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Alternative Approaches to the Effect of Unfunded Pension Liabilities on Share Prices

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Abstract

In this study, previous studies of investigating the effect of unfunded pension liabilities on shares prices are reviewed and criticized. New models are derived for determining whether the empirical results of previous studies are reasonable or not. Larger sample and more recent data than previous studies are used to the empirical investigations. It is found that empirical results of the effect of pension liabilities on share prices are very sensitive to the model specification and the measurement of variables used.

I. Introduction

The impact of unfunded pension liabilities on share prices is a concern of both the accounting and finance professions. Research on the issue carries implications for capital market efficiency, corporate pension policy, and the effect of private pensions in national savings [4]. The main purpose of this paper is to theoretically and empirically re-examine previous studies on this topic. In Section II, the prior work of Oldfield [9], Feldstein and Seligmen (FS) [4], and Feldstein and Morck [3] will be reviewed. A new model will be presented in Section III, and updated pension data will be used to do the related empirical study, in which both ordinary least squares and the instrument variables method will be employed. Section IV presents and analyzes the data characteristics and regression results. Specification analysis will be used to show that the regression results are greatly subject to influence by sample selection, variable definition, and estimation methods used. Finally, in the last section the benefits of the paper are summarized, and possible research directions indicated.

II. Review and Critique of Previous Studies

Feldstein and Seligmen [4] attribute the effect of unfunded pension obligations on share prices to five possible sources: (a) the tax deductibility of pension contributions; (b) the actuarial rate assumed; (c) the proportion of unfunded obligations which are vested; (d) the impact of inflation; and (e) the uncertainty of benefits and asset yields. Four studies which have examined the magnitude of this particular share price effect will be reviewed and discussed in this section.

The first evidence that unfunded pension liabilities influence share prices are presented by Oldfield [9] using the following model:

$$\left(\frac{S}{BA}\right)_i = a_0 + a_1\left(\frac{\overline{X}(1-\tau)}{BA}\right)_i + a_2\left(\frac{R(1-\tau)}{BA}\right)_i + a_3\left(\frac{PSD}{BA}\right)_i + a_4\left(\frac{UFVO}{BA}\right)_i + a_5\left(\frac{\Delta BA}{BA}\right)_i + \varepsilon_i \qquad (1)$$

where, for each firm i

S ≡ the market value of common equity

$\overline{X}(1-\tau)$ ≡ normalized cash flow less depreciation

R ≡ payments to holders of liabilities

BA ≡ book value of total assets

PSD ≡ preferred stock dividends paid

ΔBA ≡ five year growth in book value of total assets

$UFVO$ ≡ unfunded vested person obligation.

This model is similar to the one employed by Modligiani and Miller in computing cost of capital estimates for the electric utility industry [7]. It differs in three respects. First, the dependent variable is the size adjusted equity value instead of a similarly adjusted estimate of the value of the firms unlevered cash flow. Second, an instrumental variables approach is not used to estimate $\overline{X}(1-\tau)$; rather, separate estimates for the expected tax adjusted equity earnings were computed for each firm using an appropriate time series model, and cash flows to other parties were included separately. Finally, as the sample was not confined to the electric utility industry, risk classes were constructed on the basis of ordinary and unlevered (Hamada [6]) betas. The coefficient of interest, a_4, was usually less than -1.6, and was in 50 percent of all cases significant at the 5 percent level.

In addition to the factors named by Feldstein and Seligman [4], the a_4 coefficient should also be influenced by the potential claim on assets held by the Pension Benefit Guarantee Corporation. Since 1974, firms have been liable for unfunded pension obligations for an amount up to 30 percent of net worth. Gersowitz [5] found that the a_4 coefficient was much more negative in Oldfield's model when the sample was confined to firms with a net worth sufficiently large to make them liable for their entire unfunded obligation.

Utilizing inflation adjusted data, Feldstein and Seligmen [4] extended the work of Oldfield with the following models:

$$\left(\frac{V}{A}\right)_i = \alpha_0 + \alpha_1\left[\frac{E}{A}\right]_i + \alpha_2(\text{GROW})_i + \alpha_3\left(\frac{RD}{A}\right)_i + \alpha_4 \cdot \text{Beta}_i + \alpha_5\left(\frac{D}{A}\right)_i + \alpha_6\left(\frac{UFVL}{A}\right)_i + \varepsilon_i \quad (2)$$

where for each firm i

V ≡ the total market value of the firm

A ≡ the replacement value of physical assets

E ≡ equity profits plus interest payments

GROW ≡ average 10 year percentage growth in E

RD ≡ research and development expenditures

Beta ≡ Merrill Lynch beta coefficient

D ≡ estimate market value of debt

UFVL ≡ unfunded vested pension liabilities

and

$$\left(\frac{VE}{AE}\right)_i = \beta_0 + \beta_1\left[\frac{EE}{AE}\right]_i + \beta_2(\text{GROW E})_i + \beta_3\left[\frac{RD}{AE}\right]_i + \beta_4 \cdot \text{Beta}_i$$

$$+ \beta_5\left[\frac{D}{AE}\right]_i + \beta_6\left[\frac{UFVL}{AE}\right]_i + \varepsilon_i \qquad (2)'$$

where for each firm i

VE ≡ market value of common equity

AE ≡ replacement value of equity assets

EE ≡ common equity earnings plus inflation gains on debt

GROW E ≡ ten year percentage growth of EE.

Several differences exist between these models and the one used by Oldfield. With regard to equation (2)', three different variables are used to proxy expected future earnings. The sample is not stratified on the basis of risk; instead, beta and debt values are used directly in the model. Equation (2) differs from equation (2)' in that the dependent variable measures total, not equity, value. Finally, both models control for size effects using replacement value, as opposed to the book value, of total assets.

Estimation of the regression coefficients were made for the years 1976 and 1977. In general, th α_6 and β_6 terms were usually less than -1.44 and -1.23, respectively, and significant at the 5 percent level.

Feldstein and Morck [3] replicated these models using data for 1979 and 1980, and arrived at similar conclusions.

In the aggregate, these studies suggest that unfunded pension liabilities reduce share price on roughly a dollar-for-dollar basis. Some issues concerning methodology must, however, be resolved. Such will be the focus of the next section.

III. A Revised Model

Our chief item of interest is the effect of the risk variables on the estimation of the α_6 and β_6 coefficients. We are motivated by the prior work of (1) Hamada [6], who showed that the beta coefficient is influenced by leverage; (2) Stone [11], who extended Hamada's work to include unfunded vested pension obligations; and Arnott and Gersowitz [1], who justified the inverse relationship seen between unfunced obligations and conventional debt. To derive our new model, we extend MM [7] valuation model to include a preferred stock (PSTK) and an unfunded vested pension obligation (UFVO) as follows:

Market Value of a Firm = Market Value of [Equity + Debt + PSTK + UVFO]

$$MV(V) = MV(E) + MV(D) + MV(PSTK) + MV(UVFO) \qquad (3)$$

The pretax cash flow minus deprecation of the firm is assumed to be $\tilde{X}$. The after-tax cash flow which can be distributed to the securities holders and the employees is

$$\tilde{Y} = \tilde{X} - \tau(\tilde{X} - R - BEN)$$

$$= (1-\tau)\tilde{X} + \tau R + \tau(BEN) \qquad (4)$$

where

R = interest payments,

BEN = pension benefits.

Further assume the $\tilde{X}$, the R and the BEN to be perpetual. The discounted rate for $(1-\tau)\tilde{X}$ must be ρ^u, the cost of equity without debt and pension liability. The discount rate of both R and BEN would be r^d, cost of debt, since both streams are riskless (MM assumption). Combining equations (3) and (4), we arrive at

$$MV(V) = \frac{(1-\tau)\tilde{X}}{\rho^u} + \frac{\tau R}{r^d} + \frac{\tau \cdot BEN}{r^d}$$

$$= \frac{(1-\tau)\tilde{X}}{\rho^u} + \tau \cdot MV(D) + \tau \cdot MV(UFVO) \qquad (5)$$

or,

$$MV(E) = \frac{(1-\tau)\tilde{X}}{\rho^u} - (1-\tau)MV(D) - (1-\tau)MV(UFVO) - MV(PSTK)$$

$$= \frac{(1-\tau)\tilde{X}}{\rho^u} - \frac{(1-\tau)R}{r^d} - (1-\tau)MV(UFVO) - \frac{DIV_p}{\rho^p} \qquad (6)$$

where

DIV_p = dividend payout for preferred stock,

ρ^p = the cost of preferred stock.

Now, if the growth potential and risk are considered, equation (6) will be modified as

$$MV(E) = \frac{(1-\tau)\overline{X}}{\rho^u} - \frac{(1-\tau)R}{r^d} - (1-\tau)\cdot MV(UFVO) - \frac{DIV_p}{\rho^p}$$

$$+ k_1\Delta BV + k_2 RD + k_3[BETAU] \cdot BV \tag{7}$$

where

ΔBV = five-year average growth of the firm's book assets,

BETAU = unlevered beta coefficient.

The ΔBV measures the historical growth of a firm, while R&D expense measures the future growth potential of a firm. The unlevered instead of levered beta is used to measure risk, since the leverage effect is already captured by $(1-\tau)R/r^d$. Expressing equation (7) as a regression formular, we obtain

$$MV(E) = a_0 + a_1(1-\tau)\tilde{X} + a_2(1-\tau)R + a_3 UFVO + a_4 DIV_p$$

$$+ a_5\Delta BV + a_6 RD + a_7(BETAU)\cdot BV + \varepsilon \tag{8}$$

To reduce heteroscedasticity problem, dividing both sides of (8) by BV, we have

$$\frac{MV(E)}{BV} = a_0' + a_0\frac{1}{BV} + a_1\frac{(1-\tau)\tilde{X}}{BV} + a_2\frac{(1-\tau)R}{BV} + a_3\frac{UFVO}{BV}$$

$$+ a_4\frac{DIV_p}{BV} + a_5\frac{\Delta BV}{BV} + a_6\frac{RD}{BV} + a_7(BETAU) + \varepsilon \tag{9}$$

If the model can evaluate the equity correctly, then

$$a_0' = 0;\ a_0 = 0;\ a_1 = 1/\rho^u;\ a_2 = -1/r^d;\ a_3 = -(1-\tau);$$

$$a_4 = -1/\rho^p;\ a_5 > 0;\ a_6 > 0;\ a_7 < 0. \tag{10}$$

Since Benz [2] and Reinganum [10] found the "size effect" in testing the CAPM, we would expect $a_0 > 0$ if there exists a "size effect" in the valuation model.

Oldfield did not include the size effect as found by Benz and Reinganum or the future potential growth as discussed by Myers [8]. In FS models of (2) and (2)', the components E in (2) and EE in (2)' did not include preferred dividend or UFVO. As a result, the coefficients $\alpha_1(\beta_1)$ and $\alpha_2(\beta_2)$ will not be explained as the costs of pure equity and debt, respectively. On the other hand, our model (9) can be used to estimate the costs of the pure equity, preferred stock and debt, the size effect and the impacts of risk, historical growth, future potential growth and UFVO on the market value of the equity.

The data for this study comes from three sources. Unfunded vested pension liabilities are calculated using the FASB 36 Data Base compiled at Columbia University. Necessary balance sheet and income statement data come from the Compustat tapes; market betas are calculated using CRSP data. The number of firms with complete data for 1979, 1980, and 1981 are 280, 596, and 479, respectively.

An Ordinary Least Square (OLS) and a two-stage regression are used to estimate the coefficients in equations (1), (2), (9) and a revised (1). The unlevered beta is added into equation (1) to measure the risk. The book value of total assets, instead of replacement cost of equity value, is used in FS model (2). In addition, the growth in equity (GROWE) is replaced by the growth in the book value of total assets. The two-stage regression (instrumental variable regression) is used to explore the effect of measurement error in earnings term.

IV. Analysis of Results

Table I shows the means and standard deviations for the basic variables in 1979, 1980 and 1981. Note that all variables approximately stay the same values in all three years. The annual growth rates are about 9 percent in all three years. Debt ratios (D/BV) are about 24 percent, while pre-tax earnings minus depreciation (ERN/BV) are about 7.5 to 8.0 percent. The unfunded vested obligations (UFVO/BV) are 0.7 percent, -0.2 percent and -0.1 percent in 1979, 1980 and 1981, respectively. The UFVO/BV are less than the values in FS studies. The negative value of UFVO means overfunded. The pension liabilities in our sample, on average, are almost balanced.

Table II presents the correlation matrix of basic variables. The simple correlations between market value of equity (VE/BV) and unfunded vested obligation (UFVO/BV) are -0.130, -0.118 and -0.111 in 1979, 1980 and 1981, respectively, indicating that these two variables are weakly inversely correlated, as we expected. The earnings, debts and preferred stocks are highly correlated with market value of the equity with right signs. However, the unlevered betas (BETAU) are highly correlated with VE/BV but with wrong signs in all three years, and leverred betas (BETA) are only slightly correlated again with wrong signs. According to CAPM, the higher the risk (beta), the higher the required rate of return, and the lower the market value of the firm.

Because earnings in the valuation models are defined as market's expectation of the long-run, future earnings power of the firm, an instrumental variables regression is used to estimate the unobservable earnings. The first-stage regression of earnings on the instrumental variables is represented in Table III. All coefficients of the instrumental variables are significant at the 5 percent level in all years and both dependent variables except the coefficients of the size in 1980 and 1981 as the dependent variable being equity earnings (EE/BV). The adjusted $\bar{R}^2$ is about 50 percent.

Table IV represents estimates of four alternative specifications and two different regression methods of the equity market value equation. All coefficients on unfunded vested pension obligation are negative and between -1.0 and 0.0 except OLS estimates of FS model with a positive value in 1980. They are all significant in 1979 except FS model. However, they are all insiginificant in 1980 and 1981. Furthermore, all coefficients are also significantly different from 0.54 ($1-\tau$), the theoretical value, at the 5 percent level. Most of the coefficients on (UFVO/BV) in 1979 are higher than the theoretical value, while all of the coefficients in 1980 and 1981 are less than the theoretical value. As a result, with our larger sample, the four different alternative models do not show much different among them for the impacts of pension liability on the market value of corporate equity. Furthermore, the coefficients on UFVO/BV in our sample are much lower than Oldfield's and FS's (their coefficients are greater than one). For our sample, the test power for four different models is not good enough to distinguish zero and the theoretical value -0.54. But, most of the results do reject the coefficient of -1.0. The evidence for a larger sample than previous studies is consistent with the conclusion that share prices reflect only some value of unfunded vested pension obligations. The evidence can be explained as (i) the pension liability is overestimated, and (ii) the investors undervalue this sort of future liability.

The historical growth and future potential growth have positively significant impact on the share price. Comparing OLS estimates with two-stage estimates, most of the results show that most of the OLS estimates are more reasonable than the two-stage regression. There exists a slight but insignificant "size effect" in the OLS estimates. This evidence confirms Banz [2] and Reinganum [10] studies.

The coefficients on earnings, interest payments and preferred stock dividends in Oldfield and our models can be explained as the costs of pure equity, debt and preferred stock, respectively. However, the coefficients on earnings and debt in FS model cannot be explained as the costs of pure equity and debt, respectively. The costs of capitals estimated from OLS method are first demonstrated as follows.

Even though the signs on the costs of pure equity, debt and preferred stock are correct in all three years and in both Oldfield and our models, the estimated cost of preferred stock are unreasonable. The costs of pure equity are about 14 percent, 23 percent and 16 percent in 1979, 1980 and 1981, respectively. The costs of debt are about 11 percent, 13 percent and 12 percent in 1979, 1980 and 1981, respectively. These estimated costs of capital seem reasonable except the cost of pure equity in 1979.

However, the cost of pure equity in two-stage regression is about 14 percent in 1979. It seems more reasonable than the OLS estimate. Furthermore, all of the coefficient signs in our model are correct in all three years except the coefficient on beta.

V. Conclusion

We have used larger sample and more recent data than previous studies to re-examine the impact of unfunded pension obligations on the share price. Four alternative models are used. The evidence shows the share prices reflect but not fully the value of the unfunded pension obligations. However, the test power is too low to distinguish between zero and the theoretical value, -0.54. The instrumental variables approach is also employed to adjust the reported earnings. However, this approach failed to outperform the direct OLS method. The valuation models of Oldfield's and ours are also used to estimate the costs of capital. Except the cost of preferred stock, the estimated costs of debt and pure equity seem reasonable. Our models also showed a weak "size effect."

In sum, we proposed a revised evaluation model to re-examine the impact of unfunded pension obligation on share prices with recent data. The results cannot reject our null hypothesis that one-dollar unfunded pension liability reduces 54¢ share price, even though the estimated values are less than 54¢.

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Table I

Means and Standard Deviation of Basic Variables

	1979		1980		1981	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Book Value (1/BV)	0.0019	0.0018	0.0017	0.0017	0.0015	0.0016
Growth (ΔBV/BV)	0.0934	0.0347	0.0900	0.0406	0.0931	0.0379
Debt (D/BV)	0.2440	0.1273	0.2363	0.1307	0.2425	0.1326
Preferred (PSTK/BV)	0.0246	0.0400	0.0242	0.0400	0.0273	0.0401
Common Dividend (DIV/BV)	0.0217	0.0133	0.0222	0.0140	0.0235	0.0148
Earnings-FN (EE/BV)	0.0611	0.0393	0.0575	0.0415	0.0537	0.0393
Earnings (ERN/BV)	0.0801	0.0367	0.0780	0.0357	0.0756	0.0342
Interest (R/BV)	0.0140	0.0067	0.0157	0.0079	0.0175	0.0090
Preferred Dividend (PSD/BV)	0.0021	0.0032	0.0020	0.0032	0.0024	0.0035
R&D Expense (RD/BV)	0.0099	0.0186	0.0115	0.0207	0.0120	0.0225
UFVO	0.0070	0.0436	-.0021	0.0418	-0.0111	0.0411
Levered Beta (BETA)	1.1869	0.4493	1.0798	0.4668	0.9875	0.4642
Unlevered Beta (BETAU)	0.8370	0.4144	0.8006	0.4356	0.7055	0.4158
Market Value (E/BV)	0.4691	0.3411	0.5601	0.5061	0.4605	0.3872
Sample Size (N)	280		596		479	

Table II

Correlation Matrix of Basic Variables: 1979

	1/BV	GROWA	D/BV	PSTK/BV	DIV/BV	EE/BV	ERN/BV	R/BV	PSD/BV	RD/BV	UFVO/BV	BETA	BETAU	E/BV
1/BV	1.000													
GROWA	-.195	1.000												
D/BV	-.129	-.015	1.000											
PSTK/BV	-.256	-.030	0.530	1.000										
DIV/BV	-.017	0.128	-.308	0.059	1.000									
EE/BV	0.162	0.253	0.581	-.363	0.517	1.000								
ERN/BV	0.185	0.232	-.551	-.341	0.506	0.934	1.000							
R/BV	-.017	-.041	0.721	0.258	-.383	-.541	-.431	1.000						
ρSD/BV	-.237	0.009	0.524	0.872	0.014	-.348	-.327	0.303	1.000					
RD/BV	-.017	0.047	-.433	-.205	0.116	0.223	0.248	-.276	-.234	1.000				
UFVO/BV	0.032	-.157	-.025	-.064	-.104	-0.076	-.013	-.026	-.100	0.031	1.000			
BETA	0.285	-.138	-.231	-.420	-.353	0.042	0.051	-.005	-.370	0.210	0.094	1.000		
BETAU	0.312	0.008	-.603	-.610	-.029	0.488	0.448	-.374	-.560	0.398	-.003	0.801	1.000	
VE/BV	0.152	0.349	-.501	-.388	0.488	0.724	0.676	-.441	-.397	0.307	-.130	0.034	0.465	1.000

Table II (con't.)

Correlation Matrix of Basic Variables: 1980

	1/BV	GROWA	D/BV	PSTK/BV	DIV/BV	EE/BV	ERN/BV	R/BV	PSD/BV	RD/BV	UFVO/BV	BETA	BETAU	VE/BV
1/BV	1.000													
GROWA	-.264	1.000												
D/BV	-.037	-.038	1.000											
PSTK/BV	-.201	-.022	0.475	1.000										
DIV/BV	-.061	0.141	-.329	0.012	1.000									
EE/BV	-.019	0.348	-.564	-.310	0.574	1.000								
ERN/BV	0.036	0.302	-.516	-.305	0.539	0.925	1.000							
R/BV	0.054	-.086	0.702	0.249	-.429	-.555	-.417	1.000						
ρSD/BV	-.203	0.002	0.479	0.893	-.012	-.302	-.292	0.276	1.000					
RD/BV	-.041	-.026	-.384	-.224	0.152	0.193	0.198	-.220	-.218	1.000				
UFVO/BV	0.020	-.129	0.089	0.025	-.104	-.146	-.106	0.121	0.021	-.088	1.000			
BETA	0.164	0.007	-.278	-.494	-.401	0.084	0.112	-.011	-.471	0.194	0.000	1.000		
BETAU	0.121	0.130	-.582	-.589	0.104	0.446	0.421	-.321	-.561	0.307	-.087	0.857	1.000	
VE/BV	0.040	0.310	-.464	-.327	0.423	0.742	0.687	-.426	-.326	0.293	-.118	0.195	0.495	1.000

Table II (con't.)

Correlation Matrix of Basic Variables: 1981

	1/BV	GROWA	D/BV	PSTK/BV	DIV/BV	EE/BV	ERN/BV	R/BV	PSD/BV	RD/BV	UFVO/BV	BETA	BETAU	VE/BV
1/BV	1.000													
GROWA	-.219	1.000												
D/BV	-.155	0.062	1.000											
PSTK/BV	-.215	0.036	0.521	1.000										
DIV/BV	-.034	0.120	-.287	0.015	1.000									
EE/BV	-.050	0.249	-.473	-.276	0.620	1.000								
ERN/BV	-.097	0.237	-.417	-.238	0.565	0.919	1.000							
R/BV	-.066	0.003	0.661	0.256	-.414	-.511	-.371	1.000						
ρSD/BV	-.219	0.042	0.523	0.957	0.004	-.281	-.232	0.280	1.000					
RD/BV	-.048	-.031	-.429	-.248	0.181	0.247	0.223	-.252	-.233	1.000				
UFVO/BV	-.037	-.035	0.086	0.063	-.054	-.092	-.074	0.053	0.040	-.193	1.000			
BETA	0.095	0.145	-.303	-.499	-.367	0.047	0.076	-.020	-.469	0.162	-.044	1.000		
BETAU	0.125	0.163	-.587	-.617	-.066	0.391	0.346	-.323	-.590	0.302	-.135	0.854	1.000	
VE/BV	0.103	0.233	-.490	-.366	0.606	0.783	0.722	-.473	-.359	0.331	-.111	0.145	0.447	1.000

Table III

First-Stage Regression of Earnings on the Instrumental Variables

Dependent Variable: ERN/BV

Year	Constant	Size 1/BV	GROWA ΔBV/BV	Debt D/BV	Preferred Stock PSTK/BV	Dividend BIV/BV	$\bar{R}^2$
1979	0.056*	3.034*	0.223*	-.093*	-.148*	1.078*	0.498
	(8.026)	(3.341)	(4.826)	(-5.886)	(-3.032)	(8.375)	--
1980	0.054*	1.882*	0.223*	-.082*	-.129*	1.0543*	0.496
	(12.573)	(2.832)	(8.282)	(-8.355)	(-4.172)	(12.964)	--
1981	0.044*	2.244*	0.197*	-.055*	-.102*	1.113*	0.446
	(9.152)	(2.871)	(6.199)	(-5.006)	(-2.900)	(13.136)	--

Dependent Variable: EE/BV

Year	Constant	Size 1/BV	GROWA ΔBV/BV	Debt D/BV	Preferred Stock PSTK/BV	Dividend BIV/BV	$\bar{R}^2$
1979	0.037*	2.669*	0.257*	-0.106*	-.176*	1.161*	0.538
	(5.155)	(2.862)	(5.415)	(-6.586)	(-3.499)	(8.789)	--
1980	0.031*	1.025	0.289*	-.111*	-.139*	1.259*	0.576
	(6.854)	(1.448)	(10.095)	(10.612)	(-4.240)	(14.532)	--
1981	0.020*	1.096	0.224*	-0.073*	-0.151*	1.400*	0.538
	(4.029)	(1.333)	(6.693)	(-6.339)	(-4.091)	(15.719)	--

*: significant at the 5% level

Table IVA

Determinants of the Market Value of Corporate Equity: 1979

Equation	Constant	Size 1/BV	Growth ΔBV/BV	Debt D/BV	Earnings[a]	Interest R/BV	Pref. Div. PSD/BV	R&D RD/BV	BETA	BETAU	UFVO/BV	$\bar{R}^2$
A. Direct OLS Estimates												
Revised (9)	-0.021 (-.389)	11.264 (1.382)	2.267* (5.477)		4.142* (9.203)	-7.464* (-3.213)	-15.274* (-2.983)	1.540* (1.956)		0.063 (1.421)	-0.861* (-2.763)	0.576
FS (2)	0.054 (0.693)		1.792* (4.386)	-0.293* (-2.045)	5.063* (11.555)			2.260* (2.859)	-0.008 (-0.260)		-.485 (-1.565)	0.577
Oldfield (1)	0.079 (1.220)		2.088* (5.135)		4.555* (10.534)	-8.364* (-3.659)	-21.368* (-4.680)				-0.894* (-2.838)	0.564
Revised Oldfield	-0.012 (-0.163)		2.162* (5.344)		4.264* (9.545)	-7.557* (-3.295)	-15.799* (-3.082)			0.099* (2.341)	-0.840* (-2.683)	0.571
B. Two-Stage Estimates[b]												
Revised (9)	-0.340* (-3.500)	-3.627 (-.410)	1.490* (3.212)		7.157* (8.271)	-0.702 (-0.252)	-4.215 (-.769)	0.843 (1.034)		1.413* (3.163)	-.561* (-1.750)	0.556
FS (2)	-.358* (-3.230)		0.656 (1.381)	0.517* (2.439)	9.461* (10.130)			2.117* (2.577)	0.037 (1.117)		-.513 (-1.590)	0.542
Oldfield (1)	-0.209* (-2.304)		1.439* (3.237)		7.588* (9.401)	-2.419 (0.896)	-12.433* (-2.456)				-.614* (-1.882)	0.537
Revised Oldfield	-0.342* (-3.566)		1.555* (3.564)		7.118* (8.892)	-1.235 (-0.737)	-4.033 (-0.737)			0.150* 3.612)	-0.549* (-1.715)	0.556

a. Earning in (9) and Oldfield model = ERN = $(1-\tau)\tilde{X}/BV$; in FS, earnings = EE/BV
b. Earnings constructed from Table II.

*: significant at the 5% level

Table IVB

Determinants of the Market Value of Corporate Equity: 1980

Equation	Constant	Size 1/BV	Growth ΔBV/BV	Debt D/BV	Earnings[a]	Interest R/BV	Pref. Div. PSD/BV	R&D RD/BV	BETA	BETAU	UFVO/BV	$\bar{R}^2$
A. Direct OLS Estimates												
Revised (9)	-0.236* (-3.399)	14.555 (1.623)	1.792* (4.717)		6.884* (14.527)	-7.991* (-4.021)	-1.966 (-0.363)	2.833* (3.957)		0.212* (5.082)	-0.093 (-0.277)	0.567
FS (2)	-0.190* (-2.804)		0.944* (2.622)	0.051 (0.373)	8.347* (19.586)			3.575* (5.091)	0.121* (4.030)		0.043 (0.131)	0.587
Oldfield (1)	0.000 (0.002)		1.615* (4.297)		7.747* (16.274)	-9.558* (-4.700)	-19.890* (-4.109)				-0.277 (-0.793)	0.519
Revised Oldfield	-0.152* (-2.702)		1.482* (4.049)		7.064* (14.818)	-8.369* (-4.212)	-4.024 (-0.744)			0.246* (5.951)	-0.184 (-0.541)	0.546
B. Two-Stage Estimates												
Revised (9)	-0.570* (-5.473)	5.268 (0.528)	0.906* (1.907)		9.328* (9.476)	-2.068 (-0.798)	12.221* (1.981)	1.838* (2.309)		0.373* (8.419)	-0.048 (-0.132)	0.478
FS (2)	-0.560* (-4.903)		-0.263 (0.491)	0.724* (3.070)	11.821* (11.237)			2.616* (3.182)	0.243* (6.340)		-0.215 (-0.567)	0.438
Oldfield (1)	-0.193* (-1.904)		1.134* (2.437)		9.8249* (9.779)	-5.334* (-1.994)	-15.726* (-2.752)				-0.272 (-0.696)	0.400
Revised Oldfield	-0.584* (-5.618)		0.646 (1.471)		9.877* (10.503)	-1.675 (-0.664)	12.415* (2.014)			0.396* (9.183)	-0.096 (-0.261)	0.475

Table IVC

Determinants of the Market Value of Corporate Equity: 1981

Equation	Constant	Size 1/BV	Growth ΔBV/BV	Debt D/BV	Earnings[a]	Interest R/BV	Pref. Div. PSD/BV	R&D RD/BV	BETA	BETAU	UFVO/BV	$\bar{R}^2$
A. Direct OLS Estimates												
Revised (9)	-0.032 (-0.590)	8.289 (1.104)	1.074* (3.384)		6.206* (16.669)	-7.857* (-5.744)	-11.640* (-2.853)	1.989* (3.697)		0.074* (2.070)	-0.171 (-0.622)	0.616
FS (2)	0.044 (0.875)		0.645* (2.136)	-0.309* (-2.951)	6.763* (20.628)			1.836* (3.461)	0.045* (1.812)		-0.125 (-0.477)	0.644
Oldfield (1)	0.067 (1.416)		1.040* (3.398)		6.550* (17.711)	-8.961* (-6.547)	-18.963* (5.544)				-0.435 (-1.594)	0.602
Revised Oldfield	0.004 (0.073)		0.885* (2.858)		6.393* (17.177)	-8.438* (-6.141)	-12.951* (-3.174)			0.095* (2.663)	-0.347 (-1.269)	0.607
B. Two-Stage Estimates												
Revised (9)	-0.523* (-7.114)	-6.659 (-0.857)	-0.535 (-1.481)		11.500* (16.105)	-0.383 (-0.241)	4.056 (4.262)	1.039* (1.871)		0.223* (6.206)	-0.059 (-0.214)	0.607
FS (2)	-0.381* (5.443)		-0.997* (-2.707)	0.511* (3.594)	11.555* (17.906)			1.627* (2.877)	0.169* (5.935)		-0.204 (-0.732	0.597
Oldfield (1)	-0.320* (-4.643)		-0.005 (-0.014		11.305* (15.907)	-2.818* (-1.746)	-11.479* (-3.1220				-0.377 (-1.326)	0.568
Revised Oldfield	-0.533* (-7.258)		-0.543 (-1.598)		11.624* (17.038)	-0.643 (-0.407)	4.425 (1.038)			0.234* (6.625)	-0.137 (0.499)	0.604