

Journal of Legal Economics, 12 (2): 47-57
Fall 2002 (actually published in 2004).

Historical Net Discount Rates--An Update Through 2003

Introduction

The following eight tables are updated versions of the eight tables that were presented in a previous paper by this author that contained calculations through 1999 (Ireland 2000) and update through 2001 (Ireland 2000-01). The Bureau of Labor Statistics has made revisions to its "Average Weekly Earnings of All American Workers" series as of the *Economic Report of the President* (ERP) for 2004. The revisions go back to the beginning of the data for that series provided in tables 5-8. The current tables have been revised to include the revisions made in the series back to 1965. The 2004 ERP did not include data in that series prior to 1965 and tables 5-8 have therefore started with 1965 instead of 1959, as previously. This allowed calculations of up to 39 years. The 2004 ERP also removed reference to 1981 data for the Employer Cost Index, and that year of data was also dropped. For tables 1-4, however, data regarding the

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CPI and MCPI from the 2004 ERP allow a 50 year series. In other respects, the methods used in compiling these tables for the two previous publications have been maintained.

Brief Explanation of the Tables

The original purpose of these tables was to provide forensic economists with values for net discount rates and the real interest rate that were varied and flexible. The original version had data for the 30 year U.S. Treasury Bond rate. That has been discontinued because the U.S. Treasury stopped issuing those bonds several years ago. The tables still provide data for the 91 Day Treasury Bill, the 3 Year Treasury Note, the 10 Year Treasury Bond, the Corporate Aaa rate and the Municipal Aaa rate. Those rates are compared year by year with the CPI and the MCPI in tables 1-4 and with the Average Weekly Earnings series of earnings increases and the annual rates of change in the total compensation measure in the Employer Cost Index in tables 5-8. Using each interest rate and each growth rate, the tables provide year by year net discount rates for wage growth, the real interest rate by comparing each interest rate to the CPI growth rate, and the net medical discount rate by comparing each interest rate to the MCPI growth rate.

Tables 1 and 5 provide basic data from the ERP for price index increases in table 1 and for earnings increases in table 5. Tables 2 and 6 provide annual growth rates for each variable for periods starting in each past year and ending in 2003. This results in up to 50 year averages for the price index to interest rate comparisons and up to 40 year averages for the earnings growth rates to interest rate comparisons. Table 2, for example, shows that the arithmetic average rate of effective yields on 91 Day Treasury Bills from 1954 through 2003 was 5.64% and that the average rate of increase in the CPI over that same 50 year period was 3.96%.¹ Table 3 provides calculations of the real interest rate based on comparing each of the interest rates with the growth rate in the CPI for each of 50 possible time periods ending in 2003. Table 4 provides the same comparisons with the growth rate in the MCPI for up to 50 year periods. Table 7 provides calculations of the net discount rate based on comparing each of the interest rates with the growth rate in the Average Weekly Earnings series from for the 39 possible periods from 1965 through 2003. Table 7 provides calculations of the net discount rate based on comparing each of the interest rates with the annual growth rate in

total compensation in the total compensation measure in the Employer Cost Index for the 23 possible periods from 1981-2003.

Uses of the Tables

These tables were compiled to make it easier for a qualified forensic economist to counter claims made by unqualified forensic economic "experts" that various net discount rates are justified by historical experience. For example, claims are made in the reports of various would-be experts that purport to justify total offset or more than offset net discount rates. These claims may identify periods or interest rates that a qualified economist regularly uses. Having tables that employ multiple discount rates, multiple projections of growth rates and multiple periods over which projections are made provides a useful tool to counter such claims. These tables continue to provide no comfort for persons advocating total offset for anything but net rates based on the MCPI. For lost earnings and streams based on general consumer purchases, there is no justification for using total offset or more than offset calculations.²

Table 5. Annual Values for Various Interest Rates and Growth Rates in the Average Weekly Earnings and the Total Compensation Series of the Employer Cost Index from 1959-2003

	3	3	10	Corp	Muni	Av.	E
1965	4.111	4.22	4.28	4.49	3.27	4.2	n.a.
1966	5.106	5.23	4.92	5.13	3.82	3.5	n.a.
1967	4.504	5.03	5.07	5.51	3.98	2.8	n.a.
1968	5.601	5.68	5.65	6.18	6.94	5.4	n.a.
1969	7.066	7.02	6.67	7.03	5.81	6.1	n.a.
1970	6.825	7.29	7.35	8.04	6.51	4.2	n.a.
1971	4.533	5.65	6.16	7.39	5.70	6.2	n.a.
1972	4.236	5.72	6.21	7.21	5.27	7.7	n.a.
1973	7.469	6.95	6.84	7.44	5.18	6.2	n.a.
1974	8.411	7.82	7.56	8.57	6.09	5.6	n.a.
1975	6.145	7.49	7.99	8.83	6.89	5.6	n.a.
1976	5.222	6.77	7.61	8.43	6.49	7.3	n.a.
1977	5.521	6.69	7.42	8.02	5.56	6.9	n.a.
1978	7.669	8.29	8.41	8.73	5.90	7.6	n.a.
1979	10.862	9.71	9.44	9.63	6.39	7.2	n.a.
1980	12.568	11.55	11.46	11.94	8.51	6.8	n.a.
1981	15.583	14.44	13.91	14.17	11.23	8.6	9.9
1982	11.609	12.92	13.00	13.79	11.57	4.3	6.5
1983	9.250	10.45	11.10	12.04	9.47	4.8	5.7
1984	10.332	11.89	12.44	12.71	10.15	4.1	4.9
1985	7.957	9.64	10.62	11.37	9.18	2.4	3.9
1986	6.300	7.06	7.68	9.02	7.38	1.6	3.2
1987	6.125	7.68	7.68	9.38	7.73	2.4	3.3
1988	7.080	8.26	8.85	9.71	7.76	3.0	4.8
1989	8.674	8.55	8.49	9.26	7.24	3.6	4.8
1990	7.991	8.26	8.55	9.32	7.25	3.3	4.6
1991	5.689	6.82	7.85	8.77	6.89	2.5	4.4
1992	3.576	5.30	7.01	8.14	6.41	2.7	3.5
1993	3.121	4.44	5.87	7.22	5.63	2.9	3.6
1994	4.470	6.27	7.09	7.96	6.19	3.3	3.1
1995	5.787	6.25	6.57	7.59	5.95	2.3	2.6
1996	5.256	5.99	6.44	7.37	5.75	3.3	3.1
1997	5.310	6.10	6.35	7.87	5.55	4.5	3.4
1998	5.029	5.14	5.26	6.53	5.12	3.9	3.8
1999	4.868	5.49	5.65	7.04	5.43	3.2	3.3
2000	6.158	6.22	6.03	7.62	5.77	3.9	4.4
2001	3.576	4.09	5.02	7.08	5.19	2.7	4.0
2002	1.659	3.10	4.61	6.49	5.05	2.6	3.2
2003	1.082	2.10	4.01	5.67	4.73	2.6	3.8

Interest rates are taken from table B-75 of the Economic Report of the President. 2004. Percentage increases in Average Weekly Earnings are taken from table B-47 and percentage increases in the Total Compensation series of the Employer Cost Index are taken from table B-48. The ECI figure for 2001 is estimated at 4.0% based on results in the first three quarters. "3-Month" refers to the 90 Day U.S. Treasury Bill, "3-Year" refers to a constant maturity U.S. Treasury three year note, "10 Year" refers to a 10 Year U.S. Treasury Bond, "Corp. Aaa" refers to the Corporate Aaa rate, Muni Aaa refers to the Municipal Aaa rate, "CPI" refers to the Consumer Price Index, and "MCPY" refers to the medical component of the CPI. The 90 Day Treasury Bill rate is converted from "bank discount" to "effective yield."

Table 6. Average Rates for Various Interest Rates and Growth Rates in the Average Weekly Earnings and Total Compensation Series in the Employer Cost Index for the Number of Years Shown as Ending in 2003

Year	3			10			Corp		Muni		Av. Wk. %	E Cost %
	Year	month	year	year	year	year	Aaa	Aaa	Aaa	Av.		
1 Yr Ave	1.08	2.10	4.01	2.10	4.01	4.01	5.67	4.73	4.73	2.60	3.80	
2 Yr Ave	1.37	2.60	4.31	2.60	4.31	4.31	6.08	4.89	4.89	2.60	3.50	
3 Yr Ave	2.11	3.10	4.55	3.10	4.55	4.55	6.41	4.99	4.99	2.63	3.67	
4 Yr Ave	3.12	3.88	4.92	3.88	4.92	4.92	6.72	5.19	5.19	2.95	3.85	
5 Yr Ave	3.47	4.20	5.06	4.20	5.06	5.06	6.78	5.23	5.23	3.00	3.74	
6 Yr Ave	3.73	4.36	5.10	4.36	5.10	5.10	6.74	5.22	5.22	3.15	3.75	
7 Yr Ave	3.95	4.61	5.28	4.61	5.28	5.28	6.90	5.26	5.26	3.34	3.70	
8 Yr Ave	4.12	4.78	5.42	4.78	5.42	5.42	6.96	5.32	5.32	3.34	3.63	
9 Yr Ave	4.30	4.94	5.55	4.94	5.55	5.55	7.03	5.39	5.39	3.22	3.51	
10 Yr Ave	4.32	5.08	5.70	5.08	5.70	5.70	7.12	5.47	5.47	3.23	3.47	
11 Yr Ave	4.21	5.02	5.72	5.02	5.72	5.72	7.13	5.49	5.49	3.20	3.48	
12 Yr Ave	4.16	5.04	5.83	5.04	5.83	5.83	7.22	5.56	5.56	3.16	3.48	
13 Yr Ave	4.28	5.18	5.98	5.18	5.98	5.98	7.33	5.67	5.67	3.11	3.55	
14 Yr Ave	4.54	5.40	6.17	5.40	6.17	6.17	7.48	5.78	5.78	3.12	3.63	
15 Yr Ave	4.82	5.61	6.32	5.61	6.32	6.32	7.60	5.88	5.88	3.15	3.71	
16 Yr Ave	4.96	5.77	6.48	5.77	6.48	6.48	7.73	5.99	5.99	3.14	3.78	
17 Yr Ave	5.03	5.95	6.61	5.95	6.61	6.61	7.82	6.10	6.10	3.10	3.75	
18 Yr Ave	5.10	6.15	6.82	6.15	6.82	6.82	8.07	6.33	6.33	3.02	3.72	
19 Yr Ave	5.25	6.43	7.10	6.43	7.10	7.10	8.31	6.52	6.52	2.98	3.73	
20 Yr Ave	5.50	6.62	7.29	6.62	7.29	7.29	8.48	6.66	6.66	3.04	3.79	
21 Yr Ave	5.68	6.91	7.55	6.91	7.55	7.55	8.73	6.88	6.88	3.12	3.88	
22 Yr Ave	5.95	7.24	7.83	7.24	7.83	7.83	8.96	7.07	7.07	3.18	4.00	
23 Yr Ave	6.37	7.42	7.98	7.42	7.98	7.98	9.09	7.13	7.13	3.41	4.25	
24 Yr Ave	6.63	7.51	8.04	7.51	8.04	8.04	9.11	7.10	7.10	3.55	n.a.	
25 Yr Ave	6.80	7.54	8.05	7.54	8.05	8.05	9.09	7.05	7.05	3.70	n.a.	
26 Yr Ave	6.83	7.51	8.03	7.51	8.03	8.03	9.05	7.00	7.00	3.85	n.a.	
27 Yr Ave	6.78	7.48	8.02	7.48	8.02	8.02	9.03	6.98	6.98	3.96	n.a.	
28 Yr Ave	6.73	7.48	8.01	7.48	8.01	8.01	9.02	6.98	6.98	4.08	n.a.	
29 Yr Ave	6.71	7.48	8.01	7.48	8.01	8.01	9.02	6.98	6.98	4.13	n.a.	
30 Yr Ave	6.76	7.49	8.00	7.49	8.00	8.00	9.01	6.95	6.95	4.18	n.a.	
31 Yr Ave	6.76	7.48	7.96	7.48	7.96	7.96	8.96	6.89	6.89	4.25	n.a.	
32 Yr Ave	6.71	7.42	7.91	7.42	7.91	7.91	8.90	6.84	6.84	4.36	n.a.	
33 Yr Ave	6.64	7.37	7.85	7.37	7.85	7.85	8.86	6.81	6.81	4.41	n.a.	
34 Yr Ave	6.65	7.36	7.84	7.36	7.84	7.84	8.83	6.80	6.80	4.41	n.a.	
35 Yr Ave	6.66	7.35	7.81	7.35	7.81	7.81	8.78	6.77	6.77	4.45	n.a.	
36 Yr Ave	6.63	7.31	7.75	7.31	7.75	7.75	8.71	6.77	6.77	4.48	n.a.	
37 Yr Ave	6.57	7.25	7.67	7.25	7.67	7.67	8.62	6.70	6.70	4.44	n.a.	
38 Yr Ave	6.53	7.19	7.60	7.19	7.60	7.60	8.53	6.62	6.62	4.41	n.a.	
39 Yr Ave	6.47	7.12	7.52	7.12	7.52	7.52	8.43	6.54	6.54	4.41	n.a.	

The Employer Cost Index is Available in the Economic Report of the President, 2004 only after 1981, meaning that this series can only be used for the past 23 years.

Table 7. Net Discount Rates Based on Average Weekly Earnings of American Workers Compared with Various Interest Rates for the Number of Years Ending in 2003

Year	3			10			E		
	month	year	3	month	year	10	Corp	Muni	Av. Wk.% Cost %
1 Yr NDRP	-1.48	-0.49	1.37	2.99	2.08	0.00	0.00	1.17	1.17
2 Yr NDRP	-1.20	0.00	1.67	3.39	2.23	0.00	0.00	0.88	0.88
3 Yr NDRP	-0.51	0.45	1.86	3.68	2.30	0.00	0.00	1.01	1.01
4 Yr NDRP	0.16	0.90	1.91	3.66	2.17	0.00	0.00	0.87	0.87
5 Yr NDRP	0.45	1.17	2.00	3.67	2.17	0.00	0.00	0.72	0.72
6 Yr NDRP	0.56	1.17	1.89	3.48	2.00	0.00	0.00	0.58	0.58
7 Yr NDRP	0.59	1.22	1.87	3.44	1.86	0.00	0.00	0.35	0.35
8 Yr NDRP	0.75	1.39	2.02	3.50	1.92	0.00	0.00	0.28	0.28
9 Yr NDRP	1.05	1.67	2.25	3.69	2.10	0.00	0.00	0.28	0.28
10 Yr NDRP	1.06	1.79	2.40	3.77	2.17	0.00	0.00	0.23	0.23
11 Yr NDRP	0.98	1.76	2.44	3.81	2.22	0.00	0.00	0.27	0.27
12 Yr NDRP	0.97	1.82	2.59	3.93	2.33	0.00	0.00	0.32	0.32
13 Yr NDRP	1.13	2.01	2.79	4.10	2.48	0.00	0.00	0.43	0.43
14 Yr NDRP	1.38	2.21	2.95	4.22	2.58	0.00	0.00	0.49	0.49
15 Yr NDRP	1.61	2.38	3.07	4.31	2.64	0.00	0.00	0.54	0.54
16 Yr NDRP	1.76	2.55	3.23	4.44	2.76	0.00	0.00	0.61	0.61
17 Yr NDRP	1.87	2.70	3.35	4.58	2.91	0.00	0.00	0.63	0.63
18 Yr NDRP	2.02	2.85	3.49	4.73	3.06	0.00	0.00	0.68	0.68
19 Yr NDRP	2.20	3.07	3.73	4.94	3.25	0.00	0.00	0.72	0.72
20 Yr NDRP	2.39	3.29	3.94	5.11	3.37	0.00	0.00	0.72	0.72
21 Yr NDRP	2.48	3.39	4.04	5.20	3.43	0.00	0.00	0.73	0.73
22 Yr NDRP	2.69	3.62	4.24	5.38	3.59	0.00	0.00	0.79	0.79
23 Yr NDRP	2.86	3.70	4.27	5.37	3.54	0.00	0.00	0.81	0.81
24 Yr NDRP	2.97	3.73	4.27	5.34	3.45	0.00	0.00	n.a.	n.a.
25 Yr NDRP	2.99	3.67	4.18	5.21	3.28	0.00	0.00	n.a.	n.a.
26 Yr NDRP	2.87	3.55	4.05	5.05	3.09	0.00	0.00	n.a.	n.a.
27 Yr NDRP	2.71	3.41	3.91	4.90	2.92	0.00	0.00	n.a.	n.a.
28 Yr NDRP	2.54	3.27	3.78	4.75	2.79	0.00	0.00	n.a.	n.a.
29 Yr NDRP	2.47	3.21	3.73	4.70	2.73	0.00	0.00	n.a.	n.a.
30 Yr NDRP	2.48	3.18	3.66	4.63	2.65	0.00	0.00	n.a.	n.a.
31 Yr NDRP	2.43	3.10	3.56	4.52	2.54	0.00	0.00	n.a.	n.a.
32 Yr NDRP	2.25	2.94	3.40	4.36	2.38	0.00	0.00	n.a.	n.a.
33 Yr NDRP	2.13	2.83	3.30	4.26	2.29	0.00	0.00	n.a.	n.a.
34 Yr NDRP	2.15	2.83	3.29	4.24	2.29	0.00	0.00	n.a.	n.a.
35 Yr NDRP	2.11	2.78	3.21	4.14	2.22	0.00	0.00	n.a.	n.a.
36 Yr NDRP	2.06	2.71	3.13	4.05	2.19	0.00	0.00	n.a.	n.a.
37 Yr NDRP	2.04	2.69	3.10	4.01	2.17	0.00	0.00	n.a.	n.a.
38 Yr NDRP	2.03	2.67	3.06	3.95	2.12	0.00	0.00	n.a.	n.a.
39 Yr NDRP	1.98	2.60	2.98	3.85	2.04	0.00	0.00	n.a.	n.a.

"NDR" refers to the Net Discount Rate calculated as $[(1+i)/(1+g) - 1]$, where i is the interest rate being used and g is the rate of increase in Average Weekly Earnings for all American Workers.

Table 8. Net Discount Rates Based on the Total Compensation Series of the Employer Cost Index Compared with Various Interest rates for the Number of Years Ending in 2003

Year	3			10			E		
	month	year	3	month	year	10	Corp	Muni	Av. Wk.% Cost %
1 Yr EDP	-2.62	-1.64	0.20	1.80	0.90	-1.16	0.00	0.00	0.00
2 Yr EDP	-2.06	-0.87	0.78	2.49	1.34	-0.87	0.00	0.00	0.00
3 Yr EDP	-1.51	-0.55	0.85	2.65	1.28	-1.00	0.00	0.00	0.00
4 Yr EDP	-0.70	0.03	1.03	2.76	1.29	-0.87	0.00	0.00	0.00
5 Yr EDP	-0.26	0.44	1.28	2.93	1.44	-0.71	0.00	0.00	0.00
6 Yr EDP	-0.02	0.58	1.30	2.88	1.41	-0.58	0.00	0.00	0.00
7 Yr EDP	0.25	0.87	1.52	3.09	1.51	-0.34	0.00	0.00	0.00
8 Yr EDP	0.47	1.11	1.73	3.22	1.64	-0.28	0.00	0.00	0.00
9 Yr EDP	0.76	1.38	1.97	3.40	1.82	-0.28	0.00	0.00	0.00
10 Yr EDP	0.82	1.55	2.16	3.53	1.94	-0.23	0.00	0.00	0.00
11 Yr EDP	0.70	1.48	2.16	3.53	1.94	-0.27	0.00	0.00	0.00
12 Yr EDP	0.65	1.51	2.26	3.61	2.01	-0.31	0.00	0.00	0.00
13 Yr EDP	0.70	1.57	2.34	3.65	2.04	-0.43	0.00	0.00	0.00
14 Yr EDP	0.88	1.71	2.45	3.71	2.08	-0.49	0.00	0.00	0.00
15 Yr EDP	1.07	1.83	2.52	3.75	2.09	-0.53	0.00	0.00	0.00
16 Yr EDP	1.14	1.93	2.60	3.81	2.14	-0.61	0.00	0.00	0.00
17 Yr EDP	1.23	2.06	2.70	3.93	2.26	-0.62	0.00	0.00	0.00
18 Yr EDP	1.33	2.15	2.79	4.02	2.36	-0.67	0.00	0.00	0.00
19 Yr EDP	1.47	2.33	2.99	4.19	2.51	-0.72	0.00	0.00	0.00
20 Yr EDP	1.65	2.55	3.20	4.36	2.63	-0.72	0.00	0.00	0.00
21 Yr EDP	1.74	2.65	3.29	4.44	2.68	-0.72	0.00	0.00	0.00
22 Yr EDP	1.88	2.80	3.42	4.55	2.78	-0.79	0.00	0.00	0.00
23 Yr EDP	2.03	2.86	3.43	4.52	2.70	-0.80	0.00	0.00	0.00

"EDR" refers to the Net Discount Rate calculated as $[(1+i)/(1+g) - 1]$, where i is the interest rate being used and g is the rate of increase in the total compensation series of the Employer Cost Index.