2018 CRESTMONT RESEARCH STOCK MARKET MATRIX

TAX-EXEMPT INVESTOR REAL RETURNS

Real Returns (inflation adjusted), including dividends (reinvested), transaction costs, and taxes deferred

COMPONENTS	
Index	Included
Dividends	Included (Reinvested)
Transaction Costs	Included
Taxes	Not Included (Deferred)
Inflation	Real (Inflation Adjusted)

2018 MATRIX: AVERAGE ANNUAL DATA

NOTES:
1) Numbers reflect the percentage annual rate of return from the starting period to the ending period
2) Returns include index returns, dividends, and transaction costs/fees (bid/ask spread, commissions, fees, etc.) & exclude taxes; real returns excluding inflation (see assumptions)
3) Red: <0%; Pink: 0% - 3%; Blue: 3% - 7%; Light Green: 7% - 10%; Dark Green: >10%
4) Black type reflects P/E ratio increasing over the period; White type reflects P/E ratio decreasing over the period
5) The black diagonal line reflects the boundary of 20-year periods
6) S&P 500 & P/E reflect the methodology popularized by Robert Shiller with average daily index annually and other related data (P/E10)
7) Other data and information developed from various sources and believed to be reliable

LEGEND			
Red		<	0.0%
Pink	0.0%	-	3.0%
Blue	3.0%	-	7.0%
Light Green	7.0%	-	10.0%
Dark Green		>	10.0%

White Numbers: Decreasing P/E Ratio

CRESTMONT RESEARCH

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FROM (rows)

P/E	1899=1	FROM Yr	Event
18.6	1	1900	Rodin Completes 'The Thinker'
22.7	1	1901	First Electric Typewriter
22.0	1	1902	Navy Installs Radio
17.6	1	1903	Wright Bros Fly
16.3	1	1904	Crayola & Jell-O
19.3	1	1905	Pen Gets Pocket Clip
18.7	2	1906	S.F. Earthquake
13.4	1	1907	Photocopier Marketed
13.1	1	1908	Model T Introduced
14.9	2	1909	Chlorine In Drinking Water
13.5	1	1910	Electric Range Invented
14.2	2	1911	Sherman Anti-Trust Act; Airmail Begins
13.7	2	1912	Titanic Sinks; U.S. Radio Act
11.9	1	1913	Income Tax & Federal Reserve
11.1	1	1914	WWI Starts; First Transcon. Phone Call
11.5	1	1915	Americans Avg 40 Phone Calls A Year
12.0	2	1916	Keds & Electric Clock Invented
8.8	1	1917	US Enters WWI; Einstein Theorizes Lasers
6.4	1	1918	WWI Ends
6.5	1	1919	Prohibition; Shortwave Radio; Dial Phones
5.3	1	1920	Women's Right To Vote
5.4	1	1921	World Series On Radio; Quartz Crystals
7.5	1	1922	100,000 Radios Made In U.S.; 3 Frequencies
7.9	1	1923	500,000 Radios Made; Neon Signs
8.4	1	1924	2.5 Million Radios Made; Frozen Food Invented
10.1	2	1925	Commercial Picture Fax By Radio In U.S.
11.7	2	1926	First Publicly Shown 'Talkie'
15.9	3	1927	2-Way Radio Phone: U.S. To London ($15/min)
21.8	3	1928	Teletype Machine; Test TV In 3 Homes
27.6	5	1929	Crash of '29; Car Radio
21.5	4	1930	Photo Flash Bulbs
14.7	3	1931	Radios In 40% Of Homes; Scotch Tape
8.1	2	1932	Radar; 8 mm Cameras; Electric Eye Scanner
11.1	2	1933	End of Prohibition; FM Radio; Wallboard
12.2	3	1934	Radios In 50% Of Homes; AP Wirephoto
13.1	3	1935	Social Security Act Passed
19.3	4	1936	BBC First TV Service, 3 Hours A Day
18.5	4	1937	Hindenburg Airship Crash
13.9	3	1938	National Minimum Wage Enacted
15.6	3	1939	WW II Begins; Regular TV In U.S.; Helicopter
14.7	3	1940	FM Radio; Radar; 1st Social Security Check
12.2	3	1941	Pearl Harbor Attack; 2-Way Police Radio
9.2	2	1942	U.S. Office Of Censorship Due To War
11.0	3	1943	Phone Line Repeaters Help Service
11.3	3	1944	D-Day, Normandy
13.3	4	1945	World War II Ends; FCC Sets VHF Channels
14.0	4	1946	ENIAC, 1st Computer; First Copy Machine Sold
11.2	4	1947	Transistor Invented; Microwave Oven
10.7	4	1948	Israel Established; RCA High Speed Fax
9.9	4	1949	NATO Established; Network TV In U.S.
11.2	5	1950	Korean War Begins; Credit Card Created
12.0	5	1951	Color TV; Modern Plastic Invented
12.5	6	1952	Phone Area Codes; EDVAC Computer
12.0	6	1953	Korean War Ends; Magnetic Core Memory
13.7	8	1954	TVs In 54% Of Homes; Transistor Radios
17.5	11	1955	Tests Begin On Digital Fiber Optics
18.3	13	1956	Transatlantic Phone Cable; The Pager
15.6	12	1957	Sputnik, First Satellite; EEC Formed
15.1	12	1958	Stereo LP Records; Data On Phone Lines
18.4	15	1959	COBOL; Microchip; Plain Paper Xerox
17.4	15	1960	90% Homes w/TVs; Laser; Weather Satellite
20.5	17	1961	Berlin Wall Built; IBM Selectric Typewriter
18.8	16	1962	Cuban Missile Crisis; Mariner II At Venus
20.3	18	1963	Kennedy Killed, Income Tax 91% To 70%
22.6	21	1964	Vietnam Begins; Home VCR
23.3	23	1965	First Minicomputer; Car Phones; Hypertext
21.3	22	1966	Dow @ 1,000; 8-Tracks In Cars; Fax Machine
21.6	23	1967	Floppy Disk; Cordless Phones; Dolby
21.5	24	1968	Intelsat Global Satellite Link; Intel 1KB RAM
19.4	23	1969	Neil Armstrong Walks On Moon; ATMs
15.2	19	1970	Barcodes; First Internet Connections
16.9	21	1971	Microchip, Price Controls; Answering Machine
17.8	23	1972	Dow Closes Above 1,000; Pong; HBO
16.1	22	1973	U.S. Leaves Vietnam; International Internet
10.9	15	1974	Nixon Resigns; Wage & Price Controls End
10.2	15	1975	Microsoft; Optical Videodisk Demo
11.5	17	1976	Apple I; Cray-1; Home Satellite Dish
10.4	16	1977	Elvis Dies; TRS-80 PC; Fiber Optic Call
9.4	15	1978	Modems; Cell Phone Tests; Intel 16-bit Chip
8.9	15	1979	CompuServe Online; VisiCalc Spreadsheet
8.8	16	1980	CPI 13.5%; CNN; Sony Camcorder
8.5	16	1981	IBM PC Introduced; 300 bps Modems
7.3	15	1982	Dow Over 1,000; Compact Disk; 5.5 Mil. PCs
9.6	20	1983	AT&T Breakup; 288k Chips; Domain Names
9.4	20	1984	3 1/2" Floppy; Intel 32-bit; 1 MB Chips
10.7	23	1985	Cellphones; 2400k Modems; Windows OS
13.4	29	1986	Laser Printers; TV On 7 Hrs/Day In U.S.
16.0	34	1987	Stock Market Crash; 50% Have Cable TV
14.4	31	1988	Transatlantic Fiberoptic Cable; Internet T1
16.6	37	1989	Poland Solidarity; Nintendo Profits @ $1 Bil.
16.5	37	1990	World Wide Web (www)
17.9	40	1991	Gulf War; USSR Breakup; 75% Have VCRs
19.6	44	1992	65 Mil. PCs; 200k On AOL; CDs > Cassettes
20.7	47	1993	Pentium Chip; HTML; V-Chip
20.5	47	1994	First WTC Attack; Satellite TV; 33% w/PC
22.7	55	1995	NAFTA Enacted; Dot.com; Internet Audio
25.9	66	1996	100k Web Sites; 30 Mil In U.S. On Internet
31.0	84	1997	Internet Video; 43% In U.S. Have PCs
36.0	103	1998	Russia Debt Default; 75 Mil U.S. On Internet
42.1	123	1999	Satellite Can See 3' Objects On Earth
41.7	128	2000	Dow Hits 11,723; NASDAQ Hits 5,048
32.1	105	2001	WTC Attack (9/11); >50% U.S. On Internet; iPod
25.9	86	2002	HDTV Grows; Wi-Fi Laptops; DVD Sales>VCR
24.1	82	2003	Iraq Conflict; Home Networks; T-Bills @ <1%
26.4	95	2004	Hybrid Cars; Flat Panel TVs; Blogs; VoIP
26.0	99	2005	Hurricanes; $70 Oil; Podcasts; Housing Boom
26.0	105	2006	YouTube; Dow High; Pluto Demoted; Fed Pause
26.8	116	2007	iPhone; Sub-Prime; Going Green; Facebook
20.8	93	2008	Recession; Wall Street Crisis; $144 Oil; Obama
16.9	74	2009	H1N1; Jackson Dies; GM Bankruptcy; Digital TV
20.7	88	2010	iPad; Greece Debt Crisis; Twitter; QE2
21.8	96	2011	The Cloud; Arab Spring; OWS; E-books
21.4	103	2012	Google Glass; Mars Rover; iPhone5; Fiscal Cliff
23.2	123	2013	Fed Taper; Detroit Ch 9; NSA; ACA Launch; Nest
25.5	144	2014	Ebola; ISIS; Amazon Drones; Wearable Tech
26.2	155	2015	ZIRP Ends; Iran Deal; Refugees; Driverless Car
26.1	157	2016	Brexit; Trump; <$30 Oil; Cyborg Stingray
29.9	181	2017	Bitcoin Mania; Robot Citizen; Teleporting; WattUp
		2018	Apple $1T; Tax Reform; Zero Carbon Nat Gas; 5G

TO (columns) and annual data

"TO" Year	P/E Ratio	1899 = 1	S&P 500 Index Value	S&P 500 Div Yield (%)	CPI (Inflation %)	GDP (Nominal %)	GDP (Real %)
1900	19	1	6	4	7	4	2
01	23	1	8	4	-2	13	12
02	22	1	8	4	6	3	2
03	18	1	7	5	1	6	3
04	16	1	7	5	0	5	4
05	19	1	9	4	1	9	9
06	19	2	10	4	3	8	4
07	13	1	8	5	6	3	-2
08	13	1	8	5	-4	-7	-5
09	15	2	10	4	8	12	12
10	14	1	9	5	4	5	0
11	14	2	9	5	-8	3	3
12	14	2	10	5	7	8	6
13	12	1	9	6	3	5	4
14	11	1	8	6	1	-6	-8
15	11	1	8	5	1	6	4
16	12	2	9	5	8	27	16
17	9	1	8	7	17	20	0
18	6	1	8	8	18	26	8
19	7	1	9	6	15	11	-3
20	5	1	8	7	16	13	-2
21	5	1	7	7	-11	-16	-4
22	8	1	8	6	-6	0	7
23	8	1	9	6	2	17	14
24	8	1	9	6	0	3	3
25	10	2	11	5	2	4	2
26	12	2	13	5	1	7	6
27	16	3	15	5	-2	-1	1
28	22	3	20	4	-2	1	2
29	28	5	26	4	0	7	7
30	21	4	21	5	-2	-12	-9
31	15	3	14	7	-9	-16	-6
32	8	2	7	9	-10	-23	-13
33	11	2	9	5	-5	-4	-1
34	12	3	10	5	3	17	11
35	13	3	11	4	2	11	9
36	19	4	15	4	1	14	13
37	18	4	15	5	4	10	5
38	14	3	11	6	-2	-6	-3
39	16	3	12	5	-1	7	8
40	15	3	11	6	1	10	9
41	12	3	10	7	5	26	18
42	9	2	9	7	11	28	19
43	11	3	12	5	6	22	17
44	11	3	12	5	2	10	8
45	13	4	15	4	2	2	-1
46	14	4	17	4	8	0	-12
47	11	4	15	5	14	10	-1
48	11	4	16	6	8	10	4
49	10	4	15	7	-1	-1	-1
50	11	5	18	7	1	10	9
51	12	5	22	7	8	16	8
52	12	6	24	6	2	6	4
53	12	6	25	6	1	6	5
54	14	8	30	5	1	0	-1
55	18	11	40	4	0	9	7
56	18	13	47	4	1	6	2
57	16	12	44	4	3	5	2
58	15	12	46	4	3	2	-1
59	18	15	57	3	1	8	7
60	17	15	56	3	2	4	3
61	20	17	66	3	1	4	3
62	19	16	62	3	1	7	6
63	20	18	70	3	1	6	4
64	23	21	81	3	1	7	6
65	23	23	88	3	2	8	6
66	21	22	85	3	3	10	7
67	22	23	92	3	3	6	3
68	21	24	98	3	4	9	5
69	19	23	98	3	5	8	3
70	15	19	83	4	6	5	0
71	17	21	98	3	4	9	3
72	18	23	109	3	3	10	5
73	16	22	107	3	6	11	6
74	11	15	83	4	11	8	-1
75	10	15	86	4	9	9	0
76	12	17	102	4	6	11	5
77	10	16	98	4	7	11	5
78	9	15	96	5	8	13	6
79	9	15	103	5	11	12	3
80	9	16	119	5	13	9	0
81	8	16	128	5	10	12	3
82	7	15	120	6	6	4	-2
83	10	20	160	4	3	9	5
84	9	20	160	5	4	11	7
85	11	23	187	4	4	7	4
86	13	29	236	3	2	6	3
87	16	34	287	3	4	6	3
88	14	31	266	3	4	8	4
89	17	37	323	3	5	8	4
90	16	37	335	3	5	6	2
91	18	40	376	3	4	3	0
92	20	44	416	3	3	6	4
93	21	47	452	3	3	5	3
94	20	47	460	3	3	6	4
95	23	55	542	2	3	5	3
96	26	66	670	2	3	6	4
97	31	84	873	2	2	6	4
98	36	103	1086	1	2	6	4
99	42	123	1327	1	2	6	5
2000	42	128	1427	1	3	6	4
'01	32	105	1194	1	3	3	1
'02	26	86	994	2	2	3	2
'03	24	82	965	2	2	5	3
'04	26	95	1131	2	3	7	4
'05	26	99	1207	2	3	7	4
'06	26	105	1310	2	3	6	3
'07	27	116	1477	2	3	5	2
'08	21	93	1220	2	4	2	0
'09	17	74	948	2	0	-2	-3
'10	21	88	1140	2	2	4	3
'11	22	96	1268	2	3	4	2
'12	21	103	1379	2	2	4	2
'13	23	123	1644	2	1	4	2
'14	25	144	1931	2	2	4	2
'15	26	155	2061	2	0	4	3
'16	26	157	2095	2	1	3	2
'17	30	181	2449	2	2	4	2
'18	32	201	2746	2	2	5	3

Decade	GDP (Annualized %) Nominal	GDP (Annualized %) Real
1900-09	+5.3%	+3.9%
1910-19	+10.0%	+2.9%
1920-29	+3.1%	+3.4%
1930-39	-1.1%	+1.0%
1940-49	+11.3%	+5.6%
1950-59	+6.7%	+4.2%
1960-69	+6.9%	+4.5%
1970-79	+9.9%	+3.2%
1980-89	+7.9%	+3.1%
1990-99	+5.5%	+3.2%
2000-09	+4.1%	+1.9%
2010-18	+3.6%	+2.0%

4.1% Avg (S&P 500 Div Yield %)
3.1% Avg (CPI Inflation %)
+6.1% Avg (GDP Nominal %)
+3.2% Avg (GDP Real %)