407	0.0177	0.0362	0.0475	0.0020	-0.1189																
1930	-0.2490	0.0457	-0.2848	-0.3815	0.0798	0.0466	0.0332	0.0128	0.0330	0.0671	0.0330	0.0333	0.0291	0.0241	-0.0603	-0.2822																
1931	-0.4334	0.0535	-0.4707	-0.4975	-0.0185	-0.0531	0.0333	-0.0846	0.0407	-0.0232	0.0316	-0.0540	0.0412	0.0107	-0.0952	-0.4667																
1932	-0.0819	0.0616	-0.1515	-0.0539	0.1082	0.1684	0.0369	0.1294	0.0315	0.0810	0.0369	0.0502	0.0304	0.0096	-0.1030	-0.1188																
1933	0.5999	0.0639	0.4659	1.4287	0.1038	-0.0007	0.0312	-0.0314	0.0336	0.0183	0.0283	-0.0099	0.0325	0.0030	0.0051	0.5087																
1934	-0.0144	0.0446	-0.0594	0.2422	0.1384	0.1003	0.0318	0.0676	0.0293	0.0900	0.0293	0.0597	0.0249	0.0016	0.0203	-0.0462																
1935	0.4767	0.0495	0.4137	0.4019	0.0961	0.0498	0.0281	0.0214	0.0276	0.0701	0.0202	0.0494	0.0163	0.0017	0.0299	0.4486																
1936	0.3392	0.0536	0.2792	0.6480	0.0674	0.0752	0.0277	0.0464	0.0255	0.0306	0.0144	0.0160	0.0129	0.0018	0.0121	0.3115																
1937	-0.3503	0.0466	-0.3859	-0.5801	0.0275	0.0023	0.0266	-0.0248	0.0273	0.0156	0.0148	0.0005	0.0114	0.0031	0.0310	-0.3769																
1938	0.3112	0.0483	0.2521	0.3280	0.0613	0.0553	0.0264	0.0283	0.0252	0.0623	0.0182	0.0437	0.0152	-0.0002	-0.0278	0.2848																
1939	-0.0041	0.0469	-0.0545	0.0035	0.0397	0.0594	0.0240	0.0348	0.0226	0.0452	0.0131	0.0318	0.0098	0.0002	-0.0048	-0.0281																
1940	-0.0978	0.0536	-0.1529	-0.0516	0.0339	0.0609	0.0223	0.0377	0.0194	0.0296	0.0090	0.0204	0.0057	0.0000	0.0096	-0.1201																
1941	-0.1159	0.0671	-0.1786	-0.0900	0.0273	0.0093	0.0194	-0.0101	0.0204	0.0050	0.0067	-0.0017	0.0082	0.0006	0.0972	-0.1353																
1942	0.0234	0.0679	0.1243	0.4451	0.0260	0.0322	0.0246	0.0074	0.0246	0.0194	0.0076	0.0117	0.0072	0.0027	0.0929	-0.0012																
1943	0.2590	0.0624	0.1945	0.8837	0.0283	0.0208	0.0244	-0.0037	0.0248	0.0281	0.0156	0.0123	0.0145	0.0035	0.0316	0.2346																
1944	0.1975	0.0548	0.1380	0.5372	0.0473	0.0281	0.0246	0.0032	0.0246	0.0180	0.0144	0.0035	0.0140	0.0033	0.0211	0.1729																
1945	0.3611	0.0497	0.3072	0.7361	0.0408	0.1073	0.0234	0.0827	0.0199	0.0222	0.0119	0.0102	0.0103	0.0033	0.0225	0.3377																
1946	-0.0807	0.0409	-0.1187	-0.1163	0.0172	-0.0010	0.0204	-0.0215	0.0212	0.0100	0.0108	-0.0008	0.0112	0.0035	0.1816	-0.1011																
1947	0.0571	0.0549	0.0000	0.0092	-0.0234	-0.0262	0.0213	-0.0470	0.0243	0.0091	0.0121	-0.0030	0.0134	0.0050	0.0901	0.0358																
1948	0.0550	0.0608	-0.0065	-0.0211	0.0414	0.0340	0.0240	0.0096	0.0237	0.0185	0.0156	0.0027	0.0151	0.0081	0.0271	0.0310																
1949	0.1879	0.0750	0.1026	0.1975	0.0331	0.0645	0.0225	0.0415	0.0209	0.0232	0.0136	0.0095	0.0123	0.0110	-0.0180	0.1654																
1950	0.3171	0.0877	0.2178	0.3875	0.0212	0.0006	0.0212	-0.0206	0.0224	0.0070	0.0139	-0.0069	0.0162	0.0120	0.0579	0.2959																
1951	0.2402	0.0691	0.1646	0.0780	-0.0269	-0.0393	0.0238	-0.0627	0.0269	0.0036	0.0198	-0.0057	0.0215	0.0149	0.0587	0.2164																
1952	0.1837	0.0593	0.1178	0.3003	0.0352	0.0116	0.0266	-0.0148	0.0279	0.0163	0.0219	-0.0057	0.0235	0.0166	0.0088	0.1571																
1953	-0.0099	0.0546	-0.0662	-0.0649	0.0341	0.0364	0.0284	0.0067	0.0274	0.0323	0.0268	0.0061	0.0218	0.0062	-0.0383	-0.4983																
1954	0.5262	0.0621	0.4502	0.6058	0.0539	0.0719	0.0279	0.0495	0.0272	0.0288	0.0160	0.0108	0.0172	0.0086	-0.0050	0.4983																
1955	0.3156	0.0456	0.2640	0.2044	0.0048	-0.0129	0.0275	-0.0407	0.0295	-0.0065	0.0245	-0.0345	0.0363	0.0246	0.0037	0.2881																
1956	0.0656	0.0383	0.0262	0.0428	-0.0681	-0.0559	0.0299	-0.0846	0.0345	-0.0042	0.0305	0.0405	0.0284	0.0314	0.0302	-0.1422																
1957	-0.1078	0.0384	-0.1431	-0.1457	0.0871	0.0746	0.0344	0.0382	0.0323	0.0784	0.0359	-0.0417	0.0381	0.0314	0.0176	0.4009																
1958	0.4336	0.0438	0.3806	0.6489	-0.0222	-0.0609	0.0327	-0.0923	0.0382	-0.0129	0.0293	-0.0471	0.0381	0.0154	0.0176	0.4009																
1959	0.1196	0.0331	0.0848	0.1640	-0.0097	-0.0226	0.0401	-0.0620	0.0447	-0.0039	0.0418	-0.0456	0.0498	0.0295	0.0150	0.0795																
1960	0.0047	0.0326	-0.0297	-0.0329	0.0907	0.1378	0.0426	0.0929	0.1176	0.0742	0.0415	0.0331	0.0266	0.0148	-0.0379	-0.0379																
1961	0.2689	0.0348	0.2313	0.3209	0.0482	0.0097	0.0383	-0.0286	0.0415	0.0185	0.0354	-0.0172	0.0384	0.0213	0.0067	0.2306																
1962	-0.0873	0.0298	-0.1110	-0.1190	0.0795	0.0689	0.0400	0.0278	0.0395	0.0556	0.0373	0.0173	0.0350	0.0273	0.0122	-0.1273																
1963	0.2280	0.0361	0.1889	0.2357	0.0219	0.0121	0.0389	-0.0270	0.0164	0.0164	0.0371	-0.0210	0.0312	0.0165	0.1891	0.1233																
1964	0.1648	0.0333	0.1297	0.2352	0.0477	0.0351	0.0415	-0.0072	0.0423	0.0404	0.0400	-0.0003	0.0403	0.0354	0.0119	0.1233																
1965	-0.1006	0.0311	-0.0906	0.4175	-0.0046	0.0071	0.0120	-0.0345	0.0450	0.0419	0.0120	-0.0310	0.0490	0.0393	0.0192	0.0826																
1966	-0.1006	0.0311	-0.1309	-0.0701	0.0020	0.0365	0.0449	-0.0106	0.0455	0.0469	0.0493	-0.0041	0.0479	0.0476	0.0335	-0.1455																
1967	0.2398	0.0364	0.2090	0.8357	-0.0495	-0.0918	0.0459	-0.1355	0.0556	0.0101	0.0488	-0.0385	0.0577	0.0421	0.0304	0.1959																
1968	0.1106	0.0318	0.0766	0.3597	0.0257	-0.0026	0.0550	-0.0551	0.0598	0.0454	0.0549	-0.0099	0.0596	0.0521	0.0472	0.0556																

Year	A-1		A-2		A-3		A-4		A-5		A-6		A-7		A-8		A-9		A-10		A-11		A-12		A-13		A-14		A-15		A-16	
	Large Company Stocks	Large Company Stocks	Large Company Stocks	Small Company Stocks	Long-Term Corporate Bonds	Long-Term Government Bonds	Long-Term Government Bonds	Long-Term Government Bonds	Long-Term Government Bonds	Long-Term Government Bonds	Long-Term Government Bonds	Long-Term Government Bonds	Long-Term Government Bonds	Long-Term Government Bonds	Long-Term Government Bonds	Long-Term Government Bonds	Long-Term Government Bonds	Long-Term Government Bonds	Long-Term Government Bonds	Long-Term Government Bonds	Long-Term Government Bonds	Long-Term Government Bonds	Long-Term Government Bonds	Long-Term Government Bonds	Long-Term Government Bonds	Long-Term Government Bonds	Long-Term Government Bonds	Long-Term Government Bonds	Long-Term Government Bonds	Long-Term Government Bonds	Long-Term Government Bonds	Long-Term Government Bonds
	Total Returns	Appreciation	Total Returns	Total Returns	Total Returns	Total Returns	Total Returns	Total Returns	Total Returns	Total Returns	Total Returns	Total Returns	Total Returns	Total Returns	Total Returns	Total Returns	Total Returns	Total Returns	Total Returns	Total Returns	Total Returns	Total Returns	Total Returns	Total Returns	Total Returns	Total Returns	Total Returns	Total Returns	Total Returns	Total Returns	Total Returns	Total Returns
Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *
1969	-0.0850	0.0304	-0.1142	-0.2505	-0.0809	-0.0507	0.0595	-0.1083	0.0687	-0.0074	0.0665	-0.0727	0.0829	0.0658	0.0611	-0.1445																
1970	0.0401	0.0341	0.0016	-0.1743	0.1837	0.1211	0.0674	0.0484	0.0648	0.1686	0.0749	0.0871	0.0590	0.0652	0.0549	-0.0273																
1971	0.1431	0.0333	0.1079	0.1650	0.1101	0.0332	0.0632	0.0661	0.0597	0.0872	0.0575	0.0272	0.0525	0.0439	0.0336	0.0799																
1972	0.1898	0.0309	0.1563	0.0443	0.0726	0.0569	0.0587	-0.0035	0.0599	0.0516	0.0575	-0.0075	0.0585	0.0384	0.0341	0.1311																
1973	-0.1466	0.0286	-0.1737	-0.3090	0.0114	-0.0111	0.0651	-0.0770	0.0726	0.0461	0.0658	-0.0219	0.0679	0.0693	0.0880	-0.2117																
1974	-0.2647	0.0369	-0.2972	-0.1995	-0.0306	0.0435	0.0727	-0.0345	0.0760	0.0569	0.0724	-0.0199	0.0712	0.0800	0.1220	-0.3374																
1975	0.3720	0.0537	0.3155	0.5282	0.1464	0.0920	0.0799	0.0073	0.0805	0.0783	0.0735	0.0012	0.0719	0.0580	0.0701	0.2921																
1976	0.2384	0.0438	0.1915	0.5738	0.1865	0.1675	0.0789	0.0807	0.0721	0.1287	0.0710	0.0525	0.0600	0.0508	0.0481	0.1595																
1977	-0.0718	0.0431	-0.1150	0.2538	0.0171	-0.0069	0.0714	-0.0786	0.0803	0.0141	0.0649	-0.0515	0.0751	0.0512	0.0677	-0.1432																
1978	0.0656	0.0533	0.0106	0.2346	-0.0007	-0.0118	0.0790	-0.0905	0.0898	0.0349	0.0783	-0.0449	0.0883	0.0718	0.0903	-0.0134																
1979	0.1844	0.0571	0.1231	0.4346	-0.0418	-0.0123	0.0886	-0.0984	0.1012	0.0409	0.0904	-0.0507	0.1033	0.1038	0.1331	0.0958																
1980	0.3242	0.0573	0.2577	0.3988	-0.0276	-0.0395	0.0997	-0.1400	0.1199	0.0391	0.1055	-0.0681	0.1245	0.1124	0.1240	0.2245																
1981	-0.0491	0.0489	-0.0972	0.4134	-0.0124	0.0186	0.1155	-0.1033	0.1334	0.0945	0.1297	-0.0455	0.1396	0.1471	0.0894	-0.1646																
1982	0.2141	0.0550	0.1476	0.2801	0.4256	0.4036	0.1350	0.2395	0.1095	0.2910	0.1281	0.1423	0.0990	0.1054	0.0987	0.0791																
1983	0.2251	0.0500	0.1727	0.3967	0.0626	0.0665	0.1038	-0.0982	0.1197	0.0741	0.1035	-0.0930	0.1141	0.0880	0.0380	0.1213																
1984	0.0627	0.0456	0.0139	-0.0667	0.1686	0.1548	0.1174	0.0232	0.1170	0.1402	0.1168	0.0122	0.1104	0.0985	0.0395	-0.0547																
1985	0.3216	0.0510	0.2634	0.0466	0.3009	0.3097	0.1125	0.1784	0.0956	0.2033	0.1029	0.0901	0.0855	0.0772	0.0377	0.2091																
1986	0.1847	0.0374	0.1463	0.0685	0.1985	0.2453	0.0898	0.1499	0.0789	0.1514	0.0772	0.0699	0.0685	0.0616	0.1113	0.0949																
1987	0.0523	0.0364	0.0203	-0.0930	-0.0027	-0.0271	0.0792	-0.1069	0.0920	0.0290	0.0747	-0.0475	0.0852	0.0547	0.0441	-0.0269																
1988	0.1681	0.0417	0.1241	0.2287	0.1070	0.0967	0.0897	0.0036	0.0918	0.0610	0.0846	-0.0226	0.0917	0.0695	0.0442	0.0784																
1989	0.3149	0.0385	0.2726	0.1018	0.1623	0.1811	0.0881	0.0862	0.0816	0.1329	0.0815	0.0434	0.0770	0.0781	0.0611	-0.1136																
1990	-0.0317	0.0336	-0.0656	-0.2156	0.0678	0.0618	0.0819	-0.0261	0.0844	0.0973	0.0815	0.0012	0.0770	0.0781	0.0611	-0.1136																
1991	0.3055	0.0382	0.2631	0.4463	0.1989	0.1930	0.0822	0.1010	0.0730	0.1546	0.0743	0.0736	0.0597	0.0560	0.0306	0.2233																
1992	0.0767	0.0303	0.0446	0.2335	0.0939	0.0805	0.0726	0.0034	0.0726	0.0719	0.0627	0.0064	0.0610	0.0351	0.0290	0.0041																
1993	0.0999	0.0283	0.0706	0.2098	0.1824	0.1824	0.0717	0.1071	0.0654	0.1124	0.0553	0.0556	0.0522	0.0290	0.0275	0.0282																
1994	0.0131	0.0282	-0.0154	0.0311	-0.0576	-0.0777	0.0659	-0.1429	0.0799	-0.0514	0.0607	-0.1114	0.0780	0.0390	0.0267	-0.0528																
1995	0.3743	0.0291	0.3411	0.3446	0.2720	0.3167	0.0760	0.2304	0.0603	0.1680	0.0669	0.0966	0.0538	0.0560	0.0254	0.2983																
1996	0.2307	0.0254	0.2026	0.1762	0.0140	-0.0093	0.0618	-0.0737	0.0673	0.0210	0.0582	-0.0390	0.0616	0.0332	0.0322	0.1689																
1997	0.3336	0.0211	0.3101	0.2278	0.1295	0.1585	0.0664	0.0851	0.0602	0.0838	0.0614	0.0195	0.0573	0.0526	0.0170	0.2672																
1998	0.2858	0.0168	0.2667	-0.0731	0.1076	0.1306	0.0583	0.0689	0.0542	0.0583	0.0542	0.0466	0.0468	0.0468	0.0161	0.2275																
1999	0.2104	0.0136	0.1953	0.2979	-0.0745	-0.0896	0.0557	-0.1435	0.0682	-0.0177	0.0530	-0.0706	0.0645	0.0468	0.0268	0.1547																
2000	-0.0911	0.0110	-0.1014	-0.0359	0.1287	0.2148	0.0650	0.1436	0.0558	0.1259	0.0619	0.0594	0.0507	0.0589	0.0339	-0.1561																
2001	-0.1188	0.0118	-0.1304	0.2277	0.1065	0.1784	0.0553	-0.0189	0.0575	0.0762	0.0427	0.0523	0.0442	0.0383	0.0155	-0.1741																
2002	-0.2210	0.0139	-0.2337	-0.1328	0.1633	0.1784	0.0559	0.1169	0.0484	0.1293	0.0398	0.0865	0.0261	0.0165	0.0238	-0.2769																
2003	0.2870	0.0200	0.2638	0.6070	0.0527	0.0445	0.0480	-0.0336	0.0511	0.0480	0.0328	-0.0048	0.0347	0.0102	0.0188	0.2390																
2004	0.1087	0.0175	0.0899	0.1839	0.0872	0.0851	0.0502	0.0326	0.0484	0.0225	0.0328	-0.0107	0.0347	0.0120	0.0326	0.0585																
2005	0.0491	0.0184	0.0300	0.0569	0.0587	0.0781	0.0469	0.0302	0.0461	0.0136	0.0392	-0.0258	0.0434	0.0298	0.0342	0.0022																
2006	0.1580	0.0201	0.1362	0.1617	0.0324	0.0119	0.0468	-0.0364	0.0491	0.0314	0.0465	-0.0151	0.0465	0.0480	0.0254	0.1112																
2007	0.0549	0.0196	0.0353	-0.0322	0.0260	0.0988	0.0486	0.0469	0.0450	0.1005	0.0444	0.0533	0.0328	0.0466	0.0408	0.0063																
2008	-0.3700	0.0192	-0.3849	-0.3672	0.0878	0.2587	0.0445	0.2050	0.0303	0.1311	0.2050	0.0992	0.0126	0.0160	0.0009	-0.4145																
2009	0.2646	0.0248	0.2345	0.2809	0.0302	-0.1490	0.0347	-0.1825	0.0458	-0.0240	0.0201	-0.0442	0.0242	0.0100	0.0072	0.2299																
2010	0.1506	0.0202	0.1278	0.3126	0.1244	0.1014	0.0425	0.0589	0.0414	0.0712	0.0192	0.0516	0.0170	0.0012	0.0150	0.1081																
2011	0.0211	0.0213	0.0000	-0.0326	0.1795	0.2823	0.0381	0.2374	0.0248	0.0946	0.0158	0.0779	0.0059	0.0004	0.0296	-0.0170																

Source: Ibbotson S&P 2013 Valuation Yearbook

	A-1	A-2	A-3	A-4	A-5	A-6	A-7	A-8	A-9	A-10	A-11	A-12	A-13	A-14	A-15	A-16
	Large Company Stocks	Large Company Stocks	Large Company Stocks Capital	Small Company Stocks	Long-Term Corporate Bonds	Long-Term Government Bonds	Long-Term Government Bonds	Long-Term Government Bonds Capital	Long-Term Government Bonds	Intermediate-Term Government Bonds	Intermediate-Term Government Bonds	Intermediate-Term Government Bonds Capital	Intermediate-Term Government Bonds	U.S. Treasury Bills	Inflation	Risk Premia
Year	Total Returns Jan-Dec *	Income Returns Jan-Dec *	Appreciation Returns Jan-Dec *	Total Returns Jan-Dec *	Total Returns Jan-Dec *	Total Returns Jan-Dec *	Income Returns Jan-Dec *	Appreciation Returns Jan-Dec *	Yields Jan-Dec *	Total Returns Jan-Dec *	Income Returns Jan-Dec *	Appreciation Returns Jan-Dec *	Yields Jan-Dec *	Total Returns Jan-Dec *	Inflation Jan-Dec *	Risk Premia (A-1)-(A-7)
2012	0.1600	0.0250	0.1341	0.1824	0.1068	0.0331	0.0240	0.0088	0.0241	0.0207	0.0058	0.0148	0.0046	0.0006	0.0174	0.1360
2013	0.3239	0.0248	0.2960	0.4507	-0.0707	-0.1278	0.0288	-0.1570	0.0378	-0.0368	0.0102	-0.0468	0.0149	0.0002	0.0151	0.2951
2014	0.1369	0.0216	0.1139	0.0292	0.1728	0.2478	0.0341	0.2093	0.0246	0.0300	0.0163	0.0135	0.0155	0.0002	0.0076	0.1028
2015	0.0138	0.0210	-0.0073	-0.0360	-0.1020	-0.0065	0.0247	-0.0311	0.0268	0.0179	0.0151	0.0029	0.0169	0.0002	0.0073	-0.0109
2016	0.1196	0.0226	0.0954	0.2565	0.0670	0.0175	0.0230	-0.0040	0.0272	0.0192	0.0136	0.0058	0.0185	0.0020	0.0207	0.0966
2017	0.2183	0.0221	0.1942	0.1119	0.1225	0.0624	0.0267	0.0351	0.0254	0.0164	0.0193	-0.0029	0.0211	0.0080	0.0211	0.1916
Average	0.1186	0.0397	0.0785	0.1681	0.0637	0.0599	0.0499	0.0077	0.0504	0.0514	0.0441	0.0067	0.0437	0.0340	0.0297	0.0687
Median	0.1307	0.0383	0.1053	0.1832	0.0480	0.0368	0.0417	0.0033	0.0420	0.0336	0.0376	0.0032	0.0372	0.0297	0.0270	0.0797
High	0.5399	0.0877	0.4659	1.4287	0.4256	0.4036	0.1350	0.2395	0.1334	0.2910	0.1297	0.1423	0.1396	0.1471	0.1816	0.5087
Low	-0.4334	0.0110	-0.4707	-0.5801	-0.0809	-0.1490	0.0194	-0.1825	0.0194	-0.0601	0.0068	-0.1114	0.0046	-0.0002	-0.1030	-0.4667
Last 5 year (60 months)																
Average	0.1625	0.0224	0.1384	0.1625	0.0563	0.0387	0.0275	0.0105	0.0284	0.0093	0.0149	-0.0055	0.0174	0.0021	0.0144	0.1350
Median	0.1369	0.0221	0.1139	0.1119	0.0670	0.0175	0.0267	-0.0040	0.0268	0.0179	0.0151	0.0029	0.0169	0.0002	0.0151	0.1028
High	0.3239	0.0248	0.2960	0.4507	0.1728	0.2478	0.0341	0.2093	0.0378	0.0300	0.0193	0.0135	0.0211	0.0080	0.0211	0.2951
Low	0.0138	0.0210	-0.0073	-0.0360	-0.0707	-0.1278	0.0230	-0.1570	0.0246	-0.0368	0.0102	-0.0468	0.0149	0.0002	0.0073	-0.0109

* Compound Annual Return

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U.S. Capital Markets Performance by
Asset Class 1926–2017

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Exhibit 2.4: Large-Cap Stocks, Long-term Government Bonds, and Intermediate-term Government Bonds; Annual Total, Income, Capital Appreciation, and Reinvestment Returns, and Long-term Government Bonds, and Intermediate-term Government Bonds Year-end Yields (%) 1926-2017

Year	Large-Cap Stocks				Long-term Gov't Bonds				Intermediate-term Gov't Bonds				
	Capital Appreciation Return	Income Return	Reinvestment Return	Total Return	Capital Appreciation Return	Income Return	Reinvestment Return	Total Return	Capital Appreciation Return	Income Return	Reinvestment Return	Total Return	Year-end Yield
1971	10.63	3.49	0.18	14.30	6.61	6.32	0.31	13.23	2.72	5.75	0.25	8.72	5.25
1972	15.79	2.95	0.25	18.99	-0.35	5.87	0.17	5.69	-0.75	5.75	0.16	5.16	5.85
1973	-17.37	2.86	-0.19	-14.69	-7.70	6.51	0.08	-1.11	7.26	6.58	0.22	4.61	6.79
1974	-29.72	3.69	-0.44	-26.47	-3.45	7.27	0.54	4.35	-1.99	7.24	0.44	5.69	7.12
1975	31.55	5.37	0.31	37.23	0.73	7.99	0.47	9.20	0.12	7.35	0.36	7.83	7.19
1976	19.15	4.49	0.29	23.93	8.07	7.89	0.80	16.75	5.25	7.10	0.51	12.87	6.00
1977	-11.50	4.35	0.00	-7.16	-7.86	7.14	0.04	-0.69	-5.15	6.49	0.06	1.41	7.51
1978	1.06	5.33	0.18	6.57	-9.05	7.90	-0.03	-1.18	-4.49	7.83	0.14	3.49	8.83
1979	12.31	5.89	0.41	18.61	-9.84	8.86	-0.25	-1.23	-5.07	9.04	0.12	4.09	10.33
1980	25.77	5.74	0.99	32.50	-14.00	9.97	0.08	-3.95	-6.81	10.55	0.17	3.91	12.45
1981	-9.73	4.88	-0.08	-4.92	-10.33	11.55	0.64	1.86	-4.55	12.97	1.03	9.45	13.96
1982	14.76	5.61	1.18	21.55	23.95	13.50	2.91	40.36	14.23	12.81	2.06	29.10	9.90
1983	17.27	5.04	0.24	22.56	-9.82	10.38	0.09	0.65	-3.30	10.35	0.35	7.41	11.41
1984	1.40	4.57	0.31	6.27	2.32	11.74	1.42	15.48	1.22	11.68	1.12	14.02	11.04
1985	26.33	4.72	0.67	31.73	17.84	11.25	1.88	30.97	9.01	10.29	1.04	20.33	8.55
1986	14.62	3.92	0.13	18.67	14.99	8.98	0.56	24.53	6.99	7.72	0.43	15.14	6.85
1987	2.03	3.64	-0.41	5.25	-10.69	7.92	0.06	-2.71	-4.75	7.47	0.19	2.90	8.32
1988	12.40	3.99	0.22	16.61	0.36	8.97	0.34	9.67	-2.26	8.24	0.13	6.10	9.17
1989	27.25	4.03	0.40	31.69	8.62	8.81	0.68	18.11	8.16	8.46	0.49	13.29	7.94
1990	-6.56	3.43	0.03	-3.10	-2.61	8.19	0.61	6.18	1.02	8.15	0.56	9.73	7.70
1991	26.31	3.76	0.40	30.47	10.10	8.22	0.98	19.30	7.36	7.43	0.67	15.46	5.97
1992	4.46	2.98	0.17	7.62	0.34	7.26	0.45	8.05	0.64	6.27	0.28	7.19	6.11
1993	7.06	2.91	0.12	10.08	10.71	7.17	0.35	18.24	5.56	5.53	0.15	11.24	5.22
1994	-1.54	2.83	0.03	1.32	-14.29	6.59	-0.08	-7.77	-11.14	6.07	-0.08	-5.14	7.80
1995	34.11	3.04	0.43	37.58	23.04	7.60	1.03	31.67	9.66	6.69	0.45	16.80	5.38
1996	20.26	2.43	0.26	22.96	-7.37	6.18	0.26	-0.93	-3.90	5.82	0.18	2.10	6.16
1997	31.01	2.10	0.25	33.36	8.51	6.64	0.71	15.85	1.95	6.14	0.30	8.38	5.73
1998	26.67	1.67	0.24	28.58	6.89	5.83	0.34	13.06	4.66	5.29	0.25	10.21	4.68
1999	19.53	1.36	0.15	21.04	-14.35	5.57	-0.19	-8.96	-7.06	5.30	-0.01	-1.77	6.45
2000	-10.14	1.11	-0.07	-9.10	14.36	6.50	0.62	21.48	5.94	6.19	0.46	12.59	5.07
2001	-13.04	1.18	-0.03	-11.89	-1.89	5.53	0.06	3.70	3.23	4.27	0.12	7.62	4.42
2002	-23.37	1.39	-0.13	-22.10	11.69	5.59	0.56	17.84	8.65	4.54	0.30	12.93	2.61
2003	26.38	1.99	0.31	28.68	-3.36	4.80	0.01	1.45	-0.48	3.85	0.03	2.40	2.97
2004	8.99	1.76	0.13	10.88	3.26	5.02	0.23	8.51	-1.07	3.28	0.04	2.25	3.47
2005	3.00	1.84	0.07	4.91	3.02	4.69	0.10	7.81	-2.58	3.92	0.03	1.36	4.34
2006	13.62	2.01	0.17	15.79	-3.64	4.68	0.15	1.19	-1.51	4.54	0.11	3.14	4.65
2007	3.53	1.96	0.00	5.49	4.69	4.86	0.33	9.88	5.33	4.44	0.28	10.05	3.28
2008	-38.49	1.92	-0.43	-37.00	20.50	4.45	0.93	25.87	9.92	2.96	0.23	13.11	1.26
2009	23.45	2.48	0.53	26.46	-18.25	3.47	-0.12	-14.90	-4.42	2.01	0.00	-2.40	2.42
2010	12.78	2.02	0.26	15.06	5.89	4.25	0.00	10.14	5.16	1.92	0.04	7.12	1.70
2011	0.00	2.13	-0.01	2.11	22.62	3.82	0.66	27.10	7.09	1.64	0.08	8.81	0.74
2012	13.41	2.50	0.10	16.00	0.95	2.46	0.03	3.43	0.93	0.73	0.01	1.66	0.61
2013	29.60	2.48	0.31	32.39	-15.70	2.88	0.04	-12.78	-4.68	1.02	-0.01	-3.68	1.49
2014	11.39	2.16	0.14	13.69	20.93	3.41	0.37	24.71	1.35	1.63	0.02	3.00	1.55
2015	-0.73	2.10	0.01	1.38	-3.11	2.47	-0.02	-0.65	0.29	1.51	0.00	1.79	1.69
2016	9.54	2.26	0.17	11.96	-0.40	2.30	-0.14	1.75	0.58	1.36	-0.02	1.92	1.85
2017	19.42	2.21	0.21	21.83	3.51	2.67	0.06	6.24	-0.29	1.93	0.00	1.64	2.11

Exhibit 2.4: Large-Cap Stocks, Long-term Government Bonds, and Intermediate-term Government Bonds; Annual Total, Income, Capital Appreciation, and Reinvestment Returns, and Long-term Government Bonds, and Intermediate-term Government Bonds Year-end Yields (%) 1926–2017

Year	Large-Cap Stocks				Long-term Gov't Bonds				Intermediate-term Gov't Bonds				Year-end Yield
	Capital Appreciation Return	Income Return	Reinvestment Return	Total Return	Capital Appreciation Return	Income Return	Reinvestment Return	Total Return	Capital Appreciation Return	Income Return	Reinvestment Return	Total Return	
1926	5.72	5.41	0.50	11.62	3.91	3.73	0.13	7.77	1.51	3.78	0.10	5.38	3.61
1927	30.91	5.71	0.87	37.49	5.40	3.41	0.12	8.93	0.96	3.49	0.07	4.52	3.40
1928	37.88	4.81	0.91	43.61	-3.12	3.22	0.01	0.10	-2.73	3.64	0.18	0.92	4.01
1929	-11.91	3.98	-0.49	-8.42	-0.20	3.47	0.15	3.42	1.77	4.07	0.18	6.01	3.62
1930	-28.48	4.57	-0.98	-24.90	1.28	3.32	0.05	4.66	3.30	3.30	0.11	6.72	2.91
1931	-47.07	5.35	-1.62	-43.34	-8.46	3.33	-0.17	-5.31	-5.40	3.16	-0.08	-2.32	4.12
1932	-15.15	6.16	0.80	-8.19	12.94	3.69	0.22	16.84	5.02	3.63	0.16	8.81	3.04
1933	46.59	6.39	1.01	53.99	-3.14	3.12	-0.05	-0.07	-0.99	2.83	-0.02	1.83	3.25
1934	-5.94	4.46	0.04	-1.44	6.76	3.18	0.09	10.03	5.97	2.93	0.09	9.00	2.49
1935	41.37	4.95	1.35	47.67	2.14	2.81	0.03	4.98	4.94	2.02	0.05	7.01	1.63
1936	27.92	5.36	0.64	33.92	4.64	2.77	0.10	7.52	1.60	1.44	0.02	3.06	1.29
1937	-38.59	4.66	-1.09	-35.03	-2.48	2.66	0.05	0.23	0.65	1.48	0.03	1.56	1.14
1938	25.21	4.83	1.07	31.12	2.83	2.64	0.06	5.53	4.37	1.82	0.04	6.23	1.52
1939	-5.45	4.69	0.35	-0.41	3.48	2.40	0.06	5.94	3.18	1.31	0.03	4.52	0.98
1940	-15.29	5.36	0.14	-9.78	3.77	2.23	0.09	6.09	2.04	0.90	0.02	2.96	0.57
1941	-17.86	6.71	-0.44	-11.59	-1.01	1.94	0.00	0.93	-0.17	0.67	0.00	0.50	0.82
1942	12.43	6.79	1.12	20.34	0.74	2.46	0.02	3.22	1.17	0.76	0.00	1.94	0.72
1943	19.45	6.24	0.21	25.90	-0.37	2.44	0.02	2.08	1.23	1.56	0.02	2.81	1.45
1944	13.80	5.48	0.47	19.75	0.32	2.46	0.03	2.81	0.35	1.44	0.01	1.80	1.40
1945	30.72	4.97	0.74	36.44	8.27	2.34	0.12	10.73	1.02	1.19	0.01	2.22	1.03
1946	-11.87	4.09	-0.29	-8.07	-2.15	2.04	0.01	-0.10	-0.08	1.08	0.00	1.00	1.12
1947	0.00	5.49	0.22	5.71	-4.70	2.13	-0.06	-2.62	-0.30	1.21	0.00	0.91	1.34
1948	-0.65	6.08	0.08	5.50	0.96	2.40	0.04	3.40	0.27	1.56	0.01	1.85	1.51
1949	10.26	7.50	1.03	18.79	4.15	2.25	0.06	6.45	0.95	1.36	0.01	2.32	1.23
1950	21.78	8.77	1.16	31.71	-2.06	2.12	0.00	0.06	-0.69	1.39	0.00	0.70	1.62
1951	16.46	6.91	0.65	24.02	-6.27	2.38	-0.04	-3.93	-1.63	1.98	0.01	0.36	2.17
1952	11.78	5.93	0.66	18.37	-1.48	2.66	-0.02	1.16	-0.57	2.19	0.01	1.63	2.35
1953	-6.62	5.46	0.18	-0.99	0.67	2.84	0.12	3.64	0.61	2.55	0.07	3.23	2.18
1954	45.02	6.21	1.39	52.62	4.35	2.79	0.05	7.19	1.08	1.60	0.01	2.68	1.72
1955	26.40	4.56	0.60	31.56	-4.07	2.75	0.03	-1.29	-3.10	2.45	0.00	-0.65	2.80
1956	2.62	3.83	0.11	6.56	-8.46	2.99	-0.12	-5.59	-3.45	3.05	-0.02	-0.42	3.63
1957	-14.31	3.84	-0.30	-10.78	3.82	3.44	0.20	7.46	4.05	3.59	0.20	7.84	2.84
1958	38.06	4.38	0.93	43.36	-9.23	3.27	-0.14	-6.09	-4.17	2.93	-0.05	-1.29	3.81
1959	8.48	3.31	0.16	11.96	-6.20	4.01	-0.07	-2.26	-4.56	4.18	-0.01	-0.39	4.98
1960	-2.97	3.26	0.19	0.47	9.29	4.26	0.23	13.78	7.42	4.15	0.19	11.76	3.31
1961	23.13	3.48	0.28	26.89	-2.86	3.83	0.00	0.97	-1.72	3.94	0.03	1.85	3.84
1962	-11.81	2.98	0.10	-8.73	2.78	4.00	0.11	6.89	1.73	3.73	0.10	5.56	3.50
1963	18.89	3.61	0.30	22.80	-2.70	3.89	0.02	1.21	-2.10	3.71	0.03	1.64	4.04
1964	12.97	3.33	0.18	16.48	-3.72	4.15	-0.07	3.51	-0.03	4.00	0.07	4.04	4.03
1965	9.06	3.21	0.18	12.45	-3.45	4.19	-0.04	0.71	-3.10	4.15	-0.03	1.02	4.90
1966	-13.09	3.11	-0.08	-10.06	-1.06	4.49	0.22	3.65	-0.41	4.93	0.17	4.69	4.79
1967	20.09	3.64	0.25	23.98	-13.55	4.59	-0.23	-9.18	-3.85	4.88	-0.02	1.01	5.77
1968	7.66	3.18	0.22	11.06	-5.61	5.50	-0.25	-0.26	-0.99	5.49	0.03	4.54	5.96
1969	-11.36	2.98	-0.13	-8.50	-10.83	5.95	-0.19	-5.07	-7.27	6.65	-0.11	-0.74	8.29
1970	0.10	3.33	0.43	3.86	4.84	6.74	0.52	12.11	8.71	7.49	0.66	16.86	5.90

Exhibit 2.5: Basic Series
Annual Total Returns (%)
1926-2017

Year	Large-Cap Stocks	Small-Cap Stocks	Long-term Corp Bonds	Long-term Gov't Bonds	Inter-term Gov't Bonds	U.S. Treasury Bills	Inflation
1976	23.93	57.38	18.65	16.75	12.87	5.08	4.81
1977	-7.16	25.38	1.71	-0.69	1.41	5.12	6.77
1978	6.57	23.46	-0.07	-1.18	3.49	7.18	9.03
1979	18.61	43.46	-4.18	-1.23	4.09	10.38	13.31
1980	32.50	39.88	-2.76	-3.95	3.91	11.24	12.40
1981	-4.92	13.88	-1.24	1.86	9.45	14.71	8.94
1982	21.55	28.01	42.56	40.36	29.10	10.54	3.87
1983	22.56	39.67	6.26	0.65	7.41	8.80	3.80
1984	6.27	-6.67	16.86	15.48	14.02	9.85	3.95
1985	31.73	24.66	30.09	30.97	20.33	7.72	3.77
1986	18.67	6.85	19.85	24.53	15.14	6.16	1.13
1987	5.25	-9.30	-0.27	-2.71	2.90	5.47	4.41
1988	16.61	22.87	10.70	9.67	6.10	6.35	4.42
1989	31.69	10.18	16.23	18.11	13.29	8.37	4.65
1990	-3.10	-21.56	6.78	6.18	9.73	7.81	6.11
1991	30.47	44.63	19.89	19.30	15.46	5.60	3.06
1992	7.62	23.35	9.39	8.05	7.19	3.51	2.90
1993	10.08	20.98	13.19	18.24	11.24	2.90	2.75
1994	1.32	3.11	-5.76	-7.77	-5.14	3.90	2.67
1995	37.58	34.46	27.20	31.67	16.80	5.60	2.54
1996	22.96	17.62	1.40	-0.93	2.10	5.21	3.32
1997	33.36	22.78	12.95	15.85	8.38	5.26	1.70
1998	28.58	-7.31	10.76	13.06	10.21	4.86	1.61
1999	21.04	29.79	-7.45	-8.96	-1.77	4.68	2.68
2000	-9.10	-3.59	12.87	21.48	12.59	5.89	3.39
2001	-11.89	22.77	10.65	3.70	7.62	3.83	1.55
2002	-22.10	-13.28	16.33	17.84	12.93	1.65	2.38
2003	28.68	60.70	5.27	1.45	2.40	1.02	1.88
2004	10.88	18.39	8.72	8.51	2.25	1.20	3.26
2005	4.91	5.69	5.87	7.81	1.36	2.98	3.42
2006	15.79	16.17	3.24	1.19	3.14	4.80	2.54
2007	5.49	-5.22	2.60	9.88	10.05	4.66	4.08
2008	-37.00	-36.72	8.78	25.87	13.11	1.60	0.09
2009	26.46	28.09	3.02	-14.90	-2.40	0.10	2.72
2010	15.06	31.26	12.44	10.14	7.12	0.12	1.50
2011	2.11	-3.26	17.95	27.10	8.81	0.04	2.96
2012	16.00	18.24	10.68	3.43	1.66	0.06	1.74
2013	32.39	45.07	-7.07	-12.78	-3.68	0.02	1.51
2014	13.69	2.92	17.28	24.71	3.00	0.02	0.76
2015	1.38	-3.60	-1.02	-0.65	1.79	0.02	0.73
2016	11.96	25.65	6.70	1.75	1.92	0.20	2.07
2017	21.83	11.19	12.25	6.24	1.64	0.80	2.11

Exhibit 2.5: Basic Series
 Annual Total Returns (%)
 1926-2017

Year	Large-Cap Stocks	Small-Cap Stocks	Long-term Corp Bonds	Long-term Gov't Bonds	Inter-term Gov't Bonds	U.S. Treasury Bills	Inflation
1926	11.62	0.28	7.37	7.77	5.38	3.27	-1.49
1927	37.49	22.10	7.44	8.93	4.52	3.12	-2.08
1928	43.61	39.69	2.84	0.10	0.92	3.56	-0.97
1929	-8.42	-51.36	3.27	3.42	6.01	4.75	0.20
1930	-24.90	-38.15	7.98	4.66	6.72	2.41	-6.03
1931	-43.34	-49.75	-1.85	-5.31	-2.32	1.07	-9.52
1932	-8.19	-5.39	10.82	16.84	8.81	0.96	-10.30
1933	53.99	142.87	10.38	-0.07	1.83	0.30	0.51
1934	-1.44	24.22	13.84	10.03	9.00	0.16	2.03
1935	47.67	40.19	9.61	4.98	7.01	0.17	2.99
1936	33.92	64.80	6.74	7.52	3.06	0.18	1.21
1937	-35.03	-58.01	2.75	0.23	1.56	0.31	3.10
1938	31.12	32.80	6.13	5.53	6.23	-0.02	-2.78
1939	-0.41	0.35	3.97	5.94	4.52	0.02	-0.48
1940	-9.78	-5.16	3.39	6.09	2.96	0.00	0.96
1941	-11.59	-9.00	2.73	0.93	0.50	0.06	9.72
1942	20.34	44.51	2.60	3.22	1.94	0.27	9.29
1943	25.90	88.37	2.83	2.08	2.81	0.35	3.16
1944	19.75	53.72	4.73	2.81	1.80	0.33	2.11
1945	36.44	73.61	4.08	10.73	2.22	0.33	2.25
1946	-8.07	-11.63	1.72	-0.10	1.00	0.35	18.16
1947	5.71	0.92	-2.34	-2.62	0.91	0.50	9.01
1948	5.50	-2.11	4.14	3.40	1.85	0.81	2.71
1949	18.79	19.75	3.31	6.45	2.32	1.10	-1.80
1950	31.71	38.75	2.12	0.06	0.70	1.20	5.79
1951	24.02	7.80	-2.69	-3.93	0.36	1.49	5.87
1952	18.37	3.03	3.52	1.16	1.63	1.66	0.88
1953	-0.99	-6.49	3.41	3.64	3.23	1.82	0.62
1954	52.62	60.58	5.39	7.19	2.68	0.86	-0.50
1955	31.56	20.44	0.48	-1.29	-0.65	1.57	0.37
1956	6.56	4.28	-6.81	-5.59	-0.42	2.46	2.86
1957	-10.78	-14.57	8.71	7.46	7.84	3.14	3.02
1958	43.36	64.89	-2.22	-6.09	-1.29	1.54	1.76
1959	11.96	16.40	-0.97	-2.26	-0.39	2.95	1.50
1960	0.47	-3.29	9.07	13.78	11.76	2.66	1.48
1961	26.89	32.09	4.82	0.97	1.85	2.13	0.67
1962	-8.73	-11.90	7.95	6.89	5.56	2.73	1.22
1963	22.80	23.57	2.19	1.21	1.64	3.12	1.65
1964	16.48	23.52	4.77	3.51	4.04	3.54	1.19
1965	12.45	41.75	-0.46	0.71	1.02	3.93	1.92
1966	-10.06	-7.01	0.20	3.65	4.69	4.76	3.35
1967	23.98	83.57	-4.95	-9.18	1.01	4.21	3.04
1968	11.06	35.97	2.57	-0.26	4.54	5.21	4.72
1969	-8.50	-25.05	-8.09	-5.07	-0.74	6.58	6.11
1970	3.86	-17.43	18.37	12.11	16.86	6.52	5.49
1971	14.30	16.50	11.01	13.23	8.72	4.39	3.36
1972	18.99	4.43	7.26	5.69	5.16	3.84	3.41
1973	-14.69	-30.90	1.14	-1.11	4.61	6.93	8.80
1974	-26.47	-19.95	-3.06	4.35	5.69	8.00	12.20
1975	37.23	52.82	14.64	9.20	7.83	5.80	7.01

Cost of Capital / Required Return
Support Work Papers
As of January 1, 2018

Equity & Size Premia

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Duff & Phelps 2018 Valuation Handbook

Company Size	Arithmetic Mean Return 1926-2017	Risk Premia over Income Return Long-term Government Bonds	Size Risk Premia over Large Company Risk Premia	Capitalization Size	
Decile 1 (Largest)	11.19%	6.2%	-0.9%	18,612,367,381	18,612,367,381
Large Company (Decile 1-2)					
Total Return	12.1%	7.1%	0.0%	1,878,839,877	18,612,367,381
Income Return	4.0%				
Capital Appreciation Return	7.8%				
Decile 2	12.89%	7.9%	0.8%	1,878,839,877	3,226,232,338
Decile 3	13.67%	8.7%	1.6%	1,188,986,271	1,878,839,877
Mid-cap Stocks (Decile 3-5)					
Total Return	13.9%	8.9%	1.8%	612,455,110	1,878,839,877
Income Return	3.8%				
Capital Appreciation Return	9.9%				
Decile 4	13.84%	8.8%	1.7%	752,944,915	1,188,986,271
Decile 5	14.62%	9.6%	2.5%	612,455,110	752,944,915
Decile 6	14.89%	9.9%	2.8%	428,291,875	612,455,110
Low-cap Stocks (Decile 6-8)					
Total Return	15.3%	10.3%	3.2%	212,070,070	612,455,110
Income Return	3.4%				
Capital Appreciation Return	11.7%				
Decile 7	15.41%	10.4%	3.3%	327,841,070	428,291,875
Decile 8	16.08%	11.1%	4.0%	212,070,070	327,841,070
Decile 9	16.94%	11.9%	4.8%	99,799,059	212,070,070
Micro-cap Stocks (Decile 9-10)					
Total Return	18.0%	13.0%	5.9%	-	212,070,070
Income Return	2.5%				
Capital Appreciation Return	15.4%				
Decile 10	20.19%	15.2%	8.1%	-	99,799,059
Long-term Government Bonds					
Total Return	6.0%	1.0%			
Income Return	5.0%				
Capital Appreciation Return	0.8%				

Inputs

	Arithmetic Mean Return 1926- 2017	Risk Premia over Income Return Long- term Government Bonds	Size Risk Premia over Large Company Risk Premia	Capitalization Size	
Large Company					
Total Return	12.1%	7.1%	0.0%	3,820,771,064	18,612,367,381
Income Return	4.0%				
Capital Appreciation Return	7.8%				
Mid-cap Stocks (Decile 3-5)					
Total Return	13.9%	8.9%	1.8%	1,368,588,055	3,820,771,064
Income Return	3.8%				
Capital Appreciation Return	9.9%				
Low-cap Stocks (Decile 6-8)					
Total Return	15.3%	10.3%	3.2%	311,969,129	1,368,588,055
Income Return	3.4%				
Capital Appreciation Return	11.7%				
Micro-cap Stocks (Decile 9-10)					
Total Return	18.0%	13.0%	5.9%	-	311,969,129
Income Return	2.5%				
Capital Appreciation Return	15.4%				
Long-term Government Bonds					
Total Return	6.0%	1.0%			
Income Return	5.0%				
Capital Appreciation Return	0.8%				

Inputs

Chapter 3

Basic Building Blocks of the Cost of Equity Capital – Risk-free Rate and Equity Risk Premium

Chapter 3 is in the final process of being updated through December 31, 2017, and will be posted as soon as it is completed, likely during the first week of March 2018.

NOTE: All of the critical year-end risk-free rate and equity risk premia data (Historical ERP, Supply-Side ERP, and Duff & Phelps Conditional ERP) through December 31, 2017 is calculated and is available for Analysts to use in the online Cost of Capital Navigator.

For your convenience, the Historical ERP, Supply-Side ERP, and Duff & Phelps Recommended ERP (and the corresponding normalized risk-free rate the Duff & Phelps Recommended ERP should be used with) are listed below, all as of December 31, 2017.

On page two of this document, we have also included a table entitled: "Duff & Phelps Recommended U.S. ERP and Corresponding Risk-Free Rates from January 2008–Present" for your convenience.

Long-term Equity Risk Premia Estimates as of December 31, 2017

Long-horizon expected equity risk premium (historical):

large company stock total returns minus long-term government bond income returns 7.07%

Long-horizon expected equity risk premium (supply-side): historical equity risk premium minus price-to-earnings ratio calculated using three-year average earnings 6.04%

Duff & Phelps recommended equity risk premium (conditional): The Duff & Phelps recommended ERP was developed in relation to (and should be used in conjunction with) a 3.5% "normalized" risk-free rate. 5.00%

Table: Equity Risk Premium & Risk-free Rates

**Duff & Phelps Recommended
U.S. Equity Risk Premium (ERP) and
Corresponding Risk-free Rates (R_f);
January 2008–Present**

For additional information, please visit
www.duffandphelps.com/CostofCapital

<i>Date</i>	<i>Risk-free Rate (R_f)</i>	<i>R_f (%)</i>	<i>Duff & Phelps Recommended ERP (%)</i>	<i>What Changed</i>
Current Guidance: September 5, 2017 – UNTIL FURTHER NOTICE	Normalized 20-year U.S. Treasury yield	3.50	5.00	ERP
November 15, 2016 – September 4, 2017	Normalized 20-year U.S. Treasury yield	3.50		
January 31, 2016 – November 14, 2016	Normalized 20-year U.S. Treasury yield	4.00		
	Normalized 20-year U.S. Treasury yield	4.00		
	Normalized 20-year U.S. Treasury yield	4.00		
	Normalized 20-year U.S. Treasury yield	4.00		
	Normalized 20-year U.S. Treasury yield	4.00		
	Normalized 20-year U.S. Treasury yield	4.00		
January 15, 2012 – February 27, 2013	Normalized 20-year U.S. Treasury yield	4.00		
	Normalized 20-year U.S. Treasury yield	4.00		
September 30, 2011 – January 14, 2012	Normalized 20-year U.S. Treasury yield	4.00		
July 1 2011 – September 29, 2011	Normalized 20-year U.S. Treasury yield	4.00		
June 1, 2011 – June 30, 2011				
May 1, 2011 – May 31, 2011	Normalized 20-year U.S. Treasury yield	4.00		
December 1, 2010 – April 30, 2011				
June 1, 2010 – November 30, 2010	Normalized 20-year U.S. Treasury yield	4.00		
December 1, 2009 – May 31, 2010				
June 1, 2009 – November 30, 2009				
	Normalized 20-year U.S. Treasury yield	4.50		
November 1, 2008 – May 31, 2009	Normalized 20-year U.S. Treasury yield	4.50		
October 27, 2008 – October 31, 2008				
January 1, 2008 – October 26, 2008				

1926-2017	Geometric Mean Returns (%)	Arithmetic Mean Returns (%)	Standard Deviation of Returns (%)
Large Company Stocks			
Total Return	10.2	12.1	19.8
Income Return	4.0	4.0	1.6
Capital Appreciation Return	6.0	7.8	19.1
Small Company Stocks			
Total Return	12.1	16.5	31.7
Mid-cap Stocks (Decile 3-5)			
Total Return	11.2	13.9	24.3
Income Return	3.7	3.8	1.8
Capital Appreciation Return	7.2	9.9	23.6
Low-cap Stocks (Decile 6-8)			
Total Return	11.6	15.3	28.5
Income Return	3.4	3.4	2.0
Capital Appreciation Return	8.0	11.7	27.9
Micro-cap Stocks (Decile 9-10)			
Total Return	12.2	18.0	38.6
Income Return	2.5	2.5	1.7
Capital Appreciation Return	9.7	15.4	37.8
Long-term Corporate Bonds			
Total Return	6.1	6.4	8.3
Long-term Government Bonds			
Total Return	5.5	6.0	9.9
Income Return	5.0	5.0	2.6
Capital Appreciation Return	0.4	0.8	8.9
Intermediate-term Government Bonds			
Total Return	5.1	5.2	5.6
Income Return	4.4	4.4	2.9
Capital Appreciation Return	0.6	0.7	4.4
US Treasury Bills			
Total Return	3.4	3.4	3.1
Inflation			
	2.9	3.0	4.0

Risk
Premia

7.1

Summary Statistics of Annual Total Returns, Income Returns, and Capital Appreciation
Returns of Basic U.S. Asset Classes
1963–2017

1963–2017	Geometric Mean Returns (%)	Arithmetic Mean Returns (%)	Standard Deviation of Returns (%)
Large Company Stocks			
Total Return	10.3	11.7	16.5
Income Return	3.1	3.1	1.2
Capital Appreciation Return	7.0	8.3	16.0
Small Company Stocks			
Total Return	13.6	16.2	24.3
Mid-cap Stocks (Decile 3-5)			
Total Return	12.1	13.8	19.3
Income Return	2.8	2.8	1.4
Capital Appreciation Return	9.1	10.8	18.7
Low-cap Stocks (Decile 6-8)			
Total Return	12.7	15.2	23.2
Income Return	2.4	2.4	1.3
Capital Appreciation Return	10.2	12.6	22.5
Micro-cap Stocks (Decile 9-10)			
Total Return	12.3	16.1	29.5
Income Return	1.8	1.9	1.0
Capital Appreciation Return	10.5	14.1	28.9
Long-term Corporate Bonds			
Total Return	7.5	7.9	10.0
Long-term Government Bonds			
Total Return	7.1	7.7	11.7
Income Return	6.4	6.4	2.5
Capital Appreciation Return	0.4	1.0	10.7
Intermediate-term Government Bonds			
Total Return	6.5	6.7	6.4
Income Return	5.7	5.8	2.9
Capital Appreciation Return	0.5	0.6	5.2
US Treasury Bills			
Total Return	4.7	4.8	3.2
Inflation			
	3.9	3.9	2.9

(CRSP standard market-cap-weighted NYSE/NYSE MKT/NASDAQ deciles 1–10. Mid-cap stocks represented by a market-capitalization weighted portfolio comprised of CRSP deciles 3-5; Low-cap stocks represented by a market-capitalization weighted portfolio comprised of CRSP deciles 6-8; Micro-cap stocks represented by a market-capitalization weighted portfolio comprised of CRSP deciles 9-10. Total return is equal to sum of three components returns: income return, capital appreciation, and reinvestment return. Used with permission. All rights reserved. Calculations performed by Duff & Phelps, LLC.

Summary statistics over the 1926–2017 period for CRSP NYSE/NYSE MKT/NASDAQ⁴⁶ deciles 1–10 are shown in Exhibit 4.1. As size (in this case, as measured by market cap) *decreases*, return tends to *increase*. For example, the annual arithmetic mean return of decile 1 (the largest-cap companies) was 11.19% over the 1926–2017 period, while the annual arithmetic mean return of decile 10 (the smallest-cap companies) was 20.19%. Note that this increased return comes at a price: risk (as measured by standard deviation) increases from 18.86% for decile 1 to 42.22% for decile 10. The relationship between risk and return is a fundamental principle of finance and for estimating the cost of capital.

Summary Statistics of Annual Returns (CRSP NYSE/NYSE MKT/NASDAQ Deciles)
1926–2017

Decile	Geometric Mean (%)	Arithmetic Mean (%)	Standard Deviation (%)
1-Largest	9.45%	11.19%	18.86%
2	10.65%	12.89%	21.37%
3	11.16%	13.67%	23.24%
4	10.93%	13.84%	25.42%
5	11.53%	14.62%	26.03%
6	11.48%	14.89%	26.97%
7	11.63%	15.41%	28.87%
8	11.55%	16.08%	32.84%
9	11.59%	16.94%	36.97%
10-Smallest	13.31%	20.19%	42.22%

CRSP U.S. Stock Database and CRSP U.S. Indices Database © 2018 Center for Research in Security Prices (CRSP®), University of Chicago Booth School of Business. CRSP NYSE/NYSE MKT/NASDAQ deciles 1–10. Used with permission. All rights reserved. Calculations performed by Duff & Phelps, LLC

Exhibit 4.2 illustrates the size effect. As size (measured by market cap in this case) *decreases*, return tends to *increase*. For example, an investment of \$1 in CRSP decile 1 (comprised of the largest companies) at the end of 1925 would have grown to \$4,065 by the end of 2017, and an investment in CRSP decile 6 (comprised of medium-sized companies) would have grown to \$21,937. However, an investment of \$1 in CRSP decile 10 (comprised of the smallest companies) would have grown to \$98,396 over the same period.

⁴⁶ On October 1, 2008, NYSE Euronext acquired the American Stock Exchange (AMEX). The "NYSE MKT" is the former American Stock Exchange, or AMEX. The CRSP standard market-cap-based NYSE/AMEX/NASDAQ indices are now called the NYSE/NYSE MKT/NASDAQ indices.

Aggregate Market Capitalization and Company Counts of the CRSP (NYSE/NYSE MKT/
NASDAQ) Deciles and Size Groupings
December 31, 2017

1-Largest	63.17%	194	18,612,367,381	68.08%
2	13.94%	192	3,226,232,338	11.80%
3	7.54%	202	1,878,839,877	6.87%
4	4.73%	221	1,188,986,271	4.35%
5	3.25%	219	752,944,915	2.75%
6	2.41%	265	612,455,110	2.24%
7	1.79%	285	428,291,875	1.57%
8	1.33%	365	327,841,070	1.20%
9	1.03%	448	212,070,070	0.78%
10-Smallest	0.82%	753	99,799,059	0.37%
Mid-Cap 3-5	15.52%	642	3,820,771,064	13.98%
Low-Cap 6-8	5.52%	915	1,368,588,055	5.01%
Micro-Cap 9-10	1.85%	1,201	311,869,129	1.14%

Calculated (or derived) based on data from CRSP © 2018 Center for Research in Security Prices (CRSP®). The University of Chicago Booth School of Business (2018). Calculations by Duff & Phelps, LLC.

In Exhibit 7.2 (next page), the largest company in each of the CRSP (NYSE/NYSE MKT/NASDAQ) deciles and size groupings (by market capitalization) as of September 30, 2017.⁷¹³

⁷¹³ The CRSP deciles are re-constituted and rebalanced at the end of each calendar quarter (March, June, September, and December). These quarter-end portfolios are then followed for the subsequent three months. For example, the breakpoints in Exhibit 7.2 were a key input in defining the companies placed in each decile at the end of September 2017; these portfolio compositions were then used to calculate the October, November, and December 2017 returns associated with each decile.