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FACULTY WORKING
PAPER NO. 815

Measuring and Interpreting Current, Permanent and Transitory Earnings and Dividends: Methods and Applications

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October 1981

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ABSTRACT

This paper develops theories to explain how firms generally allocate permanent earnings and transitory earnings between dividend payments and retained earnings. It also develops a method for decomposing current earnings into permanent and transitory components.

Building on Friedman's permanent income hypothesis, models are developed to decompose current earnings into permanent and transitory components by adapting the methods suggested by Michael R. Darby in his 1972 American Economic Review article and his 1974 Quarterly Review of Economics publications.

I. Introduction

Earnings of a firm are allocated between retained earnings and dividends by a financial decision. Retained earnings are internal sources of funds which provide additional financial capital which may be used either for expansion or as a financial reserve against future contingencies; dividends are generally distributed to stockholders to satisfy their need for liquidity or for other uses according to their preference functions. It is well-known that earnings of a firm can be classified into either a permanent component or a transitory component. A firm's permanent earning power creates the permanent component and the transitory component is composed of income of temporary nature. Modigliani and Miller (1958, 1961, 1963, 1966) have argued that a firm's market value is determined by its expected (or permanent) earnings, not its transitory component of income.

The transitory component of a firm's earnings originates from a temporary change in market conditions, a temporary change in accounting method or any other non-permanent change which would cause earnings to fluctuate over time. Latané and Jones (1979) discuss the importance of unexpected earnings of firms as signaling information in financial management and investment analysis. However, to the authors' best knowledge, an acceptable method for decomposing current earnings into permanent (expected) and transitory (unexpected) earnings has not been previously developed.

The forecasting of dividends is of importance to the security analyst; therefore, allocations between retained earnings and dividend payments are generally a serious concern of financial managers.

The main purposes of this paper are (1) to develop theories to explain how firms generally allocate permanent earnings and transitory earnings between dividends payments and retained earnings and (2) to develop a method for decomposing current earnings into permanent and transitory components. Implications are also developed for a firm's dividend policy and payments decision for each of these income components.

The first section is the introduction. The second section modifies Friedman's (1957) permanent income hypothesis to describe the role of permanent earnings and transitory earnings in the dividend determination process. The relationship between accountings earnings and economic earnings are also discussed. The third section employs models to decompose the current earnings into permanent and transitory components according to methods proposed by Darby (1972, 1974). The fourth section, uses disaggregated earnings and dividends data of the electric utility industry to determine whether permanent earnings or current earnings data should be used to describe dividend payment behavior in that business. The final section summarizes the results and provides some concluding remarks.

II. Theoretical Determination of Firm's Permanent and Transitory Earnings

In the development of the consumption function, which is one of the key concepts in Keynesian economics, several important theories were developed to explain how consumers adjust consumption expenditures to accommodate changes in their levels of income. One of these theories is the Permanent Income Hypothesis developed by Milton Friedman (1957).[1]

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[1] When Friedman received the Nobel prize in economics, this work was cited as one of his major contributions.

The Permanent Income Hypothesis explains that consumption is not a function of current income but a function of permanent income. Total income, Y, is composed of two components, $Y_p + Y_t$, where Y_p is permanent income and Y_t is transitory income. Transitory income is not fully anticipated and it may be positive or negative. That is, a prize would constitute a positive transitory income component while a loss of income from temporary illness or layoff would constitute a negative component of permanent income. Friedman explains that these transitory elements would not affect consumption expenditures.

The Permanent Income Hypothesis is readily adaptable to finance theory and a new theory of dividend payments by business can be developed. The income of interest here is the income of the business firm and dividends are analogous to consumer consumption expenditures.

The level of permanent income earned by a firm determines the permanent dividends it can pay out to stockholders. Permanent income is essentially an average of current, past, and future earnings of the firm. Current income is divided into two components:

(2.1) $$Y = Y_p + Y_t$$

where: Y = current income of the firm
Y_p = permanent income of the firm
Y_t = transitory income of the firm

Transitory income may be postive or negative and current income will differ from permanent income by the amount of transitory income. A business earns transitory income, which is really unanticipated earnings, from windfall profits from any source. For example, oil companies are now earning transitory income from the increase price they receive from selling products made from crude oil produced domestically. Firms incur negative transitory income if they experience an uninsured catastrophic event such as the destruction of a plant by a disaster of any kind or an unexpected strike by employees. The transitory components of income, positive and negative, should cancel out over the permanent income time horizon. Transitory components, however, are always present during shorter time periods.

Professor Eisner (1967, 1978) has developed a permanent income theory for investment decision. If firm investment essentially depends upon internal sources of funds, then the nature of retained earnings is an important factor affecting the decision to undertake long-term or short-term investment.

Retained earnings can conceptually be decomposed into two components, i.e. permanent and transitory components. Dividends can also be divided into two components: permanent dividends and transitory dividends:

(2.2) $$D = D_p + D_t$$

where: D = current dividends paid by the firm.
D_p = permanent dividends paid by the firm.
D_t = transitory dividends paid by the firm.

Permanent dividends are only one component of dividends and total dividends may be larger than permanent dividends, depending upon the level of transitory dividends. Permanent dividends are dividends which the business firm systematically pays based on its permanent earnings; dividends paid out of transitory earnings would constitute extra dividends. Weston and Brigham (1981) explain that a firm may have one of three dividend policies: (1) stable dollar amount per share, (2) constant payout ratio, or (3) a compromise; lower regular dividend, plus extras.

All income is either paid out in dividends or retained by the business in the form of retained earnings.

(2.3) $$Y = Y_p + Y_t$$

$$Y - (D_p + D_t) - E_R = 0$$

where:
Y = current income of the firm.
Y_p = permanent income of the firm.
Y_t = transitory income of the firm.
D_p = permanent dividends of the firm.
D_t = transitory dividends of the firm.
E_R = retained earnings of the firm.

Y_t and D_t are "random" or "chance" variations in income and dividends.

Transitory dividends are paid from transitory income and are short-run in nature. They are part of the short-run measure of dividend yields. In contrast, permanent dividends are paid from permanent earnings, are long-run in nature, and constitute all of the long-run measure of dividend yield. Recently, Miller and Scholes (1981) demonstrated that short-run dividend yield and long-run dividend yield each have different implications in testing the effectiveness of alternative dividend policies on the security rate of return determination. Our theoretical framework, decomposing income and dividend payout into permanent and transitory components, elaborates upon their theoretical justification of short-run and long-run dividend yield measurements. Generally, transitory earnings are not used for payment of permanent dividends. However, transitory dividends can come from either transitory earnings or permanent earnings.

Different sources of dividend payment (i.e., permanent income or current income) may have different implications in determining a firm's dividend payment behavior. This condition gives us the motivation for examining both permanent earnings per share and current earnings per share for describing a firm's dividend payment behavior in the empirical section of this work.

III. Models for Decomposing Current Earnings Into Permanent and Transitory Earnings Components

The models used to compute permanent income as proposed by Friedman (1957) can be classified into the traditional approach and Darby's (1974) modified unbiased method. The modified method can be defined as

$$(3.1) \qquad Y_{pt} = \beta Y_t + (1 - \beta)(1 + C)Y_{pt-1}$$

where Y_{pt} and Y_{pt-1} are permanent income in period t and t-1 respectively; Y_t is the current income in period t; β is the adjustment coefficient and C is the trend rate of income growth.

To estimate the permanent income series, we need β, C and Y_{po}. Darby (1974) has shown that the unbiased weight of current income in the determination of permanent income of about .10 on an annual basis and .025 on a quarterly basis. The initial value Y_{po} and trend rate C can be taken from estimating the income trend regression

$$(3.2) \qquad \log Y_t = a_1 + a_2 t + u_t$$

After a_1 and a_2 are estimated, the Y_{po} and C can be defined as

$$(3.3)\qquad Y_{po} = e^{\hat{a}_1} \text{ and}$$

$$\log(1 + c) = \hat{a}_2$$

Note that this is only one of several methods to estimate C and Y_{po}. The estimated Y_{po} and C can be used in equation (3.1) to repeatedly estimate Y_{pt}. It should also be noted that estimated a_2 is the earnings growth rate estimate.

Standard and Poor's categorizes firms according to whether they are involved in industrial, public utility, transportation or finance businesses. The sample and analysis involved in this research is restricted to public utility firms, and other sectors are not included. This approach was taken for two reasons: first, dividend behavior of a firm in this industry is of interest to both investor and regulators. Regulators are interested in dividend policy because payments must be adequate to insure the integrity of the financial investment of stockholders without being excessive and seriously weakening the generating of internal sources of investment funds. Investors in the industry must receive adequate financial return on their investment. Management of firms in the public utility industries, therefore, must balance the interests of stockholders against the interest of the regulators who are concerned about consumers.

Both quarterly and annual earnings and dividend data from forty-two electric utility firms were used for the empirical investigations.[2] The operating data covered the period of 1962-1978.

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[2]Seasonal components were removed by using X-11 multiplicate decomposing method which was developed by the Department of Commerce.

IV. Current Earnings, Permanent Earnings and Investment Analysis

Accounting earnings contain a transitory component which does not represent the true earning power of the firm. Hence, the transitory component of earnings should not be used to determine the business' future value.

Security analysts of Value Line have generally used only the permanent component of earnings to forecast the expected future market value of common stock. Modigliani and Miller (1958, 1961, 1963, 1966) [M&M] have shown that expected earnings should be used instead of current earnings to determine the value of a firm. In estimating the cost of capital for the utility industry, M&M (1966) used the instrumental variable approach to remove the transitory component associated with current earnings. One difficulty of using the instrumental variable approach involves the selection of the appropriate explanatory variables for specifying the regression equation. A more desirable approach for determining the permanent component of earnings was previously set out in section III.

To estimate permanent income, we should estimate the initial value of permanent income and the trend rate of income growth. The exact procedures used to develop these estimations are described in equations (3.2) and (3.3). After these equations are estimated, they may be used to estimate either annual or quarterly permanent income. The weights used to estimate the annual and quarterly permanent earnings are .10 and .025, respectively as suggested by Darby (1974).

The growth rates of both annual and quarterly earnings for firms in the sample are presented in Table 1. As shown in the table, growth rates of earnings per share are quite small; the annual average growth rate for all firms in the sample is only 1.87 percent while the annualized quarterly growth rate is 1.68 percent. These rates of growth are clearly smaller than the average GNP growth during the sample period (1962-1978).

The current and permanent earnings developed from quarterly data are shown in Table 2. The table shows that current earnings are greater than permanent earnings, revealing that there is a transitory component included in firm profits. Calculations from the table show that average dividends per share, for all firms in the sample, constituted 65.88 percent of current earnings and 72.95 percent of permanent earnings. This difference demonstrates the importance of developing a statistical model to rigorously determine the relative importance of the two earnings components in affecting dividend payment behavior.

The coefficients of variation for both current and permanent earnings were calculated, for each firm in the sample, to investigate the degree of fluctuation of current earnings per share compared with permanent earnings per share. These coefficients are presented in Table 3. The results show that the coefficient of variation for permanent earnings is smaller than that statistic for current earnings in most of the cases. It also shows that the coefficient of variation for dividends per share is similar to that of current earnings per share. This result means that dividend fluctuations over time are more consistent with fluctuation of current earnings than with variations in permanent earnings. Further implications of this finding for theory and empirical analysis will be explored in the next section. The coefficient of variation was also calculated to examine the variation of dividends per share. These results, presented in column 2 of Table 3, show that permanent earnings per share is generally less volatile than current earnings per share or dividends per share.

V. Current Earnings, Permanent Earnings and Dividend Payment Behavior

Dividend payment decision theory and practice is one of the most important topics for study by finance scholars.

Lintner (1956), Fama and Babiak (1968) and others have defined the dividend payment equation as:

$$(5.1) \qquad D_{it} - D_{it-1} = a_0 + a_1(D^*_{it} - D_{i,t-1}) + u_{it} \qquad (A)$$

and

$$D^*_{it} = r_i E_{it} \qquad (B)$$

where D_{it} and $D_{i,t-1}$ are dividend per share for i^{th} firm in t^{th} and $t-1^{th}$ period respectively; $D^*_{i,t}$ is the target dividends for i^{th} firm in period t and a_1 is the "partial adjustment coefficient." r_i is the target payout ratio for ith firm. Substituting (5.1.B) into (5.1.A), we have

$$(5.2) \qquad D_{it} - D_{it-1} = b_0 + b_1 E_{it} + b_2 D_{i,t-1} + u_{it}$$

where $b_1 = a_1 r$, $b_2 = -a_1$. If the earnings per share can be decomposed into permanent component and transitory component, then

$$(5.3) \qquad E_{i,t} = E^P_{i,t} + E^T_{i,t}$$

where $E^P_{i,t}$ and $E^T_{i,t}$ are permanent and transitory earnings per share respectively and $E^T_{i,t} \simeq N(0,\sigma^2_T)$.

To test whether current earnings or permanent earnings per share should be used to describe a firm's dividend payment behavior, an alternative model for equation (5.2) can be defined as

$$(5.4) \qquad D_{it} - D_{it-1} = b_0' + b_1' E_{i,t}^{P} - b_2' D_{i,t-1} + U_{it}$$

This equation implies that $D_{it}^{*} = r_i E_{it}^{P}$ instead of $D_{it}^{*} = r_i E_{it}$ as defined in (5.1B). Equations (5.2) and (5.4) can be used to determine whether current earnings or permanent earnings per share should be used to describe a firm's dividend payment behavior. According to Cochran (1970), the adjusted coefficient of determination ($\bar{R}^2$) can be used to determine whether equation (5.2) or equation (5.4) should be used to forecast the dividend payment behavior of a firm.

Equations in the form of (5.2) and (5.4), were estimated using annual and quarterly data for the 42 electric utility firms in the sample. The summary results are presented in Tables 4, 5 and 6.

Table 4 presents $\bar{R}^2$ for four different multiple regression estimting equations using alternative income measures and data as determinants of dividend payments. As presented in the appendices of this study, the individual multiple regression equations for only 16 of the 42 firms included in the sample have a higher $\bar{R}^2$ if annual permanent earnings are used instead of current earnings as determining dividend behavior; only 17 of 42 have a higher $\bar{R}^2$ for permanent income based on quarterly data. The aggregate $\bar{R}^2$ statistics for all firms in the sample, presented in Table 4 are consistent with the firm results mentioned above; annual current income demonstrated a higher $\bar{R}^2$ than annual permanent income; also, quarterly current earnings generated a higher $\bar{R}^2$ than quarterly permanent earnings. Consequently, for firms in this sample, current earnings are more important determinants of dividend payments than are permanent earnings. These results are caused by the effect, mentioned earlier in the theory section; current dividends may be paid from either permanent or transitory income, while permanent dividends are paid only from permanent income. In other words, firms in the utility industry do tend to pay transitory dividends to meet the pressure they feel from market requirements described in the signaling theory of the information content hypothesis. (For detailed regression results see Appendices A and B.)

Table 5 presents multiple regression results for annual data and Table 6 presents the multiple regression results for quarterly data. Estimated b_2 can be used to estimate the partial adjustment coefficient. Estimated b_1 divided by estimated b_2 represents the estimated target payout ratio. The table shows that the estimated partial adjustment coefficient from permanent earnings is larger than the adjustment coefficient from current earnings. It also shows that the target payout ratio from permanent income data is larger than the ratio from current earnings. This implies that, for annual data, the payout of transitory earnings as trasitory dividends will affect the partial adjustment coefficient and estimated target payout ratio. Hence, the permanent dividend payment concept derived from the permanent income hypothesis could be useful for examining the dividend puzzle question raised by Black (1976) and Miller and Scholes (1981).

The above discussion refers to annual data. The followings analysis of Table 6, refers to similar concepts, but quarterly data are used to develop the estimating equations from which the concepts are derived. In Tables 5 and 6 if mean values are compared, one notices that comparable values (in absolute values) in Table 5 are all larger than these in Table 6. Results from Table 6, along with the earlier tables, show that the best choice between annual data and quarterly data for determining dividend payment behavior remains an open question.

VI. Summary and Concluding Remarks

Milton Friedman (1957) presented a Permanent Income Hypothesis. This study uses Friedman's basic concepts of current earnings, permanent earnings and transitory earnings and examines how well they explain dividend payment behavior of the 42 electric utility firms in the sample. Earnings per share data (both annual and quarterly) were used in the analysis. The procedure employed to decompose the current earnings into transitory and permanent components was suggested by Darby (1972, 1974).

The possible implications of the permanent component of earnings on security analysis were examined; then, the effect of the permanent earnings component on the dividend payment behavior of firms in the sample was tested. The results show that current rather than permanent income tends to describe more accurately the dividend payment behavior of firms in the sample.

The analysis also discusses possible implications of the theory and method of this study to explain the dividend puzzle mentioned by Black (1976) and the long-run dividend puzzle raised by Miller and Scholes (1981).

In estimating the cost of capital for the electric utility industry, M&M (1966, 356-358) have used the instrumental variable method to remove the transitory components of accounting reported earnings. However, they were unable to obtain satisfactory results. The permanent earnings estimation method developed in this paper may well be used to improve the quality of M&M's cost of capital estimates.

In addition to the permanent income hypothesis (Friedman 1957) several additional consumption theories have been presented in the literature and have been judged to have merit. For example Ando and Modigliani (1963) presented a life cycle hypothesis; Duesenberry (1949) presented a relative income hypothesis and Leibenstein (1950) discussed bandwagon, snob and veblen effects in theories of consumer expenditure. These theories all provide rich bases for further research into firm dividend policy and payment behavior.

TABLE 1

Growth Rate of EPS

Company	Quarterly Growth Rate	Annualized Quarterly Growth Rate	Annual Growth Rate
1	.006	.024	.026
2	.003	.012	.015
3	.0003	.001	.001
4	.005	.020	.020
5	-.002	-.008	-.007
6	.004	.016	.018
7	.004	.016	.016
8	.01	.04	.040
9	.007	.028	.029
10	.005	.020	.024
11	-.001	-.004	.003
12	.004	.016	.018
13	.001	.004	.007
14	.007	.028	.032
15	.008	.032	.034
16	.009	.036	.037
17	.012	.048	.050
18	-.005	-.020	-.018
19	.010	.040	.041
20	.0005	.002	.002
21	-.001	-.004	-.004
22	.012	.048	.055
23	.007	.028	.029
24	.001	.004	.005
25	.003	.012	.011
26	-.005	-.020	-.020
27	.004	.016	.017
28	.003	.012	.016
29	.0003	.001	-.0002
30	.004	.016	.021
31	.005	.020	.023
32	.005	.020	.028
33	.005	.020	.027
34	-.005	-.020	-.022
35	.009	.036	.039
36	.004	.016	.013
37	.001	.004	.005
38	.006	.024	.024
39	.016	.064	.069
40	.005	.020	.024
41	.007	.028	.029
42	.002	.008	.009
Average	.0042	.0168	.0187

TABLE 2

Average Current and Permanent Earnings and Dividends per Share
(quarterly data)

$\overline{X}$

	Current Earnings per share	Permanent Earnings per share	Dividends per share
1	0.49387	0.43275	0.34785
2	0.57737	0.52548	0.38310
3	0.55196	0.54472	0.36656
4	0.73413	0.65330	0.50118
5	0.68269	0.70102	0.46851
6	0.83226	0.75140	0.39450
7	0.518110	0.47446	0.38384
8	0.70331	0.55592	0.33084
9	0.55421	0.47309	0.38637
10	0.54139	0.48056	0.34991
11	0.58463	0.58446	0.38919
12	0.44675	0.40365	0.27628
13	0.57422	0.54018	0.36162
14	0.40681	0.34557	0.29201
15	0.59650	0.50057	0.40290
16	0.70400	0.58056	0.49206
17	0.48178	0.37258	0.26100
18	0.48343	0.53174	0.34241
19	0.62257	0.50654	0.40685
20	0.41722	0.40787	0.31919
21	0.47922	0.48704	0.29879
22	0.49196	0.36920	0.28194
23	0.55596	0.47802	0.36897
24	0.38419	0.36947	0.27865
25	0.52712	0.48114	0.35841
26	0.45216	0.49576	0.30726
27	0.60113	0.54541	0.47099
28	0.39019	0.36071	0.31472
29	0.55260	0.53562	0.37997
30	0.63310	0.56303	0.43019
31	0.51221	0.45031	0.33619
32	0.56134	0.49605	0.37757
33	0.58912	0.51827	0.40109
34	0.46776	0.51417	0.32874
35	0.59575	0.48795	0.42453
36	0.42866	0.39001	0.27529
37	0.54956	0.52751	0.29300
38	0.34457	0.29855	0.21019
39	0.31047	0.21757	0.18746
40	0.52268	0.45562	0.36900
41	0.61053	0.50654	0.39150
42	0.46838	0.43672	0.30557
Average	0.53656	0.48454	0.35348

TABLE 3

Coefficients of Variation of Current and Permanent Earnings and Dividends Per Share

$\sigma/\overline{X}$

	Current Earnings/Share	Permanent Earnings/Share	Dividend/Share
1	0.20837	0.08268	0.12698
2	0.24379	0.04217	0.42785
3	0.22456	0.05028	0.22763
4	0.23473	0.07594	0.22178
5	0.26996	0.03747	0.16693
6	0.26162	0.07328	0.20441
7	0.12681	0.04974	0.11119
8	0.33624	0.11428	0.28482
9	0.26291	0.09785	0.18335
10	0.22895	0.77776	0.18765
11	0.27180	0.02448	0.18718
12	0.22209	0.04692	0.19274
13	0.29440	0.02860	0.20663
14	0.21135	0.09584	0.21486
15	0.20491	0.10302	0.11000
16	0.23041	0.13351	0.20117
17	0.30325	0.16396	0.28870
18	0.22847	0.05772	0.16889
19	0.22078	0.14366	0.50178
20	0.19527	0.01493	0.14913
21	0.17451	0.01511	0.08431
22	0.34602	0.16639	0.23118
23	0.21102	0.08918	0.17191
24	0.21945	0.02712	0.18216
25	0.25065	0.04493	0.19966
26	0.22437	0.64985	0.54133
27	0.18357	0.06375	0.19784
28	0.16154	0.05134	0.11003
29	0.25670	0.02584	0.17109
30	0.22180	0.05174	0.47388
31	0.21042	0.06631	0.44064
32	0.22854	0.09711	0.24811
33	0.22289	0.09233	0.45057
34	0.29389	0.08464	0.24661
35	0.22041	0.12009	0.17681
36	0.23049	0.06731	0.40089
37	0.17858	0.02753	0.46164
38	0.24547	0.06615	0.18649
39	0.36097	0.22903	0.31708
40	0.31074	0.06233	0.21260
41	0.30408	0.08481	0.23451
42	0.29038	0.35263	0.19001
Average	0.24112	0.11308	0.24507

TABLE 4

Average $\bar{R}^2$ Statistics

	$\bar{R}_1^2$	$\bar{R}_2^2$	$\bar{R}_3^2$	$\bar{R}_4^2$
$\bar{X}$	.44604	.32470	.28137	.24618
σ	(.25023)	(.22807)	(.2567)	(.28754)

Footnotes:

$\bar{R}_1^2$ = adjusted coefficient of multiple determination - annual current earnings

$\bar{R}_2^2$ = adjusted coefficient of multiple determination - annual permanent earnings

$\bar{R}_3^2$ = adjusted coefficient of multiple determination - quarterly current earnings

$\bar{R}_4^2$ = adjusted coefficient of multiple determination - quarterly permanent earnings

TABLE 5

Regression Coefficients for Annual Data

	Mean	Standard Deviation
b_1	.32019	.22015
b_1'	.72983	.01041
b_2	-.49428	.48302
b_2'	-.55640	.40705

b_1', b_2' represent coefficients of permanent income as data in multiple regression equations

b_1, b_2 represent coefficients of current income as data in multiple regression equations

TABLE 6

Regression Coefficients for Quarterly Data

	Mean	Standard Deviation
b_1	.18064	.23379
b_1'	.591047	.99660
b_2	-.46261	.55185
b_2'	-.43369	.53426

b_1', b_2' represent coefficients of permanent income as data in multiple regression equations

b_1, b_2 represent coefficients of current income as data in multiple regression equations

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APPENDIX A

Empirical Results for Equations (5.2) and (5.4)
(Annual Data)

Company		b_0,b_0'	b_1,b_1'	b_2,b_2'	Adj R^2	DW
Atlantic City Electric	(i)	0.14718	0.24358	-0.44622	0.3384	1.538
		(0.798)	(3.071)**	(-2.452)*		
	(ii)	-0.27607	0.68376	-0.65174	0.3051	1.635
		(-1.195)	(2.890)*	(-2.666)*		
Carolina Power & Light	(i)	0.93647	0.59704	-1.50640	0.6353	2.085
		(2.434)*	(3.039)**	(-5.290)**		
	(ii)	-2.79640	2.30572	-1.36862	0.5796	1.874
		(-1.606)	(2.508)*	(-4.757)**		
Central & Southwest Corp	(i)	-0.01839	0.61186	0.90862	0.9026	0.914
		(-0.210)	(10.835)**	(-11.365)**		
	(ii)	1.98571	-0.86103	-0.05667	0.1635	1.855
		(1.801)	(-1.480)	(-0.279)		
Cleveland Electric Illum	(i)	-0.17933	0.48863	-0.62296	0.6886	1.333
		(-0.821)	(5.513)**	(-5.188)**		
	(ii)	-0.46878	0.48305	-0.40792	0.000	0.725
		(-0.301)	(0.572)	(-1.031)		
Columbus & So. Ohio	(i)	0.28056	0.10459	-0.29866	0.0510	1.351
		(0.711)	(1.122)	(-1.488)		
	(ii)	2.18420	-0.64407	-0.20046	0.0812	1.889
		(1.603)	(-1.314)	(-1.036)		
Florida Power & Light	(i)	0.32212	0.27172	-0.76830	0.4429	1.294
		(1.255)	(3.118)**	(-3.620)**		
	(ii)	0.70896	-0.06344	-0.29981	0.0298	1.328
		(0.896)	(-0.223)	(-1.335)		
General Public Utilities	(i)	0.12021	0.09087	-0.18038	0.2789	1.818
		(1.456)	(1.603)	(-2.733)*		
	(ii)	-0.07335	0.24504	-0.23639	0.2556	1.557
		(-0.371)	(1.443)	(-2.292)*		
Houston Industries	(i)	0.06836	0.35221	-0.79344	0.7443	1.557
		(0.560)	(6.711)**	(-5.591)**		
	(ii)	-1.43803	1.18937	-0.97669	0.7984	0.713
		(-6.319)**	(7.784)**	(-6.861)**		
Indianapolis Power & Light	(i)	-0.01259	0.08403	-0.08496	0.0102	1.795
		(-0.094)	(1.462)	(-0.790)		
	(ii)	-0.57442	0.73224	-0.52000	0.2311	1.262
		(-2.180)*	(2.546)*	(-2.345)*		

Company		b_0, b_0'	b_1, b_1'	b_2, b_2'	Adj R^2	DW
Kansas Gas & Electric	(i)	-0.05200	0.06949	-0.04040	0.000	1.534
		(-0.495)	(1.108)	(-0.441)		
	(ii)	-0.55517	0.55189	-0.34085	0.0549	1.093
		(-1.566)	(1.628)	(-1.443)		
Kentucky Utilities	(i)	-0.01991	0.19640	-0.27233	0.1278	1.168
		(-0.053)	(1.617)	(-1.47)		
	(ii)	-4.17654	2.32258	-0.73138	0.2418	0.697
		(-2.030)	(2.228)*	(-2.590)*		
Middle South Utilities	(i)	0.00515	0.43082	-0.69951	0.6223	1.284
		(0.036)	(4.915)**	(-4.357)**		
	(ii)	-1.55803	1.44680	-0.70600	0.1961	1.470
		(-1.784)	(2.112)	(-2.346)		
Minnesota Power & Light	(i)	0.06892	0.35088	-0.60541	0.4963	1.636
		(0.401)	(3.782)**	(-3.779)**		
	(ii)	1.20555	-0.50879	-0.07031	0.000	1.341
		(0.604)	(-0.479)	(-0.251)		
Oklahoma Gas & Electric	(i)	-0.14478	0.70933	-0.85885	0.8262	1.339
		(-1.600)	(8.332)**	(-7.714)**		
	(ii)	-1.13522	1.67471	-1.02827	0.6047	0.199
		(-3.802)**	(4.820)**	(-4.832)**		
Pennsylvania Power & Light	(i)	0.16581	0.10737	-0.24425	0.7059	2.213
		(4.076)**	(6.164)**	(-5.393)**		
	(ii)	0.06942	0.39650	-0.52495	0.4343	1.865
		(1.411)	(3.676)**	(-3.593)**		
Public Service Co. of Indiana	(i)	0.24956	0.30549	-0.55299	0.2613	1.670
		(1.262)	(2.195)*	(-2.679)*		
	(ii)	-0.38134	-0.04035	-0.04035	0.000	1.530
		(1.147)	(-0.162)	(-0.588)		
Public Service Co. of New Mexico	(i)	-0.10396	0.01689	0.13289	0.4899	1.979
		(-2.420)*	(0.485)	(1.925)		
	(ii)	-0.18537	0.16389	-0.00175	0.5309	1.866
		(-2.209)*	(1.180)	(-0.012)		
Southern Company	(i)	0.25131	0.35008	-0.67704	0.4924	1.568
		(0.930)	(3.155)**	(-3.557)**		
	(ii)	0.74846	-0.07073	-0.43937	0.1054	1.847
		(0.814)	(-0.150)	(-1.733)		
Toledo Edison Co.	(i)	-0.15387	0.57669	-0.76781	0.2195	2.684
		(-0.287)	(1.603)	(-2.341)*		
	(ii)	-1.58698	1.77835	-1.24526	0.5368	2.170
		(-2.505)*	(3.638)**	(-4.358)**		

Company		b_0,b_0'	b_1,b_1'	b_2,b_2'	Adj R^2	DW
Union Electric	(i)	0.63968	0.27227	-0.87323	0.7868	0.7779
		(3.156)**	(2.652)*	(-7.461)**		
	(ii)	2.08078	-0.70073	-0.75968	0.6797	0.376
		(1.118)	(-0.578)	(-4.432)**		
Virginia Electric & Power	(i)	0.48854	0.21120	-0.75203	0.5327	1.118
		(1.514)	(1.928)	(-3.803)**		
	(ii)	1.66025	-0.41659	-0.71723	0.4168	1.046
		(1.368)	(-0.630)	(-3.008)**		
Arizona Public Service Co.	(i)	-0.01374	0.11515	-0.14685	0.3439	2.132
		(-0.176)	(2.071)	(-0.966)		
	(ii)	-0.20923	0.71108	-0.73986	0.5598	1.779
		(-3.310)**	(3.573)**	(-2.939)*		
Central Hudson Gas & Electric	(i)	0.02414	0.04293	-0.04536	0.000	1.317
		(0.316)	(1.001)	(-0.647)		
	(ii)	-0.41060	0.53072	-0.38809	0.2423	1.241
		(-2.200)*	(2.605)*	(-2.482)*		
Central Illinois Public Service	(i)	-0.35901	0.50655	-0.36772	0.4564	1.527
		(-1.667)	(3.544)**	(-2.655)*		
	(ii)	-4.71264	3.86849	-0.98761	0.3690	0.568
		(-2.862)*	(3.003)**	(-3.276)**		
Cincinnati Gas & Elec.	(i)	-0.20511	0.29504	-0.27274	0.1846	0.843
		(-0.882)	(2.268)*	(1.718)		
	(ii)	-3.33704	2.09805	-0.54990	0.1148	0.344
		(-1.853)	(1.926)	(1.926)		
Del Marva Power & Light	(i)	0.10935	0.61686	-0.98908	0.5783	1.857
		(0.449)	(3.672)**	(-4.672)**		
	(ii)	-0.12543	0.44269	-0.60517	0.1880	1.158
		(-0.141)	(0.870)	(-2.309)*		
Illinois Power Co.	(i)	-0.27485	0.29615	-0.21066	0.3022	2.505
		(-1.380)	(2.789)*	(-2.437)*		
	(ii)	-1.84924	1.29883	-0.52893	0.1128	1.181
		(-1.672)	(1.829)	(-1.965)		
Interstate Power Co.	(i)	0.05734	0.11399	-0.16670	0.3485	2.455
		(1.103)	(2.145)	(-3.125)**		
	(ii)	-0.39783	0.71653	-0.48919	0.5136	2.357
		(-2.415)*	(3.252)**	(-3.763)**		
Iowa Illinois Gas & Elec.	(i)	0.38695	0.28887	-0.68313	0.1962	1.579
		(1.355)	(1.734	(-2.377)*		
	(ii)	2.28177	-0.93029	-0.14974	0.1393	1.863
		(1.703)	(-1.395)	(-0.671)		

Company		b_0, b_0'	b_1, b_1'	b_2, b_2'	Adj R^2	DW
Iowa Power & Light	(i)	1.09078	0.85847	-1.92025	0.7999	2.016
		(3.342)**	(4.769)**	(-7.743)**		
	(ii)	-2.14387	2.21840	-1.71043	0.7400	1.946
		(1.974)	(3.810)**	(-6.625)**		
Long Island Lighting	(i)	-0.09439	0.74468	-1.06153	0.6836	1.686
		(-0.533)	(5.369)**	(-5.692)**		
	(ii)	-1.48599	1.40953	-0.82154	0.3888	1.011
		(-2.232)*	(2.941)*	(-3.343)**		
Louisville Gas & Electric	(i)	0.12258	0.03250	-0.08522	0.6230	0.795
		(4.323)**	(1.843)	(-4.659)**		
	(ii)	0.44456	-0.24873	0.08091	0.6604	0.833
		(3.540)**	(-2.281)*	(1.280)		
Montana Power Co.	(i)	0.21066	0.05067	-0.17859	0.1377	1.502
		(2.089)	(0.944)	(-1.960)		
	(ii)	0.16332	0.08137	-0.17883	0.1012	1.660
		(1.043)	(0.572)	(-1.399)		
Niagra Mohawk Power	(i)	0.11531	0.59780	-0.94373	0.6653	2.153
		(0.942)	(4.765)**	(-5.638)**		
	(ii)	0.75206	-0.29468	-0.13442	0.1319	1.585
		(1.396)	(-0.877)	(-0.681)		
Northern States Power	(i)	0.49346	0.41998	-0.87523	0.3655	2.480
		(2.211)**	(2.857)**	(-3.262)**		
	(ii)	0.00911	0.79841	-0.92190	0.3977	2.103
		(0.036)	(3.049)**	(3.450)**		
Public Service Co of Colo.	(i)	0.36820	0.32198	-0.82923	0.2671	1.895
		(0.928)	(1.410)	(-2.713)*		
	(ii)	-1.73234	1.87563	-1.19547	0.4817	1.706
		(-1.933)	(2.862)*	(-3.964)**		
Rochester Gas & Electric	(i)	-0.26109	0.14128	-0.02883	0.1580	1.699
		(-1.508)	(2.147)	(-0.223)		
	(ii)	-3.00923	1.74874	-0.63107	0.3522	1.098
		(-3.167)**	(3.145)**	(-2.592)*		
Sierra Pacific Power Co.	(i)	-0.02472	0.35113	-0.54244	0.7189	2.681
		(-0.276)	(6.288)**	(-4.271)**		
	(ii)	-0.89541	1.18153	-0.62486	0.3919	1.631
		(-2.784)*	(3.361)**	(-2.828)*		
Tucson Gas & Electric	(i)	-0.06986	-0.01691	0.20611	0.4567	1.866
		(-1.987)	(-0.250)	(1.426)		
	(ii)	-0.08724	0.17213	-0.01779	0.4791	1.554
		(-2.106)	(0.790)	(0.073)		

Company		b_0, b_0'	b_1, b_1'	b_2, b_2'	Adj R^2	DW
Washington Water Power	(i)	0.23648 (1.584)	0.37334 (5.573)**	-0.70077 (5.633)**	0.7125	2.306
	(ii)	-1.12299 (-1.912)	1.04221 (2.792)*	-0.54064 (-3.153)**	0.3910	1.694
Wisconsin Electric Power	(i)	0.05044 (0.293)	0.43419 (4.137)**	-0.70348 (-3.820)**	0.5128	1.087
	(ii)	-1.96150 (-4.556)**	1.56294 (5.229)**	-0.82728 (-4.877)**	0.6364	0.260
Wisconsin Public Service	(i)	0.21006 (1.521)	0.41973 (4.481)**	-0.81197 (-4.359)**	0.5693	0.653
	(ii)	0.63600 (0.661)	-0.29979 (-0.476)	-0.08169 (-0.356)	0.0000	1.188

(i) represents coefficients for regression equations using current earnings (Equation 5.2).

(ii) represents coefficients for regression equations using permanent earnings (Equation 5.4).

* denotes significance at 5% level.

** denotes significance at 1% level.

APPENDIX B

Empirical Results for Equation (5.2) and (5.4)
(Quarterly Data)

Company		b_0, b_0'	b_1, b_1'	b_2, b_2'	Adj R^2	DW
Atlantic City Electric	(i)	0.01602	0.04688	-0.10878	0.0370	2.084
		(1.038)	(1.959)	(-1.896)		
	(ii)	-0.02427	0.19072	-0.16412	0.0466	1.994
		(-1.023)	(2.127)*	(2.212)*		
Carolina Power & Light	(i)	0.31472	0.51354	-1.60342	0.8057	1.830
		(4.525)**	(4.709)**	(-16.452)**		
	(ii)	-0.61575	2.31855	-1.58416	0.7716	1.814
		(1.556)	(3.051)**	(-14.982)**		
Central & Southwest Corp	(i)	0.00196	0.41342	-0.62635	0.5580	1.644
		(0.162)	(8.841)**	(-9.098)**		
	(ii)	0.17066	-0.27285	-0.05668	0.0707	2.119
		(2.275)*	(-1.902)	(1.206)		
Cleveland Electric Illum	(i)	0.00310	0.17135	-0.25740	0.2618	1.878
		(0.152)	(4.754)**	(-4.615)**		
	(ii)	0.05649	-0.05115	-0.04700	0.0029	2.235
		(0.743)	(-0.345)	(-0.715)		
Columbus & So. Ohio	(i)	0.02990	0.05794	-0.14607	0.0911	1.880
		(1.080)	(2.320)*	(-2.460)*		
	(ii)	0.21216	-0.23317	-0.10204	0.0429	2.032
		(1.735)	(-1.376)	(-1.733)		
Florida Power & Light	(i)	0.03348	0.09233	-0.27282	0.1785	1.856
		(1.614)	(3.550)**	(-3.848)**		
	(ii)	0.07202	-0.04223	-0.09343	0.0208	2.143
		(1.161)	(-0.508)	(-1.629)		
General Public Utilities	(i)	0.01042	0.00123	-0.02304	0.0002	2.330
		(1.656)	(0.098)	(-1.188)		
	(ii)	-0.00926	0.06968	-0.05640	0.0204	2.299
		(-0.508)	(1.154)	(-1.679)		
Houston Industries	(i)	0.01633	0.14020	-0.34370	0.2608	1.771
		(1.229)	(4.948)**	(-4.671)**		
	(ii)	-0.09082	0.27820	-0.18931	0.0764	1.802
		(-2.129)*	(2.610)*	(-2.578)*		
Indianapolis Power & Light	(i)	0.01540	0.06580	-0.13292	0.0919	1.209
		(0.845)	(2.591)*	(-2.517)*		
	(ii)	-0.18656	0.86939	-0.58427	0.4087	0.660
		(-5.358)**	(6.678)**	(-6.780)**		

Company		b_0, b_0'	b_1, b_1'	b_2, b_2'	Adj R^2	DW
Kansas Gas & Electric	(i)	0.00958	0.05934	-0.11753	0.0592	1.030
		(0.543)	(2.105)*	(-2.180)*		
	(ii)	-0.26637	0.96619	-0.56808	0.3773	0.452
		(-5.560)**	(6.276)**	(-6.363)**		
Kentucky Utilities	(i)	0.00968	0.02202	-0.05612	0.0076	1.961
		(0.541)	(1.143)	(-1.327)		
	(ii)	0.12029	-0.18892	-0.02359	0.0	2.064
		(0.872)	(-0.745)	(-0.467)		
Middle South Utilities	(i)	0.00735	0.11770	-0.21256	0.1481	1.960
		(0.590)	(3.500)**	(-3.311)**		
	(ii)	-0.02662	0.12416	-0.07991	0.0	2.080
		(-0.417)	(0.664)	(-1.189)		
Minnesota Power & Light	(i)	0.02331	0.07926	-0.19022	0.1313	2.234
		(1.322)	(3.032)**	(-3.167)**		
	(ii)	0.16633	-0.27111	-0.53969	0.0216	2.372
		(1.194)	(-0.994)	(-0.950)		
Oklahoma Gas & Electric	(i)	-0.00265	0.18317	-0.2487	0.1983	1.835
		(-0.246)	(4.168)**	(-3.988)*		
	(ii)	-0.07641	0.41012	-0.22261	0.1075	2.048
		(-2.476)*	(3.016)**	(3.071)**		
Pennsylvania Power & Light	(i)	0.01407	0.03133	-0.07600	0.1510	2.487
		(2.203)*	(3.677)**	(-3.194)**		
	(ii)	-0.001658	0.17075	-0.20329	0.0963	2.077
		(-0.255)	(2.971)**	(-2.998)**		
Public Service Co. of Ind	(i)	0.03246	0.26944	-0.45225	0.3899	0.994
		(1.587)	(6.258)**	(-6.407)**		
	(ii)	-0.00532	0.16251	-0.18217	0.0609	1.201
		(-0.139)	(1.738)	(-2.504)*		
Public Service Co. of New Mexico	(i)	-0.00472	0.00794	0.01823	0.0604	2.458
		(-1.329)	(0.855)	(0.981)		
	(ii)	-0.02425	0.12433	-0.07105	0.1123	2.351
		(-2.390)*	(2.125)*	(-1.449)		
Southern Company	(i)	0.02674	0.11349	-0.23800	0.1699	1.799
		(1.373)	(3.297)**	(3.616)**		
	(ii)	0.09110	-0.10149	-0.10841	0.0409	2.033
		(-1.514)	(-0.894)	(-1.807)		
Toledo Edison Co.	(i)	-0.07008	1.15032	-1.59972	0.7007	1.995
		(-0.710)	(6.013)**	(-12.335)**		
	(ii)	-0.54136	2.31767	-1.56250	0.7646	2.137
		(-4.111)**	(7.958)**	(-14.708)**		

Company		b_0, b_0'	b_1, b_1'	b_2, b_2'	Adj R^2	DW
Union Electric	(i)	0.04181	0.21484	-0.41449	0.3655	1.671
		(2.267)*	(5.164)**	(-5.999)**		
	(ii)	0.35596	-0.74297	-0.16974	0.1266	2.133
		(1.656)	(-2.427)*	(-1.366)		
Virginia Electric & Power	(i)	0.05803	0.06424	-0.29850	0.1996	1.947
		(2.747)**	(2.870)**	(-3.999)**		
	(ii)	0.19350	-0.27783	-0.19618	0.1117	2.058
		(1.564)	(-1.045)	(-2.511)*		
Arizona Public Service Co.	(i)	-0.00456	0.01466	0.00413	0.0646	2.101
		(-0.903)	(1.406)	(0.144)		
	(ii)	-0.03619	0.30231	-0.25740	0.1804	1.845
		(-3.626)**	(3.361)**	(-2.895)**		
Central Hudson Gas & Elec.	(i)	0.00286	0.00254	-0.00229	0.0	1.994
		(0.668)	(0.339)	(-0.163)		
	(ii)	-0.03293	0.15267	-0.10004	0.0651	1.982
		(-2.252)*	(2.567)*	(-2.463)*		
Central Illinois Public Service	(i)	0.09047	0.17258	-0.57167	0.4719	0.658
		(3.319)**	(3.151)**	(-7.564)**		
	(ii)	-0.90822	3.15609	-0.93920	0.7264	0.144
		(-7.588)**	(8.871)**	(-13.310)**'		
Cincinnati Gas & Electric	(i)	-0.00025	0.08705	-0.12224	0.1352	2.030
		(-0.015)	(3.352)**	(-2.506)*		
	(ii)	-0.23083	0.64173	-0.21399	0.0569	1.885
		(-2.052)*	(2.233)*	(2.429)*		
Del Marva Power & Light	(i)	0.19334	0.41275	-1.24981	0.6155	2.443
		(2.228)*	(2.074)*	(-10.126)**		
	(ii)	0.15893	0.39631	-0.17608	0.5917	2.383
		(0.536)	(0.656)	(-9.703)**		
Illinois Power Co.	(i)	-0.00787	0.09725	-0.10580	0.0827	1.370
		(-0.355)	(2.536)*	(-2.353)*		
	(ii)	-0.42133	1.15849	-0.44820	0.2503	0.741
		(-4.397)**	(4.710)**	(-4.874)**		
Interstate Power Co.	(i)	0.00925	0.00361	-0.02741	0.0187	2.251
		(2.101)*	(0.421)	(-1.728)		
	(ii)	-0.03347	0.21732	-0.13678	0.1118	2.229
		(-1.980)	(2.627)*	(-3.050)**		
Iowa-Illinois Gas & Elec.	(i)	0.02898	0.03890	-0.13206	0.0371	1.822
		(1.404)	(1.372)	(-2.110)*		
	(ii)	0.19578	-0.31504	-0.07033	0.0324	1.968
		(1.486)	(-1.249)	(-1.280)		

Company		b_0, b_0'	b_1, b_1'	b_2, b_2'	Adj R^2	DW
Iowa Power & Light	(i)	0.48120	0.33329	-1.60289	0.7758	2.247
		(4.745)**	(2.240)*	(-15.059)**		
	(ii)	-0.83939	2.77906	-1.67717	0.8032	2.305
		(-2.092)*	(3.810)**	(-16.340)**		
Long Island Lighting	(i)	0.10361	0.88290	-1.66656	0.7821	1.850
		(1.592)	(6.316)**	(-15.318)**		
	(ii)	-0.61427	2.52449	-1.56577	0.7280	1.668
		(-2.513)*	(4.409)**	(-13.220)**		
Louisville Gas & Elec.	(i)	0.00846	0.00525	-0.1869	0.3415	1.552
		(7.192)**	(2.245)*	(-5.841)**		
	(ii)	0.02649	-0.05336	0.01177	0.3992	1.691
		(5.335)*	(-3.417)**	(1.458)		
Montana Power Co.	(i)	0.44922	0.25537	-1.50737	0.6962	2.131
		(4.182)**	(1.633)	(-12.157)**		
	(ii)	-0.07322	1.32833	-1.54697	0.7313	2.253
		(-0.366)	(3.352)**	(-13.374)**		
Niagra Mohawk Power	(i)	0.01702	0.12669	-0.23521	0.1800	1.834
		(1.330)	(3.588)**	(-3.977)**		
	(ii)	0.06086	-0.09146	-0.04617	0.0309	2.057
		(1.514)	(-1.025)	(-0.967)		
Northern States Power	(i)	0.13861	0.29022	-0.73035	0.3591	2.398
		(3.674)**	(4.339)**	(-6.240)**		
	(ii)	-0.3968	0.87488	-0.90947	0.4410	2.037
		(0.779)	(5.564)**	(7.353)**		
Public Service Co. of Colorado	(i)	0.14889	0.51933	-1.35131	0.6988	1.662
		(2.177)*	(3.352)**	(-12.370)**		
	(ii)	-0.46475	2.21632	-1.47094	0.7491	1.850
		(-2.870)**	(5.128)**	(-14.097)**		
Rochester Gas & Electric	(i)	0.44272	0.07723	-1.67034	0.8176	1.919
		(5.555)**	(0.538)	(-17.103)**		
	(ii)	-0.96072	2.76164	-1.71040	0.8444	2.160
		(-2.237)*	(3.367)**	(-18.971)**		
Sierra Pacific Power Co.	(i)	0.00231	0.08869	-0.15120	0.1506	2.060
		(0.262)	(3.667)**	(-2.777)**		
	(ii)	-0.04478	0.22580	-0.10245	0.0271	1.710
		(-1.591)	(1.902)	(-1.664)		
Tucson Gas & Electric	(i)	-0.00024	0.06588	-0.09083	0.2165	2.126
		(0.085)	(4.225)**	(-2.962)**		
	(ii)	-0.01684	0.26570	-0.20351	0.1331	2.084
		(-2.846)**	(3.157)**	(-2.776)**		

Company		b_0, b_0'	b_1, b_1'	b_2, b_2'	Adj R^2	DW
Washington Water	(i)	0.02290	0.10788	-0.21538	0.2178	2.043
		(1.359)	(4.128)**	(-3.903)**		
	(ii)	-0.06740	0.25160	-0.12870	0.0479	1.983
		(-1.061)	(1.605)	(-2.244)*		
Wisconsin Electric Power	(i)	0.01430	0.10775	-0.20184	0.1779	1.858
		(0.936)	(3.921)**	(-3.544)**		
	(ii)	-0.12923	0.40463	-0.19191	0.0924	1.913
		(-2.394)*	(2.810)**	(2.806)**		
Wisconsin Public Service	(i)	0.02708	0.08202	-0.21199	0.1118	2.353
		(1.685)	(2.801)**	(-3.039)**		
	(ii)	0.10711	-0.19629	-0.06724	0.0163	2.272
		(1.204)	(-0.932)	(-1.185)		

(i) represents coefficients for regression equations using current earnings.

(ii) represents coefficients for regression equations using permanent earnings.

* denotes significance at 5% level.

** denotes significance at 1% level.