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Volume Title: Yields on Corporate Debt Directly Placed

Volume Author/Editor: Avery B. Cohan

Volume Publisher: UMI

Volume ISBN: 0-87014-472-3

Volume URL: <http://www.nber.org/books/coha67-1>

Publication Date: 1967

Chapter Title: Appendix B CHANGING CHARACTERISTICS OF DIRECT PLACEMENTS

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Chapter URL: <http://www.nber.org/chapters/c1517>

Chapter pages in book: (p. 144 - 157)

Appendix B

CHANGING CHARACTERISTICS OF DIRECT PLACEMENTS

This appendix is devoted to tabular description of the behavior of the various significant variables. The data are presented separately for industrials and utilities.

Means and Standard Deviations: Industrials

Table B-6 describes the behavior of the logs of the *geometric* means of X_2 , X_3 , X_4 , X_8 , X_{12} , X_{13} , and X_{15} , i.e., of all the significant variables for which logarithms were used. Table B-8 gives the *arithmetic* means for all ten significant variables, including X_5 (type of security), X_6 (industrial class), and X_7 (years non-refundable). Table B-7 gives the standard deviations of the logs of the geometric means and Table B-9, the standard deviations of the arithmetic means. Tables B-1 and B-2 are summary tables which compare the behavior of the means of the significant variables, for industrials, as between the first half (1951-55) and the second half (1956-61) of the period.

These tables tell a very simple story: the size variables, X_2 , X_8 , and X_{12} , all showed substantial increases between 1951-55 and 1956-61. The geometric mean of X_2 , for example, rose from \$12.8 million on the average in the earlier period to \$24.9 million in the later period. The geometric mean of X_{12} (EBIT) rose from \$1.8 million in the earlier period to \$2.9 million in the later period. On the other hand, X_4 (which is usually considered to be *the* most important "quality" variable) declined steadily during the period. The geometric mean of X_4 during the years 1951-55 was

TABLE B-1

*Industrials: Average Values for 1951-55 Compared
with Average Values for 1956-61, Geometric
Means of Seven Significant Variables*

Variable	Units	1951-55 (1)	1956-61 (2)	Col. 2 ÷ Col. 1 × 100
				(3)
X ₂	Million dollars	12.8	24.9	194.5
X ₃	Years	9.3	9.8	105.4
X ₄	Times	11.8	8.3	70.3
X ₈	Million dollars	2.0	2.6	130.0
X ₁₂	Years	1.8	2.9	161.1
X ₁₃	Years	14.9	15.7	105.4
X ₁₅	Dollars of long-term debt per dollar of total capital	.28	.28	100.0

11.8, whereas in 1956-61, it was 8.3 (Table B-1). The variable X₇, years nonrefundable, rose sharply from an average of 4.9 years in 1951-55 to an average of 7.5 years in 1956-61 (Table B-2).¹

For the most part the other variables, with the exception of X₈ (which rose slightly), showed no material change in one direction or the other. The combination of the increase in EBIT (earnings before interest and taxes) and the decline in times charges earned (which is simply EBIT divided by total pro-forma interest) can be explained by three factors. The first is the sharp rise in interest rates which took place during the period. On the average, for example, rates on industrial direct placements rose from a low of about 3.65 in the first quarter of 1951 to a peak of about 6.00 in the fourth quarter of 1960.

The second is the sharp increase in total capitalization, and the third, the slight increase in the ratio of debt to total capitalization.

In brief, EBIT rose by 60 per cent but interest rates rose by

¹ These figures are *simple* means, i.e., they are not weighted by dollar amount.

TABLE B-2

*Industrials: Average Values for 1951-55 Compared
with Average Values for 1956-61, Arithmetic
Means of Ten Significant Variables*

Variable	Units	1951-55 (1)	1956-61 (2)	Col. 2 ÷ Col. 1 × 100
				(3)
X ₂	Million dollars	59.2	140.2	236.8
X ₃	Years	10.5	10.4	99.0
X ₄	Times	15.6	11.6	74.4
X ₅	a	1.6	1.6	100.0
X ₆	b	0.61	0.63	103.3
X ₇	Years	4.9	7.5	153.1
X ₈	Million dollars	5.9	7.3	123.7
X ₁₂	Million dollars	10.2	19.6	192.2
X ₁₃	Years	16.1	16.4	101.9
X ₁₅	Dollars of long-term debt per dollar of total capital	0.31	0.32	103.2

^aSee note a, Table 29.

^bSee note b, Table 29.

about 65 per cent and total debt by something more than 90 per cent, i.e., by about the same percentage as total capitalization. Hence, times-charges-earned ratios came down sharply.²

CYCLICAL CONFORMITY

No attempt has been made to analyze systematically the cyclical behavior of the foregoing series. On the basis of the raw data, four variables show clear signs of cyclical behavior: X₂, X₇, X₈, and X₁₂. Of these four variables, the behavior of X₇ (years non-

² Times charges earned equals EBIT/rD, where r equals average interest rates and D, total debt outstanding. The numerator of the fraction doubled during the period but the denominator *quadrupled*.

refundable) is perhaps the most interesting. In the early part of the period, when rates were relatively low, the series appears to be conforming negatively. But beginning in 1955, when rates began to rise sharply, its positive conformity is almost perfect. The positive conformity in the latter part of the period is what one would expect: when rates are high, lenders are eager to forestall call or prevent it altogether. The apparent negative conformity in the earlier years may merely be random fluctuation around a mean of four or five years. In any event, there can be no doubt that the mean value around which the series is fluctuating in 1951-55 is significantly less than the mean value around which it is fluctuating in 1956-61.

Means and Standard Deviations: Public Utilities

On the whole, public utilities show much the same behavior as industrials. The size variables showed an increase, X_4 , a decrease,

TABLE B-3

Public Utilities: Average Values for 1951-55 Compared with Average Values for 1956-61, Geometric Means of Seven Significant Variables

Variable	Units	1951-55 (1)	1956-61 (2)	Col. 2 ÷
				Col. 1 × 100 (3)
X ₂	Million dollars	11.4	16.1	141.2
X ₃	Years	19.8	18.8	94.9
X ₄	Times	3.1	2.9	93.5
X ₈	Million dollars	1.1	1.9	172.7
X ₁₂	Years	0.7	2.1	300.0
X ₁₃	Years	24.3	24.1	99.1
X ₁₅	Dollars of long-term debt per dollar of total capital	.54	.54	100.0

TABLE B-4

*Public Utilities: Average Values for 1951-55 Compared
with Average Values for 1956-61, Arithmetic
Means of Ten Significant Variables*

Variable	Units	1951-55	1956-61	Col. 2 ÷ Col. 1 × 100
		(1)	(2)	(3)
X ₂	Million dollars	44.6	77.8	174.4
X ₃	Years	21.2	19.9	93.9
X ₄	Times	3.6	3.3	91.7
X ₅	a	0.3	0.4	133.3
X ₆	b	1.47	1.52	103.4
X ₇	Years	1.4	5.2	371.4
X ₈	Million dollars	4.9	5.7	116.3
X ₁₂	Million dollars	2.8	5.1	182.1
X ₁₃	Years	25.2	24.7	98.0
X ₁₅	Dollars of long-term debt per dollar of total capital	0.56	0.55	98.2

^aSee note a, Table 29.

^bSee note b, Table 29.

and the other variables remained much the same. The changes from the early part to the latter part of the period for utilities are summarized in Tables B-3 and B-4. The variables X₂, X₈, and X₁₂ rose sharply (Table B-3) as did X₇ and X₅ (Table B-4); X₄ declined as did X₃. The other variables remained virtually unchanged.

CYCLICAL CONFORMITY

Again, on the basis of the raw data above, X₂, X₈, and X₁₂ (all size variables) show clear signs of cyclical behavior, as does X₇ and perhaps also X₄ and X₅. Cyclical behavior on the part of X₅ would mean that in periods of prosperity more utility place-

TABLE B-5

Finance Companies: Average Values for 1951-54 compared with Average Values for 1955-57 and 1958-61, Geometric Means of Selected Variables

		1951-54	1955-57	1958-61	Col. 3 ÷ Col. 1 × 100
		(1)	(2)	(3)	(4)
X ₃	Years	9.2	9.2	9.7	
X ₄	Times	2.4	1.8	1.6	66.7
X ₅	a	2.8			
X ₈	Million dollars	3.5	2.9	2.5	71.4
X ₁₂	Million dollars	2.9	2.6	2.3	79.3
X ₁₃	Years	12.4	13.1	14.2	114.5
X ₂₄	Dollars of net worth per dollar of senior long- term debt	.82	.69	.59	72.0

^aSee note a, Table 29.

ments tend to be in the form of debentures, whereas in periods of recession, more tend to be in the form of mortgage bonds.

Principal Variables of Finance Companies

Table B-5 describes the behavior of the principal finance company variables. Average size of issue, earnings, and interest coverage all declined during the period, as did equity-debt ratios. Average term and maturity rose.³

³Satisfactory quarterly series for finance companies could not be obtained because of the small number of observations.

TABLE B-6
*Industrials: Natural Logs of Geometric Means of Seven
 Significant Variables, Quarterly, 1951-61*

Year and Quarter	X ₂	X ₃	X ₄	X ₈	X ₁₂	X ₁₃	X ₁₅
1951							
1	9.5169	2.1967	2.7083	7.8253	7.6607	2.6584	-1.3053
2	9.6034	2.1658	2.6029	7.7477	7.6545	2.6424	-1.2588
3	8.7762	2.1399	2.5411	7.1219	6.8190	2.6053	-1.2356
4	9.9401	2.4058	2.5195	8.4086	8.0337	2.8529	-1.1946
1952							
1	9.7485	2.2968	2.4503	7.8658	7.8062	2.7691	-1.1570
2	9.6814	2.3164	2.7734	7.7424	7.8499	2.7737	-1.3818
3	9.1434	2.0980	2.5544	7.2776	7.1794	2.6289	-1.3757
4	9.7683	2.2749	2.4229	7.8786	7.7093	2.7413	-1.0655
1953							
1	9.2634	2.2080	2.2308	7.4513	7.2038	2.6905	-1.2252
2	9.4265	2.1438	2.4792	7.5898	7.3971	2.6163	-1.3889
3	8.9839	2.1134	2.5494	7.0473	7.0462	2.6849	-1.3866
4	9.6687	2.3114	2.4854	7.5769	7.7538	2.7085	-1.3245
1954							
1	9.3666	2.2462	2.4684	7.5530	7.4532	2.7357	-1.3340
2	9.2930	2.1476	2.4723	7.3980	7.3000	2.6381	-1.3591
3	9.5762	2.3062	2.3155	7.4310	7.5068	2.7445	-1.1904
4	9.9393	2.2877	2.4726	7.8252	7.8720	2.7832	-1.3336
1955							
1	8.9012	2.2129	2.3525	7.0710	6.9989	2.6837	-1.1822
2	9.5868	2.3149	2.3659	7.6759	7.5527	2.8059	-1.2403
3	9.2754	2.1621	2.4088	7.4792	7.2901	2.6537	-1.2273
4	9.2536	2.2185	2.0533	7.5069	7.1602	2.6478	-1.1145
1956							
1	9.4491	2.2001	2.0332	7.6660	7.3309	2.6922	-1.0605
2	9.8157	2.2285	2.3136	7.8163	7.6628	2.6749	-1.2652
3	10.4485	2.3265	2.4039	8.0168	8.3865	2.7368	-1.3251
4	10.3435	2.3569	1.9969	8.3149	8.0879	2.8145	-1.1556
1957							
1	9.9961	2.2692	2.1657	7.8295	7.9495	2.7544	-1.2011
2	10.5580	2.3824	2.3498	8.0730	8.5130	2.8092	-1.4381
3	10.3081	2.4723	2.0916	8.2390	8.1217	2.8693	-1.2625
4	10.5903	2.4923	2.1958	8.5394	8.5089	2.9183	-1.3585
1958							
1	10.0002	2.3117	2.1640	8.0348	7.8686	2.7995	-1.3738
2	10.5803	2.2913	2.4517	7.6903	8.5187	2.7932	-1.4930
3	10.0437	2.3565	2.0131	8.1641	7.8487	2.8359	-1.2222
4	10.4073	2.2949	2.3078	7.8378	8.1781	2.8217	-1.3370
1959							
1	10.3479	2.2648	2.7438	7.3461	8.3754	2.7621	-1.7344
2	10.2928	2.2245	2.1070	7.7104	8.0936	2.7171	-1.2855
3	10.7433	2.4120	2.0855	7.9593	8.5041	2.8449	-1.4054
4	9.8227	2.1373	2.0957	7.5922	7.5873	2.6460	-1.4815
1960							
1	10.9988	2.3121	1.7460	8.3628	8.7121	2.6691	-1.0726
2	10.1327	2.2756	1.8832	7.9297	7.8300	2.7958	-1.3093
3	10.1417	2.2575	2.1305	7.8643	7.9234	2.7310	-1.3474
4	9.5236	2.2506	1.8376	7.3822	7.2454	2.7377	-1.2075
1961							
1	9.7804	2.2358	1.8484	7.7267	7.6595	2.6775	-1.0731
2	9.9323	2.1856	1.9712	7.8942	7.6977	2.6930	-1.2590
3	9.6318	2.2400	1.9070	7.7206	7.4837	2.7064	-1.1421
4	9.8494	2.2803	2.3564	7.7205	7.9559	2.7918	-1.3530

TABLE B-7

Industrials: Standard Deviations of Natural Logs of Geometric Means of Seven Significant Variables, Quarterly, 1951-61

Year and Quarter	X ₂	X ₃	X ₄	X ₈	X ₁₂	X ₁₃	X ₁₅
1951							
1	1.6352	0.3706	0.6986	1.5486	1.6947	0.3291	0.4503
2	1.4223	0.3383	0.7448	1.2890	1.3907	0.2854	0.3594
3	1.5172	0.5181	0.5736	1.4161	1.6439	0.4122	0.3823
4	2.1809	0.6216	0.5530	2.2410	1.9940	0.4859	0.2391
1952							
1	1.4351	0.4762	0.6646	1.4583	1.4200	0.3900	0.3118
2	1.5805	0.4590	0.4105	1.5643	1.6055	0.3559	0.5505
3	1.5898	0.4038	0.6144	1.3574	1.6579	0.4067	0.3758
4	1.6516	0.3905	0.8341	1.3326	1.8236	0.3065	0.4073
1953							
1	1.2222	0.3761	0.6770	0.9965	1.3994	0.2779	0.3762
2	1.6270	0.4029	0.5360	1.4833	1.7713	0.3228	0.3559
3	1.4632	0.2382	0.5159	0.8405	1.5225	0.2337	0.3047
4	1.5565	0.2760	0.7782	1.3448	1.5159	0.2079	0.6851
1954							
1	1.8429	0.5135	0.8180	1.6627	1.8826	0.4092	0.5363
2	1.3277	0.3577	0.7938	1.0646	1.5024	0.3081	0.4998
3	2.1532	0.7438	0.8394	1.6401	2.3476	0.6315	0.4013
4	1.7575	0.3483	0.8828	1.5807	1.7664	0.2830	0.5565
1955							
1	1.2912	0.3719	0.7782	1.0450	1.4054	0.3694	0.4190
2	1.9998	0.4162	0.7720	1.3801	2.2027	0.3420	0.3390
3	1.2858	0.3702	0.7071	1.2543	1.3339	0.3169	0.3370
4	1.5856	0.3684	0.7690	1.3147	1.4818	0.3185	0.4738
1956							
1	1.6156	0.4116	0.6757	1.3557	1.5849	0.3535	0.4496
2	1.7723	0.3503	0.7814	1.3466	1.6860	0.3271	0.5120
3	1.9619	0.3848	1.0789	1.4420	2.1238	0.2549	0.8920
4	1.8991	0.2970	0.6327	1.5387	1.8688	0.2265	0.4078
1957							
1	1.4774	0.3455	0.5469	1.4124	1.4380	0.3032	0.3344
2	2.0113	0.3494	1.0103	1.5266	1.9427	0.3114	0.7623
3	1.0449	0.2205	0.5718	1.4537	1.0768	0.2373	0.4473
4	1.5511	0.2386	0.9351	1.5810	1.7545	0.2653	0.5868
1958							
1	1.2569	0.2353	0.8382	1.1090	1.2074	0.2043	0.6751
2	1.9323	0.3518	1.2119	1.5823	1.9735	0.3679	1.0123
3	1.9244	0.2364	0.8278	1.2424	2.0543	0.1991	0.4546
4	1.8510	0.2752	0.9612	1.3355	1.9559	0.2646	0.4187
1959							
1	1.7137	0.2506	1.6330	1.3169	1.6436	0.2703	1.5589
2	2.0942	0.3382	0.6828	1.3454	2.2255	0.3367	0.4521
3	1.7762	0.3813	0.8504	1.3153	1.8327	0.3570	0.5778
4	1.2816	0.3326	0.7612	1.2411	1.2895	0.3289	0.6092
1960							
1	2.0443	0.3212	0.6677	1.6947	2.1907	0.3038	0.3951
2	1.9254	0.3004	0.5819	1.4456	1.8986	0.2646	0.4462
3	1.6176	0.2581	1.0240	1.4019	1.6371	0.2301	0.8361
4	2.2125	0.3198	0.8880	1.4937	2.2845	0.3365	0.5802
1961							
1	1.7553	0.3407	0.5050	1.4703	1.6739	0.3868	0.3282
2	1.8074	0.4108	0.6941	1.3714	1.8447	0.4353	0.3982
3	1.7609	0.3331	0.7293	1.1995	1.8656	0.3421	0.3458
4	1.6561	0.2654	0.9831	1.1809	1.6061	0.2138	0.6246

TABLE B-8
*Industrials: Arithmetic Means of Ten Significant Variables,
 Quarterly, 1951-61*

Year and Quarter	X ₂	X ₃	X ₄	X ₅	X ₆	X ₇	X ₈	X ₁₂	X ₁₃	X ₁₅
1951										
1	46.3	9.6	19.6	1.6	0.72	3.7	8.8	7.2	15.0	0.30
2	44.0	9.2	18.9	1.8	0.54	5.2	6.7	6.1	14.6	0.30
3	17.8	10.0	15.2	1.5	0.40	5.2	3.0	3.1	15.0	0.31
4	166.7	14.6	14.4	1.8	0.45	6.6	47.7	20.9	20.2	0.31
1952										
1	43.4	12.0	13.8	1.5	0.55	8.2	7.8	6.0	17.8	0.33
2	48.5	11.3	17.4	1.8	0.78	5.5	7.6	7.3	17.1	0.32
3	55.6	8.8	15.4	1.4	0.63	2.9	5.7	7.8	14.8	0.27
4	50.0	10.5	16.4	1.5	0.62	6.2	5.9	7.2	16.2	0.38
1953										
1	23.6	9.8	11.4	1.8	0.62	3.8	2.8	3.7	15.3	0.31
2	57.9	9.2	13.7	1.7	0.47	2.5	6.6	7.6	14.3	0.27
3	40.6	8.5	14.4	1.3	0.63	2.4	1.6	4.4	15.1	0.26
4	49.2	10.5	15.7	1.6	0.54	5.6	4.6	6.7	15.3	0.31
1954										
1	66.5	11.8	17.8	1.4	0.69	6.1	11.8	11.0	17.4	0.29
2	28.9	9.1	17.4	1.6	0.62	3.7	3.0	4.8	14.6	0.28
3	205.3	15.7	16.3	1.5	0.62	9.5	8.0	67.8	20.5	0.33
4	86.7	10.4	17.6	1.6	0.72	4.6	7.7	11.6	16.8	0.29
1955										
1	19.2	9.8	14.9	1.4	0.57	2.5	2.0	3.4	15.6	0.33
2	110.2	11.1	13.9	1.6	0.69	5.4	6.4	22.0	17.6	0.31
3	21.3	9.2	14.1	1.6	0.59	3.2	3.7	3.3	14.9	0.31
4	32.7	9.8	10.4	1.5	0.62	4.4	4.0	3.7	14.8	0.37
1956										
1	49.8	9.8	9.3	1.8	0.62	2.4	6.2	5.6	15.7	0.38
2	121.9	9.8	13.5	1.8	0.44	5.6	7.5	13.5	15.2	0.32
3	203.7	11.1	60.4	1.6	0.65	8.0	11.7	39.2	15.9	0.33
4	154.8	11.0	8.7	1.4	0.65	7.4	12.5	16.9	17.1	0.34
1957										
1	84.9	10.3	10.1	1.7	0.59	9.0	8.4	10.9	16.5	0.32
2	198.8	11.5	20.4	1.3	0.63	11.7	8.8	23.2	17.4	0.29
3	46.4	12.1	9.4	2.0	0.58	10.0	8.0	5.2	18.1	0.31
4	95.0	12.4	14.7	1.7	0.67	10.3	11.9	14.5	19.1	0.29
1958										
1	52.6	10.4	11.9	1.6	0.70	7.4	5.0	5.4	16.8	0.30
2	172.3	10.4	78.4	1.5	0.53	5.7	6.2	23.3	17.3	0.27
3	236.3	10.9	10.4	1.5	0.57	7.9	8.2	36.5	17.4	0.33
4	203.1	10.3	20.1	1.5	0.61	6.2	6.1	24.5	17.4	0.29
1959										
1	108.0	9.9	160.4	1.3	0.73	8.0	2.7	14.6	16.4	0.29
2	213.1	9.8	9.9	0.9	0.54	5.2	5.4	27.8	16.0	0.30
3	193.5	11.8	11.5	1.2	0.62	7.7	6.5	28.8	18.1	0.28
4	36.6	8.9	11.0	1.8	0.62	9.2	3.9	4.1	14.8	0.26
1960										
1	225.3	10.6	7.4	1.6	0.79	7.6	13.0	26.3	15.1	0.36
2	139.9	10.2	7.7	1.4	0.68	9.0	6.9	14.8	16.9	0.30
3	85.0	9.9	18.9	1.5	0.75	8.7	6.9	10.5	15.8	0.32
4	179.8	10.0	9.6	1.6	0.57	7.1	4.8	25.4	16.3	0.34
1961										
1	65.1	9.8	7.2	1.4	0.69	6.2	5.9	6.3	15.4	0.36
2	116.2	9.6	9.0	1.6	0.69	7.7	7.2	16.3	15.9	0.31
3	148.0	9.9	9.1	1.8	0.65	7.4	4.1	29.6	15.8	0.34
4	105.5	10.1	21.3	1.8	0.78	7.2	3.9	24.3	16.7	0.29

TABLE B-9
*Industrials: Standard Deviations of Arithmetic Means,
 Ten Significant Variables, Quarterly, 1951-61*

Year and Quarter	X ₂	X ₃	X ₄	X ₅	X ₆	X ₇	X ₈	X ₁₂	X ₁₃	X ₁₅
1951										
1	81.5	3.6	18.3	0.8	0.45	6.6	18.7	11.3	4.6	0.12
2	83.5	3.4	24.9	0.6	0.50	7.1	14.7	12.3	4.2	0.11
3	26.2	7.7	12.1	0.9	0.50	7.7	4.0	5.0	8.8	0.14
4	322.0	17.6	7.8	0.6	0.51	8.9	99.5	42.6	16.7	0.07
1952										
1	76.7	14.3	7.5	0.8	0.50	16.8	18.1	10.2	13.6	0.12
2	73.8	5.6	7.8	0.6	0.42	7.8	14.4	10.0	6.3	0.40
3	177.9	3.4	11.4	0.9	0.49	6.9	19.0	23.2	5.1	0.08
4	68.3	4.4	21.1	0.9	0.50	8.7	9.0	10.8	4.7	0.19
1953										
1	41.6	4.3	7.2	0.7	0.50	7.4	3.3	7.7	4.4	0.10
2	150.6	3.8	7.3	0.7	0.51	5.1	13.5	17.1	4.0	0.10
3	133.6	2.2	7.2	1.0	0.50	5.4	1.4	11.5	3.7	0.08
4	86.1	3.0	12.7	0.9	0.51	6.4	7.8	11.2	3.2	0.16
1954										
1	175.8	15.4	27.9	1.0	0.47	17.0	41.8	35.8	14.5	0.13
2	58.0	3.4	24.9	0.8	0.49	6.1	4.1	9.5	4.3	0.11
3	657.3	24.9	28.9	0.9	0.50	24.4	21.2	297.0	23.5	0.12
4	177.3	3.6	19.8	0.8	0.45	6.9	12.0	21.9	4.4	0.12
1955										
1	33.5	3.8	16.5	0.9	0.50	5.8	2.5	7.1	5.7	0.13
2	263.6	5.6	10.3	0.8	0.47	9.0	13.1	62.3	6.7	0.10
3	26.1	3.1	12.6	0.8	0.50	5.1	5.6	4.9	4.3	0.10
4	53.6	3.6	10.1	0.9	0.49	6.2	5.4	5.9	4.3	0.19
1956										
1	104.3	4.0	5.9	0.6	0.49	4.6	13.0	11.3	5.6	0.17
2	319.8	3.3	11.4	0.7	0.50	6.3	20.2	47.2	4.8	0.15
3	445.8	4.8	327.8	0.9	0.48	7.2	36.9	102.4	4.1	0.20
4	329.4	3.2	4.5	1.0	0.48	6.7	20.9	46.7	3.9	0.16
1957										
1	206.6	4.4	5.9	0.8	0.50	6.8	21.2	33.0	5.9	0.12
2	398.6	3.8	40.1	0.9	0.49	6.9	13.0	53.4	5.6	0.14
3	44.9	2.8	5.5	0.0	0.51	7.8	8.7	5.6	4.3	0.11
4	134.6	3.0	21.4	0.9	0.49	5.7	12.8	21.0	5.2	0.12
1958										
1	115.4	2.3	12.1	0.8	0.47	5.9	4.6	9.4	3.2	0.15
2	325.6	3.0	362.3	0.8	0.51	6.0	8.7	46.2	5.4	0.09
3	646.8	2.9	9.4	0.8	0.50	7.4	14.6	104.2	3.9	0.17
4	579.8	3.0	45.6	0.8	0.50	6.9	10.6	74.9	4.8	0.12
1959										
1	193.3	2.6	542.2	1.0	0.46	8.2	2.1	26.2	4.7	0.18
2	617.4	3.3	5.7	1.0	0.51	5.6	8.9	81.3	5.6	0.13
3	453.8	3.8	11.7	1.0	0.49	8.0	12.0	89.7	5.0	0.12
4	46.9	2.5	10.5	0.5	0.50	6.9	4.6	6.2	4.3	0.12
1960										
1	377.9	3.4	6.9	0.9	0.43	5.2	18.1	46.1	4.8	0.12
2	292.9	2.9	4.9	0.9	0.48	6.4	9.6	33.9	4.4	0.13
3	172.5	2.6	48.8	0.9	0.44	6.6	11.8	21.7	3.8	0.16
4	540.9	3.1	12.3	0.7	0.50	4.7	8.1	90.6	5.8	0.15
1961										
1	127.3	3.0	3.6	0.9	0.47	5.7	9.2	10.2	4.8	0.11
2	296.2	3.5	6.4	0.8	0.47	5.5	11.9	60.8	5.4	0.13
3	611.9	3.4	8.7	0.7	0.49	6.0	5.2	133.9	5.0	0.10
4	334.9	2.8	43.7	0.7	0.43	6.8	3.7	8.9	3.6	0.11

TABLE B-10
*Public Utilities: Natural Logs of Geometric Means of
 Seven Significant Variables, Quarterly, 1951-61*

Year and Quarter	X ₂	X ₃	X ₄	X ₈	X ₁₂	X ₁₃	X ₁₄
1951							
1	8.7016	2.9801	0.7294	6.8834	5.4254	3.1798	-0.5737
2	9.4971	3.0322	1.3634	7.3893	6.6983	3.1227	-0.8238
3	8.8168	2.9823	1.0545	6.9440	5.9716	3.2107	-0.5790
4	9.4610	3.1031	1.2054	7.2346	6.6964	3.2804	-0.5733
1952							
1	10.0682	3.1094	1.2574	7.6928	7.3325	3.2671	-0.5919
2	9.5442	2.9514	0.9756	7.2851	6.6436	3.1810	-0.5384
3	9.1975	2.8907	1.3295	6.7880	6.6232	3.1079	-0.6154
4	9.6651	2.9894	1.4944	7.4072	6.9449	3.1867	-0.8392
1953							
1	9.9604	2.7378	1.0516	8.2027	7.1478	2.9793	-0.6026
2	10.5684	3.1975	1.1066	8.2338	7.7766	3.3202	-0.5369
3	9.9100	3.1236	1.0797	7.7681	7.1012	3.2598	-0.6233
4	9.3781	2.9137	1.0994	7.2303	6.5622	3.1927	-0.5972
1954							
1	9.6003	3.0850	1.2012	7.9636	6.9503	3.2770	-0.5430
2	9.1093	2.9674	1.1492	6.9398	6.3897	3.1909	-0.5548
3	9.4794	3.0481	1.1058	7.1328	6.6402	3.2513	-0.6091
4	9.1951	2.9454	0.8905	7.1963	6.2394	3.1570	-0.5821
1955							
1	9.4002	3.0325	1.2029	7.4841	6.6567	3.2321	-0.6494
2	8.7640	2.9888	1.2572	6.8870	6.0521	3.1811	-0.6392
3	8.5326	2.9156	0.9960	6.6032	5.6750	3.1553	-0.5185
4	8.5639	2.7990	1.1162	6.6113	5.8281	3.1142	-0.6223
1956							
1	9.4752	2.7900	1.2032	7.4511	6.8206	3.1368	-0.5869
2	9.3893	3.0989	1.0783	7.2977	6.6266	3.2234	-0.6236
3	9.2262	2.9913	0.9443	7.2119	6.3729	3.2504	-0.5708
4	9.3749	2.8754	1.0242	7.3580	6.7228	3.0925	-0.5868
1957							
1	9.7346	2.9631	0.9818	7.5105	6.9607	3.1499	-0.6160
2	9.6386	3.0301	1.1229	7.3637	6.9188	3.2606	-0.6489
3	10.0513	2.9253	1.0835	7.8067	7.3531	3.1829	-0.5787
4	9.9571	3.1164	1.1961	7.8063	7.3285	3.2955	-0.6405
1958							
1	10.0526	2.9560	1.2884	7.7654	7.5160	3.1763	-0.6416
2	9.7230	2.9454	1.1865	7.6372	7.1350	3.1896	-0.6233
3	8.7943	2.8725	1.1658	6.8031	6.2292	3.1371	-0.6372
4	9.4432	2.9215	1.0455	7.2390	6.7694	3.2024	-0.6304
1959							
1	10.1422	3.0905	1.1860	7.8395	7.5380	3.2576	-0.6535
2	10.5955	3.9066	0.9794	8.1372	7.8763	3.2142	-0.5913
3	9.6380	2.8616	0.7602	7.7743	6.8076	3.1262	-0.6065
4	9.8025	3.1603	0.7990	7.6402	6.9273	3.3231	-0.5610
1960							
1	10.2166	2.8604	1.1106	7.8199	7.6733	3.1833	-0.5659
2	9.7988	2.9171	1.0583	7.8518	7.1762	3.1618	-0.6435
3	8.9320	2.9023	0.8972	6.9441	6.2512	3.1307	-0.5920
4	9.7850	2.9434	0.8176	7.5314	6.8629	3.2506	-0.6618
1961							
1	9.4038	2.8607	1.1244	7.2570	6.8323	3.1476	-0.5892
2	9.2725	2.8319	1.1687	7.0302	6.7496	3.1440	-0.6467
3	10.5678	3.0436	0.9856	8.3104	7.8809	3.2446	-0.6343
4	10.2593	2.9783	1.1293	8.1115	7.6486	3.1554	-0.6879

TABLE B-11

Public Utilities: Standard Deviations of Natural Logs of Geometric Means of Seven Significant Variables, Quarterly, 1951-61

Year and Quarter	X ₂	X ₃	X ₄	X ₈	X ₁₂	X ₁₃	X ₁₄
1951							
1	1.2635	0.5517	0.4412	1.0980	1.3973	0.3625	0.4422
2	1.5553	0.4947	0.4666	1.3691	1.5942	0.4955	0.3177
3	1.7352	0.3179	0.5345	1.4382	1.8861	0.1837	0.2149
4	1.5608	0.3305	0.4098	1.4149	1.6248	0.2599	0.1135
1952							
1	0.9377	0.3569	0.3656	1.0360	1.0953	0.2334	0.1143
2	1.5329	0.3934	0.3941	1.4589	1.5288	0.2084	0.1532
3	1.6321	0.4394	0.4455	1.1972	1.5319	0.3174	0.2937
4	1.8579	0.4513	0.7497	1.6396	1.8907	0.3233	0.4420
1953							
1	1.9685	0.4844	0.4321	1.8311	1.9214	0.4402	0.2033
2	1.2199	0.2392	0.5604	1.5062	1.5959	0.0961	0.1597
3	1.4835	0.3305	0.4758	1.4852	1.5523	0.2152	0.2480
4	1.2802	0.2625	0.6764	1.1377	1.5867	0.1876	0.1779
1954							
1	1.5212	0.3126	0.3862	1.3850	1.6334	0.1487	0.1749
2	1.1311	0.3655	0.4797	1.0061	1.2895	0.2098	0.1840
3	2.1256	0.3462	0.4960	1.6005	2.3160	0.2375	0.1038
4	1.3350	0.5942	0.5294	1.3925	1.6076	0.4912	0.1626
1955							
1	2.1969	0.3618	0.5839	1.7760	2.3080	0.2109	0.2899
2	1.5877	0.2872	0.5917	1.1836	1.6882	0.1961	0.2398
3	1.7896	0.3056	0.4424	1.6878	1.9508	0.1612	0.2275
4	1.1717	0.4335	0.5693	0.7729	1.4409	0.3673	0.1633
1956							
1	1.5746	0.3520	0.4768	1.5639	1.6019	0.1523	0.2348
2	1.8675	0.2436	0.5340	1.4388	1.9111	0.1752	0.1623
3	1.0257	0.2669	0.5971	0.9580	1.2636	0.1036	0.1641
4	1.6362	0.4013	0.5550	1.3505	1.7627	0.3127	0.2678
1957							
1	1.5277	0.4206	0.6946	1.3602	1.7731	0.2661	0.2044
2	1.3771	0.2261	0.6047	1.0526	1.5240	0.1284	0.2107
3	1.8066	0.3976	0.5490	1.7612	1.8552	0.2499	0.1665
4	1.4525	0.2930	0.3415	1.2264	1.4635	0.1976	0.1199
1958							
1	1.3346	0.2831	0.5582	1.2956	1.4626	0.1355	0.1789
2	1.9782	0.3385	0.5413	1.7804	1.8359	0.2088	0.1982
3	1.4750	0.3568	0.6225	1.3680	1.5438	0.1652	0.2972
4	1.6048	0.2824	0.4414	1.3547	1.7630	0.1923	0.1800
1959							
1	1.1922	0.2963	0.3679	1.1152	1.1778	0.2315	0.2402
2	2.3269	0.3708	0.4398	1.9402	2.2348	0.2867	0.1421
3	1.5068	0.3110	0.6188	1.6461	1.7233	0.2527	0.1628
4	1.5999	0.2825	0.5743	1.1211	1.7687	0.0867	0.1231
1960							
1	1.6427	0.3285	0.3671	1.3262	1.5540	0.1860	0.1599
2	1.3857	0.2916	0.7153	1.2354	1.4844	0.1892	0.2276
3	2.0896	0.2985	0.4181	1.8899	2.2711	0.1570	0.1685
4	1.3980	0.3708	0.7816	1.0716	1.7913	0.1348	0.2272
1961							
1	1.4295	0.4263	0.3651	1.1964	1.4738	0.2915	0.1731
2	1.7700	0.4012	0.4664	1.1921	1.7949	0.2665	0.1587
3	2.0464	0.2725	0.3973	1.8341	2.0830	0.1501	0.1180
4	1.3812	0.4351	0.4463	1.2125	1.5721	0.4048	0.1928

TABLE B-12
*Public Utilities: Arithmetic Means of Ten Significant
 Variables, Quarterly, 1951-61*

Year and Quarter	X ₂	X ₃	X ₄	X ₅	X ₆	X ₇	X ₈	X ₁₂	X ₁₃	X ₁₅
1951										
1	10.6	22.0	2.3	0.2	1.82	0.8	1.5	0.5	25.3	0.60
2	27.3	22.6	4.3	0.4	1.30	0.7	3.4	1.7	24.6	0.46
3	31.4	20.6	3.2	0.0	1.53	0.6	3.0	2.1	25.2	0.57
4	37.0	23.3	3.6	0.2	1.31	2.6	3.5	2.5	27.4	0.57
1952										
1	36.1	23.5	3.7	0.2	1.18	0.3	3.2	2.7	26.8	0.56
2	44.1	20.5	2.9	0.3	1.38	0.0	6.6	2.1	24.5	0.59
3	40.3	19.6	4.1	0.5	1.46	0.7	1.7	2.9	23.4	0.56
4	69.5	21.5	6.3	0.4	1.28	1.4	5.6	4.2	25.3	0.46
1953										
1	103.4	17.2	3.1	0.5	1.76	1.5	18.6	5.5	21.3	0.56
2	72.6	25.1	3.4	0.2	1.33	2.2	8.3	6.1	27.8	0.59
3	56.9	23.8	3.3	0.4	1.48	3.6	6.2	3.2	26.6	0.55
4	23.3	19.0	3.8	0.1	1.57	0.9	2.5	1.8	24.7	0.56
1954										
1	43.4	22.8	3.6	0.1	1.47	4.4	9.6	3.7	26.8	0.59
2	15.7	20.6	3.5	0.4	1.40	0.3	1.6	1.3	24.8	0.58
3	73.2	22.2	3.3	0.1	1.60	2.5	3.1	4.6	26.5	0.55
4	20.5	21.2	2.7	0.1	1.41	1.3	2.9	1.4	25.2	0.57
1955										
1	107.3	22.0	3.8	0.3	1.33	0.0	9.0	5.4	25.8	0.54
2	18.3	20.6	4.1	0.8	1.50	0.3	1.8	1.2	24.5	0.54
3	39.2	19.3	3.0	0.4	1.62	1.2	3.6	3.1	23.8	0.61
4	9.2	17.7	3.6	0.3	1.53	0.9	1.0	0.8	23.6	0.54
1956										
1	36.6	17.3	3.7	0.6	1.79	1.9	5.4	3.5	23.3	0.57
2	79.2	22.8	3.3	0.2	1.55	3.1	4.4	4.0	25.5	0.54
3	16.3	20.6	3.0	0.1	1.36	2.9	2.1	1.1	25.9	0.57
4	57.2	19.0	3.1	0.5	1.75	6.0	4.0	5.6	23.0	0.57
1957										
1	86.6	20.9	3.2	0.5	1.55	5.6	4.4	4.9	24.1	0.55
2	32.1	21.2	3.8	0.4	1.32	5.8	2.7	2.3	26.3	0.53
3	111.4	19.9	3.3	0.5	1.33	8.2	9.8	6.4	24.8	0.57
4	40.9	23.4	3.5	0.3	1.23	8.0	4.4	3.0	27.5	0.53
1958										
1	83.4	19.9	4.2	0.3	1.28	5.1	6.1	6.4	24.2	0.53
2	126.1	20.1	3.8	0.5	1.54	4.6	9.4	6.3	24.8	0.54
3	23.2	18.7	3.9	0.3	1.68	4.0	3.0	2.2	23.3	0.55
4	37.3	19.2	3.1	0.4	1.56	4.9	2.8	2.9	25.0	0.54
1959										
1	46.5	22.8	3.5	0.3	1.27	4.5	4.3	3.4	26.5	0.53
2	301.7	19.5	2.9	0.4	1.55	3.2	15.5	16.3	26.0	0.56
3	40.1	18.3	2.5	0.4	1.87	7.7	7.9	2.8	23.4	0.55
4	50.2	24.3	2.5	0.3	1.33	5.3	3.5	3.9	27.8	0.57
1960										
1	140.2	18.4	3.2	0.1	1.67	4.7	7.2	8.0	24.5	0.58
2	52.6	19.2	3.6	0.7	1.47	6.0	5.4	3.9	24.0	0.54
3	36.9	19.0	2.6	0.7	1.61	5.8	3.6	3.5	23.2	0.56
4	33.5	20.0	2.8	0.3	1.50	2.8	3.0	2.3	26.0	0.53
1961										
1	30.0	18.8	3.3	0.3	1.52	4.7	2.7	2.4	24.1	0.56
2	84.3	18.2	3.6	0.4	1.48	5.6	3.5	5.4	23.9	0.53
3	159.3	21.7	2.9	0.5	1.45	4.8	11.3	12.8	25.9	0.53
4	60.9	21.1	3.4	0.3	1.86	4.1	7.3	5.2	24.9	0.51

TABLE B-13

*Public Utilities: Standard Deviations of Arithmetic Means of
Ten Significant Variables, Quarterly, 1951-61*

Year and Quarter	X ₂	X ₃	X ₄	X ₅	X ₆	X ₇	X ₈	X ₁₂	X ₁₃	X ₁₅
1951										
1	10.7	8.9	1.1	0.6	0.87	1.5	1.1	0.5	7.0	0.17
2	27.1	8.0	1.7	0.8	0.48	1.6	4.4	1.8	7.7	0.13
3	64.7	5.6	1.5	0.0	0.62	1.5	5.5	4.1	4.3	0.13
4	56.5	6.3	1.3	0.7	0.48	7.6	5.4	3.9	6.4	0.06
1952										
1	41.5	6.5	1.2	0.6	0.40	0.6	2.8	3.5	5.3	0.06
2	87.8	7.3	1.3	0.8	0.65	0.0	17.7	3.2	4.8	0.09
3	97.6	8.1	1.9	0.9	0.52	1.7	2.1	7.4	6.9	0.14
4	132.2	7.5	7.5	0.9	0.46	2.1	9.6	6.8	6.8	0.14
1953										
1	164.5	7.8	1.3	0.9	0.75	2.8	34.6	8.4	7.7	0.11
2	80.7	5.5	1.7	0.7	0.50	2.6	8.6	7.9	2.6	0.09
3	117.1	6.6	1.8	0.8	0.59	2.5	9.5	5.5	4.9	0.12
4	25.6	4.8	3.4	0.3	0.51	1.3	2.6	2.0	4.0	0.09
1954										
1	67.1	6.6	1.5	0.5	0.62	9.6	23.1	6.4	3.8	0.10
2	18.0	6.9	1.3	0.8	0.51	0.5	1.8	2.0	5.0	0.12
3	152.2	6.9	1.4	0.5	0.74	7.7	3.9	8.7	5.7	0.06
4	28.0	7.2	1.2	0.4	0.50	3.3	3.6	2.2	6.5	0.10
1955										
1	328.8	7.2	1.8	0.8	0.59	0.0	22.7	14.6	4.9	0.12
2	27.4	5.8	2.4	1.1	0.51	1.1	2.2	1.8	4.6	0.11
3	114.2	5.7	1.3	0.8	0.62	5.0	7.2	9.4	3.9	0.13
4	11.4	6.0	2.3	0.7	0.51	1.2	1.1	1.4	5.7	0.09
1956										
1	57.9	6.4	1.9	0.9	0.58	2.4	9.6	7.5	3.7	0.13
2	212.7	5.3	1.3	0.6	0.69	3.8	8.7	9.8	4.3	0.09
3	19.0	5.1	1.5	0.5	0.50	2.8	2.5	1.2	2.7	0.09
4	161.2	6.7	1.4	0.9	0.61	4.4	6.6	17.1	6.0	0.13
1957										
1	296.1	7.5	1.7	1.0	0.60	3.4	7.7	14.3	5.9	0.11
2	36.9	4.6	3.2	0.8	0.48	3.3	3.5	2.7	3.2	0.11
3	234.2	6.6	1.4	0.9	0.56	3.4	18.2	12.0	5.1	0.10
4	40.0	6.1	1.1	0.7	0.43	3.0	4.3	3.0	4.8	0.06
1958										
1	233.4	5.2	2.3	0.8	0.46	2.4	11.9	15.6	3.3	0.09
2	321.2	6.5	2.0	0.9	0.76	2.2	17.5	13.0	4.8	0.10
3	53.6	5.9	2.5	0.7	0.63	3.4	8.0	6.4	3.5	0.14
4	58.8	5.2	1.0	1.0	0.51	2.8	3.2	4.6	4.5	0.10
1959										
1	53.9	5.5	1.3	0.7	0.46	2.7	5.0	3.6	4.7	0.10
2	505.0	6.8	1.1	0.8	0.69	3.1	24.8	25.9	9.2	0.08
3	61.6	5.7	1.6	0.8	0.64	4.0	14.7	4.5	5.1	0.09
4	75.8	6.0	1.4	0.8	0.52	4.5	3.8	6.8	2.4	0.07
1960										
1	366.4	5.9	1.1	0.4	0.68	3.4	15.5	17.8	4.4	0.09
2	105.0	5.2	2.5	1.0	0.62	4.7	7.5	7.7	4.3	0.12
3	69.4	6.0	0.9	1.1	0.61	3.7	6.0	7.5	3.8	0.09
4	33.5	7.0	1.9	0.8	0.55	2.8	3.5	2.3	3.5	0.12
1961										
1	46.6	6.3	1.1	0.7	0.59	3.2	3.2	3.6	5.5	0.09
2	291.0	6.4	1.6	0.8	0.59	6.2	10.2	17.0	5.5	0.08
3	294.0	5.7	1.1	0.9	0.52	2.6	13.8	26.3	3.8	0.06
4	87.9	7.7	2.0	0.8	1.46	1.9	12.3	8.0	7.5	0.09