Total Offsets in Forensic Economics:

Legal Requirements, Data Comparisons, and Jury Comprehension

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Introduction

"Total offsets" in forensic economics are assumptions that one set of variables will have

impacts that can be completely "offset" by another set of variables in such a way both sets of

variables can be eliminated from a damage calculation. The term "total offset" is often used to

refer to an assumption that wage growth and an appropriate discount rate for reducing future

values to present values exactly offset each other, two other "total offset" assumptions as well.

In forensic economics, the term "total offset" typically refers to either a complete offset

between increases in wages and discount rates (the "Alaska Rule," which was used in Alaska

until 1986) or to a complete offset between rates of price increase and the discount rate (the

"Pennsylvania Rule," which still applies in Pennsylvania today). A third total offset involving

discount rates is an assumed offset between increases in medical care costs and the discount rate.

There are also other "total offsets" that are sometimes used by economic experts in personal

injury and wrongful death damage analysis, but these will not be considered in the current paper.[1]

This paper considers these six total offset assumptions from the standpoint of

three criteria: (1) what is required by law?; (2) what is most accurate from the standpoint of

economic practice and theory?; and (3) what will be most helpful to a jury that is trying to assign

damages in a case at hand? The first criterion is a *sine qua non* for being an economic expert

witness and consultant. In terms of admissible testimony, legal restrictions trump issues of

theoretical accuracy and jury comprehension. If testimony does not conform to the requirements

of law, it will not be permitted. The second criterion of accuracy focuses on how much empirical

justification exists for the assumed offset. The third criterion of helpfulness to a jury takes into account the fact that a theoretically accurate and precise measurement of damages is not meaningful if a jury cannot comprehend and assess the method by which measurement was made. The social goal of expert testimony is having juries better informed and more able to assess complicated issues. As such, it may be important in some instances to sacrifice measurement precision to increase jury comprehension as long as this is done in a way that is not biased toward the plaintiff or the defendant. By its nature, any total offset calculation represents a simplification of the calculation process; therefore any total offset method will have some advantages according to the third criterion.

Total Offset

When the term "total offset" is used in forensic economics, it typically refers to a total offset between wage increases and the discount rate. This is the rule that was mandated by the Alaska Supreme Court from 1967 to 1986; for that reason, it is sometimes referred to as the "Alaska Rule.[2]" In 1986, however, the Alaska legislature eliminated the Alaska Rule and this author is not aware of any legal venues that require this specific offset to be made, though it may be frequently used in Pennsylvania (see below under the "Pennsylvania Rule"). This method is specifically mentioned and, with sufficient justification, [3] it is specifically allowed under the *Jones & Laughlin Steel Co. v. Pfeifer* (1983) decision which is the central precedent for lost earnings analysis in federal cases.[4] It is, however, not a favored method in that decision.

The advantage of this approach is its simplicity. If wage increases can be assumed to totally offset the discount rate needed to reduce future values to present values, wage loss can be assessed by multiplying the wage loss by the number of years over which the loss is projected to

continue. From the standpoint of jury comprehension, this method gets the highest possible rating, though the need for an economic expert to make this calculation seems questionable. In a case where this method is used, arguments may center around the work life period over which losses should be projected, but a base year loss figure and the number of years of losses are the only necessary variables for an instant calculation of loss. Under the *Pfeifer* decision, this is a legally permissible method only if given proper evidentiary foundation. This is not an easy feat, given the lack of consistency of this method with basic wage growth and interest rate data for the American economy over the past 40 years. Thus, this method fails from the standpoint of accuracy.

The lack of accuracy of this method is shown in Tables 40 and 41 at the end of this paper. The data contained in these tables is all taken from *The Economic Report of the President, 2008,* showing annual discount rates for five different interest rates and two wage series. The data cover the forty year period from 1965 to 2007. Data for the Employer Cost Index (ECI) for earnings was became available only in 1981. Arithmetic averages are calculated at the bottom of the table for five year, ten year, fifteen year, nineteen year, twenty year, twenty five year, thirty year, and thirty five year periods that end with 2007.[5]

Table 41 uses the averages for different time periods calculated for Table 40 to calculate net discount rates for corresponding periods. An explanation of the specific processes that were used is provided in the notes to Table 41. Net Discount Rates were calculated for all available periods using the "Average Weekly Earnings of All American Workers" ("Av.Wk.%") series and the Total Compensation Series of the Employer Cost Index ("E Cost"). Net discount rates are calculated through 40 years using the "Av. Wk. %" and through 25 year periods using "E Cost

%," which is the longest period available in recent versions of the *Economic Report of the President*. The final two columns show 0.00 comparison values when each series is compared to itself and provide measures of the differences between the two growth series when compared with each other. The only period and only discount rate for which one can find net discount rates approach close to total offset are five and ten year periods ending in 2007 with the 91 Day Treasury Bill rate.

The Pennsylvania Rule--An Offset Between the CPI and the Discount Rate

The "Pennsylvania Rule" is confined to the state of Pennsylvania.[6] State law requires that an offset be assumed between the rate of inflation, represented by the Consumer Price Index and the discount rate. Since the first criterion for being an economic expert is to conform one's calculations to existing law, experts in that state have no choices about this particular issue. It was, in fact, this issue that prompted the ruling federal precedent in *Jones & Laughlin Steel v. Pfeifer* (1983), 103 S. Ct. 2541. Howard Pfeifer, a longshoreman in western Pennsylvania had won an award for damages under the Longshoremen's and Harbor Worker's Compensation Act, which had been, according to Pennsylvania law, calculated by the total offset method. The United States Supreme Court ruled that, contrary to Pennsylvania law, the total offset method was not mandated in federal courts in Pennsylvania. For this reason, the Supreme Court vacated the trial court decision and remanded the case to for further consideration of damages.

In reading *Pfeifer* and cases following *Pfeifer*, it is not always clear that the courts have been cognizant of the difference between total offset as an offset between wages and the discount rate and total offset as an offset between the CPI and the discount rate. Indeed, over the past 20 years, calculations under the two different total offsets would have had quite similar results since

wage increases, until the very recent past, have been quite similar to the rate of inflation, implying very little increase in real earnings. The difference between these two forms of total offset occurs when there are productivity increases in earnings. In other words, in theory, one could add productivity increases in earnings under the Pennsylvania Rule since the mandated total offset is between inflation and the discount rate. Some forensic economists in Pennsylvania, however, have not chosen to do so, realizing that the mandated offset between inflation and the discount rate already implies overcompensation for lost earnings, at least for workers 35 and older. In general, the only uses of the Pennsylvania total offset method have been in the state of Pennsylvania and only because of the requirements of state law. Effectively, this means that the criteria of accuracy and clarity to a jury are moot issues.

Tables 42 and 43 are structured similarly to Tables 40 and 41, but with the CPI-U and the Medical CPI substituted for the growth rates in Average Weekly Earnings and the Employer Cost Index. Using the CPI effectively makes the net discount rates from Table 41 become real interest rates (RDR's) in Table 43. Medical Net Discount rates are shown as MDR's. Real rates are positive for all comparison periods in Table 43.

Total Offset between Medical Care Cost Increases and the Discount Rate

It is common in the medical economics literature to assume a total offset between rates of medical care increase and the discount rate.[7] Many forensic economists do this as well with respect to life care costs when an individual has been catastrophically injured and a costs of a life care plan are part of damages in personal injury cases. As Table 43 suggests, a total offset between medical care costs and selected discount rates is much less unreasonable than an assumed total offset between earnings of an average worker and the discount rate.

However, this semblance of parity between rates of medical care increase and discount rates is sometimes misused to characterize rates of cost increase in life care plans. Life care plans, especially life care plans with large values, contain large component costs for attendant care. Costs of trained attendants and even Licensed Practical Nurses have not increased at the rates indicated in Tables 42 and 43 for the Medical Care CPI. Neither have many basic medical commodities, like wheel chairs and other basic types of equipment. Further, many items in life care plans are simply ordinary commodities made necessary because of the life care needs of the injured individual. This use of a total offset for the total annual costs of a life care plan would significantly overstate the true expected rates of increase for the majority of components in the plan, even assuming that a total offset for medical care itself is reasonable. That, of course, requires the use of the "parking value of money" 91 day U.S. Treasury Bill rate. Other rates would result in higher net discount differences. With medical care cost increases, it also must be understood that historical rates of increase were so far above the average for other types of goods and services that they could not have been expected to continue at historical rate in any case.

From the standpoint of the legal criterion, this total offset poses no special problem. Neither the states nor the federal courts have special rules for dealing with rates of cost increase for medical or life care plans relative to discount rates used to reduce future costs to present value. From the standpoint of economic accuracy, an assumption of total offset between medical care costs and the discount rate is less unreasonable than total offsets between earnings and the discount rate or general price inflation and the discount rate. But this assumption still overstates future increases in medical care cost unless the discount rate used is the three month Treasury Bill rate. And it certainly overstates the rates of cost increase for most life care plans, especially

those with large components for attendant care. From the standpoint of jury comprehension,

there is usually little problem for jurors in understanding that medical care increases have been

greater than other cost increases.

References

Economic Report of the President, 2010, and earlier editions.

Endnotes

1.Other "total offsets" include: (a)An assumed offset between income taxes on lost earnings and income tax liabilities on interest paid on balances in loss replacement accounts. In most states, income taxes that would have to have been paid on lost earnings are not taxable, so this offset would be irrelevant. However, in federal personal injury litigation and in Hawaii and South Carolina (and perhaps other states) taxes are subtracted from lost earnings. For loss calculations in those venues, some economic experts try to argue that the taxes owed on income would offset taxes owed on the interest on the loss replacement fund that both can be ignored. (b)An assumed offset between income taxes owed on lost earnings in the same venues, and fringe benefits that a worker would have received in addition to income. (c) Still another "total offset", in use in Canada, is an assumed total offset between negative employment contingencies (mainly unemployment and non-participation) and job-related fringe benefits.

2. The "Alaska Rule" originated with *Beaulieu v. Elliot*, 434 P.2d 665 (Alaska 1967). It was modified somewhat by *State v. Quinn*, 555 P.2d 530 (Alaska 1976), which affirmed the Court's earlier *Beaulieu* ruling of no growth and no discount, but allowed plaintiffs to include known step increases that existed in current contracts. Quite interestingly, while sticking with *Beaulieu* and *Guinn*, the Court decided that pensions should be reduced to present value in *Alaska Airlines v. Sweat*, 568 P.2d 916 (Alaska 1977) and again in the same original case *Alaska Airlines v. Sweat*, 584 P.2d 544 (Alaska 1978). The "Alaska Rule" was eliminated in 1986 by statute AS 09.17.040(b), which requires explicit consideration of inflation, real growth, and reduction to present value for all actions arising after passage in 1986. The author thanks Paul Taylor for this review of the history of the "Alaska Rule."

3. This is discussed in the next section in the context of the "Pennsylvania Rule" since *Pfeifer* represented a specific challenge to the "Pennsylvania Rule" in federal actions in Pennsylvania.

4.This approach is used by only a very small number of forensic economists, but is commonly associated with employees of Vocational Economics, a business centered in Louisville, Kentucky that has branches in a number of states. It appears to be a business practice of Vocational Economics for this method to be used in all lost earnings cases and for the use of this practice to be justified in a particular way. A few other practitioners, including Dr. Charles Linke of the University of Illinois, argue for a total offset approach, but offer different types of

justification for this method.

5.Calculating geometric averages for the same periods involves an extensive process of formula development. Geometric averages were calculated for periods up to 22 years and showed very little difference from simple arithmetic averages of annual rates. Therefore, arithmetic averages were used in all calculations in both Tables 1 and 2.

6. This is based on *Kaczkowski v. Bolubasz*, 491 Pa. 561, 421 A.2d 1027 (1980). Based on the name of the defendant, *Bolubasz*, this case is sometimes referred to by Pennsylvania attorneys as the "soup" case. This author thanks James D. Rodgers for this citation.

7. The author thanks Ted R. Miller for suggesting this item.

Table 40 - Comparison of Various Interest Rates to Rates of Increase in Average Weekly Earnings for All American Workers and the Employer Cost Index (after 1981)

Year	3-month	3-year	10-year	Corp Aaa	Muni Aaa	Av. Wk.%	E Cost %
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	1.041	2.10	4.01	5.67	4.73	2.6	3.8
2004	1.411	2.78	4.27	5.63	4.63	2.2	3.9
2005	3.269	3.93	4.29	5.24	4.29	2.9	3.2
2006	4.943	4.77	4.80	5.59	4.42	4.3	2.8
2007	4.559	4.35	4.63	5.56	4.42	3.8	3.2
2008	1.515	2.24	3.66	5.63	4.80	3.0	2.4
2009	0.162	1.43	3.26	5.31	4.64	1.4	1.2

Interest Rates in Table 40 are taken from Table B-73 of the *Economic Report of the President: 2010.* Percentage increases in average weekly earnings are taken from Table B-47. Percentage Increases in the Employer Cost Index are taken from Table B-48. Abbreviations are explained in Table 41.

Table 41--Calculation of Net Discount Rates Based on Comparisons of Various Interest Rates to Average Weekly Earnings for All American Workers and the Employer Cost Index (after 1979)

Average Annual Discount and Growth Rates for the Periods Ending in 2009

Years Averaged	3 month	3 year	10 year	Muni	CorpAAA	Ave Wk	E-Cost
5 Year Average	2.89	3.34	4.13	5.47	4.51	3.10	2.54
10 Year Average	2.83	3.50	4.46	5.98	4.79	2.91	3.23
15 Year Average	3.64	4.27	4.99	6.41	5.05	3.09	3.22
20 Year Average	3.97	4.75	5.56	6.88	5.41	3.05	3.38
25 Year Average	4.62	5.45	6.18	7.45	5.90	2.96	3.50
30 Year Average	5.83	6.58	7.21	8.37	6.61	3.42	n.a.
35 Year Average	6.01	6.76	7.35	8.42	6.56	3.92	n.a.
40 Year Average	6.04	6.75	7.29	8.33	6.46	4.18	n.a.

Net Discount Rates Based on Average Weekly Earnings for the Periods Ending in 2009

Years Averaged	3 month	3 year	10 year	Muni	CorpAAA	Ave Wk	E-Cost
5 Yr Net Discount Rate	-0.20	0.24	1.00	2.29	1.37	0.00	-0.54
10 Yr Net Discount Rate	-0.08	0.57	1.50	2.99	1.83	0.00	0.31
15 Yr Net Discount Rate	0.53	1.14	1.84	3.23	1.90	-0.00	0.13
20 Yr Net Discount Rate	0.89	1.65	2.44	3.72	2.29	0.00	0.32
25 Yr Net Discount Rate	1.61	2.42	3.13	4.37	2.85	0.00	0.52
30 Yr Net Discount Rate	2.33	3.06	3.67	4.78	3.09	0.00	n.a.
35 Yr Net Discount Rate	2.01	2.73	3.30	4.33	2.54	0.00	n.a.
40 Yr Net Discount Rate	1.79	2.46	2.98	3.99	2.19	-0.00	n.a.

Net Discount Rates Based on Employer Cost Index for the Periods Ending in 2009

Years Averaged	3 month	3 year	10 year	Muni	CorpAAA	Ave Wk	E-Cost
5 Yr Net Discount Rate	0.34	0.78	1.55	2.85	1.93	0.55	0.00
10 Yr Net Discount Rate	-0.39	0.26	1.19	2.67	1.52	-0.31	0.00
15 Yr Net Discount Rate	0.40	1.01	1.71	3.10	1.77	-0.13	0.00
20 Yr Net Discount Rate	0.57	1.33	2.11	3.39	1.96	-0.32	-0.00
25 Yr Net Discount Rate	1.08	1.88	2.59	3.82	2.31	-0.52	0.00

In Tables 40 and 41, "3-month" refers to the ending rate on 91 Day U.S. Treasury Bills. "3-Year" refers to the ending rate on three year U.S. Treasury Notes, "10-Year" refers to ending rates on 10 U.S. Treasury Bonds. "Corp Aaa" refers to the ending rate on Aaa rated corporate bonds. "Muni Aaa" refers to the ending rate on Aaa rated state and local bonds that are not subject to federal income taxation. "Av. Wk. %" refers to the annual rate of change in average weekly earnings of all American workers during that year. "E Cost %" refers to the annual rate of change in the Employer Cost Index, starting after 1981. All Data are taken from *The Economic Report of the President:* 2010, with tables indicated in the notes to Table 40

Table 41 was developed from data reported in Table 40, based on the general formula (1 + i)/(1 +g) = 1 + the appropriate net rate. Thus, in the first calculation reported above, the period was a five year average. Using the five year average rate of interest for 10 year U.S. Treasury Bonds of 4.46 percent and the five year average rate of increase in average weekly earnings of 2.91 percent, those numbers would be substituted into the general formula as 1.0446/1.0291 = 1.0150. Therefore, 1.50 is the net discount rate based on a five year average of the interest rate on 10 Year U.S. Treasury Bonds and the five year average of annual rates of increase in average weekly earnings of all American workers. The numbers reported in the final two columns are not net discount rates, but comparisons of data in the average weekly earnings series with the employer cost series. The number zero appears for values in the "Ave. Wk. %" for all NDR entries the value is equal to the rate of change in average weekly earnings divided by itself minus one, which equals zero.

The "5 Yr Net Discount" figure of 0.55 for Average Weekly Earnings in the "E Cost %" column implies that average weekly earnings percentage was smaller than the employer cost percentage for that five year period. The negative 0.54 that appears in the comparison for the "5 Yr Net Discount Rate" for the Employer Cost Index is based on the rate of change in the Employer Cost Index. These numbers are the inverse of each other with slight variation due to rounding. The 10, 15, 20 and 25 year comparisons between NDR And EDR the inverses of each other. Since the Employer Cost Index figures are reported after 1981, the longest possible comparison of that data source is 25 years, which is why that calculation is only reported for a 25 year period.

Table 42– Comparison of Various Interest Rates to Rates of Increase in the CPI and MCPI

Year	3-month	3-year	10-year	Corp Aaa	Muni Aaa	CPI Incr.	Med CPI
1965	4.111	4.22	4.28	4.49	3.27	1.6	3.2
1966	5.106	5.23	4.92	5.13	3.82	2.9	5.3
1967	4.504	5.03	5.07	5.51	3.98	3.1	8.8
1968	5.601	5.68	5.65	6.18	6.94	4.2	7.3
1969	7.066	7.02	6.67	7.03	5.81	5.5	8.2
1970	6.825	7.29	7.35	8.04	6.51	5.7	7.0
1971	4.533	5.65	6.16	7.39	5.70	4.4	7.4
1972	4.236	5.72	6.21	7.21	5.27	3.2	3.5
1973	7.469	6.95	6.84	7.44	5.18	6.2	4.5
1974	8.411	7.82	7.56	8.57	6.09	11.0	10.4
1975	6.145	7.49	7.99	8.83	6.89	9.1	12.6
1976	5.222	6.77	7.61	8.43	6.49	5.8	10.1
1977	5.521	6.69	7.42	8.02	5.56	6.5	9.6
1978	7.669	8.29	8.41	8.73	5.90	7.6	8.4
1979	10.862	9.71	9.44	9.63	6.39	11.3	9.2
1980	12.568	11.55	11.46	11.94	8.51	13.5	11.0
1981	15.583	14.44	13.91	14.17	11.23	10.3	10.7
1982	11.609	12.92	13.00	13.79	11.57	6.2	11.6
1983	9.250	10.45	11.10	12.04	9.47	3.2	8.8
1984	10.332	11.89	12.44	12.71	10.15	4.3	6.2
1985	7.957	9.64	10.62	11.37	9.18	3.6	6.3
1986	6.300	7.06	7.68	9.02	7.38	1.9	7.5
1987	6.125	7.68	7.68	9.38	7.73	3.6	6.6
1988	7.080	8.26	8.85	9.71	7.76	4.1	6.5
1989	8.674	8.55	8.49	9.26	7.24	4.8	7.7
1990	7.991	8.26	8.55	9.32	7.25	5.4	9.0
1991	5.689	6.82	7.85	8.77	6.89	4.2	8.7
1992	3.576	5.30	7.01	8.14	6.41	3.0	7.4
1993	3.121	4.44	5.87	7.22	5.63	3.0	5.9
1994	4.470	6.27	7.09	7.96	6.19	2.6	4.8
1995	5.787	6.25	6.57	7.59	5.95	2.8	4.5
1996	5.256	5.99	6.44	7.37	5.75	3.0	3.5
1997	5.310	6.10	6.35	7.87	5.55	2.3	2.8
1998	5.029	5.14	5.26	6.53	5.12	1.6	3.2
1999	4.868	5.49	5.65	7.04	5.43	2.2	3.5
2000	6.158	6.22	6.03	7.62	5.77	3.4	4.1
2001	3.576	4.09	5.02	7.08	5.19	2.8	4.6
2002	1.659	3.10	4.61	6.49	5.05	1.6	4.7
2003	1.041	2.10	4.01	5.67	4.73	2.3	4.0
2004	1.411	2.78	4.27	5.63	4.63	2.7	4.4
2005	3.269	3.93	4.29	5.24	4.29	3.4	4.2
2006	4.943	4.77	4.80	5.59	4.42	3.2	4.0
2007	4.559	4.35	4.63	5.56	4.42	2.8	4.4
2008	1.515	2.24	3.66	5.63	4.80	3.8	3.7
2009	0.162	1.43	3.26	5.31	4.64	-0.4	3.2

Interest Rates in Table 42 are taken from Table B-73 of the *Economic Report of the President: 2010*. Increases in the CPI and MCPI are taken from Table B-64. Abbreviations are explained in Table 43.

Table 43--Real Interest Rates and Medical Care Net Discount Rates Calculated from Comparisons of Various Interest Rates, Rates of Change in the CPI and the Medical CPI

Average Annual Discount and Growth Rates for the Periods Ending in 2009

Years Averaged	3-month	3-year	10-year	Corp Aaa	MuniAaa	CPI Incr.	Med CPI
5 Year Average	2.89	3.34	4.13	5.47	4.51	2.56	3.90
10 Year Average	2.83	3.50	4.46	5.98	4.79	2.56	4.13
15 Year Average	3.64	4.27	4.99	6.41	5.05	2.50	3.92
20 Year Average	3.97	4.75	5.56	6.88	5.41	2.79	4.73
25 Year Average	4.62	5.45	6.18	7.45	5.90	2.95	5.17
30 Year Average	5.83	6.58	7.21	8.37	6.61	3.71	5.92
35 Year Average	6.01	6.76	7.35	8.42	6.56	4.33	6.50
40 Year Average	6.04	6.75	7.29	8.33	6.46	4.55	6.50
45 Year Average	5.96	6.60	7.07	8.04	6.27	4.43	6.51

Real Discount Rates Based on the CPI for the Periods Ending in 2009

Years Averaged	3-month	3-year	10-year	Corp Aaa	MuniAaa	CPI Incr.	Med CPI
5 Yr Real Discount Rate	0.32	0.76	1.53	2.83	1.91	0.00	1.31
10 Yr Real Discount Rate	0.26	0.92	1.85	3.34	2.18	0.00	1.53
15 Yr Real Discount Rate	1.11	1.72	2.43	3.82	2.49	0.00	1.39
20 Yr Real Discount Rate	1.15	1.91	2.70	3.98	2.54	-0.00	1.89
25 Yr Real Discount Rate	1.62	2.43	3.14	4.38	2.86	-0.00	2.15
30 Yr Real Discount Rate	2.04	2.77	3.38	4.49	2.80	-0.00	2.13
35 Yr Real Discount Rate	1.61	2.33	2.90	3.92	2.14	-0.00	2.08
40 Yr Real Discount Rate	1.43	2.10	2.62	3.62	1.82	0.00	1.87
45 Yr Real Discount Rate	1.46	2.08	2.53	3.45	1.76	-0.00	1.99

Medical Net Discount Rates Based on the MCPI for the Periods Ending in 2009

Years Averaged	3-month	3-year	10-year	Corp Aaa	MuniAaa	CPI Incr.	Med CPI
5 Yr Medical Discount Rate	-0.97	-0.54	0.22	1.51	0.59	-1.29	0.00
10 Yr Medical Discount Rate	-1.25	-0.60	0.31	1.78	0.64	-1.51	0.00
15 Yr Medical Discount Rate	-0.27	0.33	1.03	2.40	1.09	-1.37	0.00
20 Yr Medical Discount Rate	-0.73	0.02	0.79	2.05	0.64	-1.86	0.00
25 Yr Medical Discount Rate	-0.52	0.27	0.96	2.17	0.69	-2.11	-0.00
30 Yr Medical Discount Rate	-0.09	0.63	1.22	2.31	0.65	-2.09	-0.00
35 Yr Medical Discount Rate	-0.46	0.24	0.80	1.80	0.06	-2.04	-0.00
40 Yr Medical Discount Rate	-0.43	0.23	0.74	1.72	-0.04	-1.83	0.00
45 Yr Medical Discount Rate	-0.52	0.09	0.52	1.43	-0.23	-1.95	0.00

In Tables 42 and 43, "3-month" refers to the ending rate on 91 Day U.S. Treasury Bills. "3-Year" refers to the ending rate on three year U.S. Treasury Notes, "10-Year" to the ending rates on 10 year U.S. Treasury Bonds. "Corp Aaa" refers to the ending rate on Aaa rated corporate bonds. "Muni Aaa" refers to the ending rate on Aaa rated state and local bonds that are not subject to federal income taxation. "CPI Increase" refers to the annual rate of increase in the Consumer Price Index. "Med CPI" refers to the annual rate of increase in the medical care component of the Consumer Price Index. All data is taken from the *Economic Report of the President 2010*, with tables and pages indicated as for Table 42. .

Table 43 was developed from data reported in Table 42, based on the general formula (1 + i)/(1 +g) = (1 + the appropriate net rate). In the first calculation reported above, the period was a five year average. Using the five year average rate of interest for 10 year U.S. Treasury Bonds of 4.46 percent and the five year average rate of increase in the Consumer Price Index of 2.64 percent, those numbers would be substituted into the formula as 1.0446/1.0256 = 1.0185. Therefore, 1.85 is the real discount rate based on a five year average of the interest rate on 10 Year U.S. Treasury Bonds and the five year average of annual rates of increase in the Consumer Price Index. The same calculations is made for the Medical Discount Rate. The numbers in the final two columns are not net discount rates, but comparisons of data in the CPI and Med CPI columns. The number zero appears for all values in the "CPI" column for the real discount categories because the value is equal to the rate of change in average weekly earnings divided by itself minus one, which equals zero. The 5 Yr real figure of 1.31 in the for the MDR column implies that the MCPI was greater than the CPI by that amount. The -1.29 value that appears in the comparison for the 5 Yr MDR column where the formula is the inverse of the 1.31 rate in the 5 Yr real discount rate column. Numbers vary slightly due to rounding.