The Effect of Defined Benefit Pension Plans on the American Steel Industry

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This study analyzes 42 American steel industry firms between the years 2006-2015. Analysis relating the information content of accounting earnings to stock prices for the full sample indicates that there is significant positive correlation between earnings and stock price for the firms in total.
When the sample is portioned between firms that contain underfunded pension plans and firms that do not, the underfunded plan firms' earnings are not significantly related to stock price. Those firms with pension plans not underfunded are significantly related to stock price, and are positive in their correlation.
The firms are then assessed against the DJIA 30 firms during the test period. Findings show greater positive correlation between earnings and stock prices for the DJIA firms. When a subsample comparing underfunded firms in each group are assessed, samples from both groups show a reduced correlation and DJIA firms are still positive and significant in correlation, but the steel industry firms show no significance at conventional levels. A subsample of firms from each group with pension plans not underfunded are then analyzed. Both groups are significant and positive in correlation between earnings and stock price, but the DJIA firms still possess an edge in information content.

INTRODUCTION

"What many Americans do not know is that their own steel industry is bigger than those of all the other nations on earth put together. No other nation in the world could have matched that record. It is a record that stands as a glorious tribute to the men who make steel in America."
-Ben Fairless, Chairman U.S. Steel, January 1951.

In a study conducted in January, 2012, it was found that in the United States, publicly traded firms account for more than $2.5 trillion in unfunded pension liabilities. Staggering as it may seem, it pales in comparison to the $4.5 trillion in unfunded pension liabilities reported by State and Local governments, and this does not even address the reported $4.4 trillion of unfunded pension liabilities the Federal government faces (Feldstein and Seligman 2012).

In the fourth quarter of 2016 it was determined that many private pension plans won't be able to pay the benefits that they have promised. They are underfunded by an estimated $450 billion. Even the Federal Pension Benefit Guaranty Corporation (PBGC), which was set up by the U.S. Congress in 1974 and insures these plans, is in the red by $23 billion. Its shortfall could hit $142 billion within a decade (Organization for Economic Cooperation and Development 2016).

An industry that seemingly has been hit the hardest by these pension facts, and has accounted for a significant portion of the PBGC's loss, is the American steel industry. As of the end of 2016, one third of

the PBGC's $29.07 billion in liabilities relate to the steel industry and almost four million Americans (Pittsburgh Post Gazette.com 1/4/17).

Since publicly traded firms operate on the premise of returning a profit to their shareholders, and thus contain a direct correlation to the valuation of firms' wealth through stock prices and the ability to raise capital, this study will focus on the impact of underfunded pension liabilities of publicly traded American steel industry firms.

Although this problem seems to have been a long time in coming, very little research has been conducted which fully assesses the impact of underfunded pension plans on the steel industry. This study will attempt to do just that. An analysis will be made of U.S. steel firms that are underfunded and a comparison will be made to U.S. steel firms not considered to be underfunded. In addition, this analysis will be compared to Dow Industrial firms in order to provide the reader with a national perspective on the issue concerning the pension liability threat.

LITERATURE REVIEW

Defined Benefit Versus Defined Contribution Plans

In a defined benefit (DB) plan the employee's pension benefit entitlement is determined by a formula which takes into account years of service for the employer and, in most cases, wages or salary. Many defined benefit formulas also take into account the Social Security benefits to which an employee is entitled. These are the so-called integrated plans (Bodie, and Marcus 1987). Currently 85% of American steel firms have some degree of DB pension plan (Organization for Economic Cooperation and Development 2016).

This contrasts significantly with a defined contribution (DC) plan where each employee has an account into which the employer and, if it is a contributory plan, the employee make regular contributions. Benefit levels depend on the total contributions and investment earnings of the accumulation in the account. Often the employee has some choice regarding the type of assets in which the accumulation is invested and can easily find out what its value is at any time. Defined contribution plans are, in effect, tax deferred savings accounts in trust for the employees, and they are by definition fully funded (Bodie, Marcus and Merton 1988).

Funding

DC plans are by their nature fully funded, that is, the market value of the plan's assets equals the liability of the sponsor to the plan's beneficiaries. In sharp contrast, the calculation of the funding status of DB plans is complex and controversial. If the plan's assets are invested in traded securities, their market value is relatively easy to ascertain. The source of difficulty is in measuring the sponsor's liability (Bierwag and Kaufman 1987).

From a strictly legal point of view the sponsor's liability is the present value of the accrued vested benefits which would be payable if the plan were immediately terminated. But many pension experts contend that sponsors have an implicit semi-contractual obligation which makes it more appropriate to take account of projected future salary growth in the computation of the firm's pension liability (Bierwag 1987). For the past several years the Financial Accounting Standard Board (FASB) has been grappling with pension-related issues, trying to establish a uniform set of valuation standards for firms to use in their financial statements.

The Federal government guarantees, up to a limit, employer pension benefits through the PBGC. The valuation of guaranteed benefits therefore should utilize the riskless-in-terms-of-default interest rate. However, in practice, only 80 percent of accrued benefits is vested while only 90-95 percent of vested benefits is guaranteed so that roughly one-quarter of accrued benefits is not guaranteed (Amoroso 1992). Thus, the funding status of a plan is important to employees as well as to the PBGC. In effect, adequate funding protects accrued-but-not-yet-vested benefits. (Marcus 1987).

Tradeoffs

The original belief was that the DC plans would necessarily dominate DB plans because of the flexibility of DC plan design. It would have been surmised that anything that could be accomplished with a DB plan could be replicated in a cleverly constructed DC plan. However, this belief is not borne out. DB plans create implicit securities that can be welfare improving and that are neither currently available in capital markets, nor likely to be created in capital markets in the future. Some examples of these "securities" are factor-share claims, price-indexed claims, and perhaps deferred life annuities at fair interest rates. Moreover, some of the "real-world' ' complications in plan design, such as incentive effects, tend to favor DB over DC plans. Thus, the optimal plan design is likely to be firm specific (Bulow 2012).

Stock Market Connection

Pension fund capital is devoted almost entirely to the financial markets (Merton 1983). While pension fund managers generally direct the funds across various asset classes, the stock market is the major avenue for investment. As a result, performance in the stock market has the ability to sway the overall value of a pension fund (Ellwood 1995). In addition, the stock market also has the ability to affect the timing in which an individual chooses to retire from an employer (Diamond and Mirlees 1985).

While pension funds receive contributions from plan sponsors, and in some cases employees, on an on-going basis, those deposits alone are not enough to increase the overall value of the fund so that plan members have enough money to eventually retire. To a large extent, fund value is also dependent upon firm value. That firm value is best reflected in the stock price of firms in which the funds are invested (Cohn 1993). In 2015, U.S. pensions directed an average of 54% of overall capital invested in the stock market (Towers and Watson 2016). This clearly shows the market impact that pension funds exert within the financial markets.

In 2008, when the economy was in recession, performance in the stock market caused funding levels at corporate pensions plans to drop 17% in a matter of months to 81% on average. A funding status of 80% or greater is considered sufficient to cover liabilities and, therefore, becomes the measuring parameter for determining if a pension fund is underfunded (Cox, Ingersoll, and Ross 2009). At an average funding level of 81%, clearly, many funds were found to be underfunded.

The stock market continues to affect pension benefits even after individuals retire. Many retirement accounts are assessed against the Dow Jones industrial Average. With the 2008 recession, the Dow declined 34%, the balance in pension funds were reduced almost in lock step (Mellon Asset Management Group 2009).

HYPOTHESES DEVELOPMENT

Three hypotheses are tested. First, Ball and Brown (1968), Beaver, Lambert and Morse (1980), Basu (1997) and Ball, Kothari and Robin (1998), all incorporate a research design that associates accounting earnings to changes in market values of equity. These studies indicate, (with varying degrees of significance depending on such factors as firm size, firm risk or industry of the firm), that there is an overall significant positive correlation between accounting earnings and a firm's security price. Drawing upon this literature, and in order to establish a baseline upon which to further this line of research, the following hypothesis is stated:

H1: The information content of accounting earnings is positively correlated with security prices for all steel industry firms selected in the study sample.

The second hypothesis draws from recent findings that investors react differently to firms that exhibit underfunding of pension plans versus those that overfund a pension plan, Francesco (2009). This finding is a secondary result of a study which assesses mainly cash flows and is limited in scope in that very few overfunding firms were targeted. The research follows that of Fama (1970), Jensen (1980), and Ding and

McInish (2008) which find pension accruals relevant to investor behavior. This results in the second hypothesis, stated in the null form:

H2: The information content of accounting earnings is not significantly different for steel industry firms that underfund a pension plan versus steel industry firms that do not underfund a pension plan.

The third hypothesis draws from literature that is still undergoing development; that is, industry impact on pension liabilities. Fields (2001) assesses specific stakeholder groups in industrial firms and the impact on accounting accruals. Findings suggest that firms with a strong presence of labor union activity results in downward earnings trends due mainly to pension and benefit accruals. Bova (2012) finds that managers in industries where labor unions are strongest face disincentives in reporting earnings due to the potential for earnings reduction as a result of union-bargained pensions. Allegretto and Jacobs (2011) find that unions in the private sector are as influential as those in the public sector, and the impact is affecting economic wealth of firms through long term pension and benefit liabilities: Although a central theme in these studies is the presence of union activity, that is not a prime area of research in this paper. Instead, these studies focus on industry groups. It would be noteworthy information if it can be ascertained how firms within the American steel industry compare and contrast with other high profile firms in other industries. This leads to the third hypothesis stated in the null form:

H3: The information content of accounting earnings among steel industry firms is not significantly different from firms in other industries.

RESEARCH DESIGN

This study analyzes the effect of accounting earnings on security prices of American steel industry firms, with the central focus placed on these firms' pension plans. The Electronic Data Gathering Analysis and Retrieval system (EDGAR), is used to identify firm detail regarding pension plans during the study period 2006-2015. In addition, for inclusion in the sample, the firms must have the following characteristics: 1. Inclusion in Compustat; 2. Inclusion in Center for Research in Security Prices (CRSP); and 3. Inclusion in Investment Brokers Estimate Service (IBES). Also, this study evaluates only defined benefit pension plans which is the traditional pension plan offered in the U.S. throughout the 20th century. Defined contribution plans, typified by the 401K model, are not included in this study. The sample of firms and their breakdown is detailed in Table 1.

TABLE 1:
STUDY SAMPLE SUMMARY- AMERICAN STEEL INDUSTRY FIRMS
2006-2015

Firms identified by EDGAR	63
Firms removed due to insufficient Compustat data	(7)
Firms removed due to insufficient CRSP data	(4)
Firms removed due to insufficient IBES data	(10)
Final overall sample	42

TEST/RESULTS OF HYPOTHESES

H1: Test of Overall Information Content of the Full Sample

The purpose of this test is to assess the relative information content of the unexpected earnings to the security prices of all 42 firms in the ten year sample. 10-K audited financial data is typically released by each publicly held firm within 75 days after the close of their fiscal year. Based on this information, stock traders respond along with the stock price itself. The prime belief is that earnings, more specifically, "unexpected earnings" was causing the stock price to move. This is a belief that was postulated as early as Ball and Brown (1968) and shown in numerous studies thereafter. The Dow Jones News Retrieval Service (DJNRS) was used to identify the date that each firm released 10-K financial data for the study periods. This date of data release is known as the event date. The following model in equation 1 is established for determining information content:

$$CARit = a + b_1(UEit) + b_2Bit + b_3MVit + eit \quad (1)$$

Where:

CARit = Cumulative abnormal return firm i, time t
a = Intercept term
UEit = Unexpected Earnings for firm i, time t
Bit = Market model slope coefficient as proxy for systematic risk
MVit = Market value of equity as proxy for firm size
eit = error term for firm i, time t

The coefficient "a" measures the intercept. The coefficient b_1 is the response coefficient for measuring the effect of unexpected earnings on security prices for all 42 firms in the overall sample. In order to investigate the effect of information content on security prices, there must be some control for variables found in prior studies to be determinants of information content. For this reason, variables b_2, representing systematic risk, and b_3, representing firm size are included as controls in the study.
Unexpected earnings (UEi) is measured as the difference between the management earnings forecast (MFi) and security market participants' expectations for earnings proxied by consensus analyst following as per Investment Brokers Estimate Service (IBES) (EXi). The unexpected earnings are scaled by the firm's stock price (Pi) 180 days prior to the forecast:

$$UEi = \frac{(MFi) - (EXi)}{Pi} \quad (2)$$

For each firm sample, an abnormal return (ARit) is generated around the event dates of -1, 0, +1 (day 0 representing the day that the firm's financials were available per DJNRS). The market model is utilized along with the CRSP equally-weighted market index and regression parameters are established between -180 and -91. Abnormal returns are then summed to calculate a cross-sectional cumulative abnormal return (CARit).

Results of H1

As indicated in Table 2, the response coefficient b_1, representing unexpected earnings for all firms during the study period was .05 with a p-value of .10. The other control variables were not found to be significant at conventional levels. This finding confirms similar results by Ball and Brown (1968) and numerous other subsequent researchers who found a significant positive correlation between accounting earnings and firm stock prices. The baseline hypothesis, hypothesis one, which suggests that information content of all firms in the sample would be positively correlated with stock prices, cannot, therefore, be overturned.

In addition, whenever a set of multiple regression variables are employed, there is a probability of the presence of multicollinearity within the set of independent variables which may be problematic from an interpretive perspective. To assess the presence of multicollinearity, the Variance Inflation Factor (VIF) was utilized. Values of VIF exceeding 10 are often regarded as indicating multicollinearity. In the test of hypothesis 1, a VIF of 1.9 was observed, thus indicating the non-presence of significant multicollinearity.

TABLE 2
TEST OF HYPOTHESIS 1
MODEL: $CARit = a + b_1(UEit) + b_2Bit + b_3MVit + eit$

a	b1	b2	b3	Adj. R^2
.05	.05	.11	.03	.205
(.69)	(1.99)[a]	(.41)	(.29)	

b_1= information content of all firms in the full sample
b_2= control variable systematic risk
b_3= control variable firm size

[a] Significant at the .10 level

Sample= 42 firms, 2006-2015

H2: Test of Information Content of Earnings in Underfunded Firms Versus Firms Not Underfunded

Of the 42 firms contained in the overall sample, not all are presumed to maintain pension plans that are underfunded. Cox, Ingersoll, and Ross (2009) find that a funding status of 80% or greater is considered sufficient to cover liabilities and, therefore, becomes the measuring parameter for determining if a pension fund is underfunded. Therefore, an analysis of the 42 selected firms finds that 28 firms fall below the 80% level (underfunded), while 14 firms are above the 80% level (not underfunded).

To assess if there is any difference between these two groups, a similar regression is run with the following model:

$$CARit = a + b_1(UEUit) + b_2(UENit) + b_3Bit + b_3MVit + eit \quad (3)$$

Where:

CARit = Cumulative abnormal return firm i, time t
a = Intercept term
UEUit = Unexpected Earnings for firm i, time t for underfunded firms
UENit = Unexpected Earnings for firm i, time t for firms not underfunded
Bit = Market model slope coefficient as proxy for systematic risk
MVit = Market value of equity as proxy for firm size
eit = error term for firm i, time

The only change in this regression equation versus the one used in Hypothesis 1 is that the b1 variable now represents the 28 firms which contain underfunded pension plans. In addition, a b2 variable is added which represents the14 firms which do not have underfunded pension plans. The remaining variables are the same as in the previous regression.

Results of H2

As indicated in Table 3, the response coefficient b_1, representing unexpected earnings for underfunded firms during the study period was .02 with a p-value of .15, which is not significant at

conventional levels. The response coefficient b_2, representing unexpected earnings for firms with plans not underfunded during the study period was .08 with a p-value of .05. These findings indicate that the earnings response coefficient has greater positive value for firms that do not possess undervalued pension plans and that investors perceive a difference in firms with underfunded pension plans versus those versus without underfunded plans with respect to significance relating to security price effect.

To assess the presence of multicollinearity, the Variance Inflation Factor (VIF) was utilized. In the test of this sensitivity analysis, a VIF of 2.0 was observed, thus indicating the non-presence of significant multicollinearity.

TABLE 3
TEST OF HYPOTHESIS 1-SENSITIVITY ANALYSIS
MODEL: $CARit = a + b_1(UEUit) + b_2(UENit) + b_3Bit + b_3MVit + eit$

a	b_1	b_2	b_3	b_4	Adj. R^2
.04	.02	.08	.10	.04	.211
(.70)	(2.31)	(1.79)[a]	(.41)	(.30)	

b_1= information content of firms with underfunded pension plans
b_2= information content of firms with pension plans not underfunded
b_3= control variable systematic risk
b_4= control variable firm size

[a] Significant at the .05 level

Sample= 42 firms, 2006-2015
28 firms contain underfunded pension plans
14 firms contain pension plans not underfunded

H3: Test of Information Content on Earnings of Steel Industry Firms Versus Firms in Other Industries

The purpose of this test is to assess the relative information content of unexpected earnings to security prices of the steel industry firms sample versus a sample representing other industries. The Mellon Asset Group regularly assesses pension management results within the 30 firms comprising the Dow Jones Industrial Average (DJIA). In fact, this group further correlates associated pension fund changes directly to stock market impact (Mellon Asset Management Group 2009).

The DJIA is one of several stock market indices. Currently owned by S&P Dow Jones Indices, it is the most notable of the Dow Averages. It is an index that shows how 30 large publicly owned companies based in the United States have traded during a standard trading session in the stock market. It is the second-oldest U.S. market index after the Dow Jones Transportation Average. The *Industrial* portion of the name is largely historical, as many of the modern 30 components have little or nothing to do with traditional heavy industry. The average is price-weighted, and to compensate for the effects of stock splits and other adjustments, it is currently a scaled average. The value of the Dow is not the actual average of the prices of its component stocks, but rather the sum of the component prices divided by a divisor, which changes whenever one of the component stocks has a stock split or stock dividend, so as to generate a consistent value for the index. Although the Dow is compiled to gauge the performance of the industrial sector within the American economy, the index's performance continues to be influenced by not only corporate and economic reports, but also by domestic and foreign political events such as war and terrorism, as well as by natural disasters that could potentially lead to economic harm. Roughly two-thirds of the DJIA's 30 component firms are manufacturers of industrial and consumer goods. The others represent industries as diverse as financial services, entertainment, and information technology. Even so,

the DJIA today serves the same purpose for which it was created- to provide a clear, straightforward view of the stock market, and by extension, the U.S. economy.

Therefore, utilizing a regression analysis similar to that employed in the prior two hypotheses, the following model is determined:

$$CARit = a + b_1(UESit) + b_2(UEDit) + b_3Bit + b_3MVit + eit \quad (4)$$

Where:

CARit = Cumulative abnormal return firm i, time t
a = Intercept term
UESit = Unexpected Earnings for firm i, time t for steel industry firms
UEDit = Unexpected Earnings for firm i, time t for DJIA firms
Bit = Market model slope coefficient as proxy for systematic risk
MVit = Market value of equity as proxy for firm size
eit = error term for firm i, time

Results of H3

As indicated in Table 4, the response coefficient b_1, representing unexpected earnings for underfunded firms during the study period was .05 with a p-value of .10. The response coefficient b_2, representing DJIA firms was .13 with a p-value of .01. These findings indicate that the earnings response coefficient has greater positive value for DJIA firms versus steel industry firms, and thus a greater security price effect. In other words, investors respond more positively to earnings of DJIA firms than they do to the earnings of steel industry firms.

To assess the presence of multicollinearity, the Variance Inflation Factor (VIF) was utilized. In the test of this sensitivity analysis, a VIF of 2.6 was observed, thus indicating the non-presence of significant multicollinearity.

TABLE 4
TEST OF HYPOTHESIS 3
MODEL: $CARit = a + b_1(UESit) + b_2(UEDit) + b_3Bit + b_3MVit + eit$

a	b_1	b_2	b_3	b_4	Adj. R^2
03	.05	.13	.15	.07	.228
(.72)	(1.99)[b]	(1.65)[a]	(.38)	(.27)	

b_1= information content of steel industry firms
b_2= information content of DJIA firms
b_3= control variable systematic risk
b_4= control variable firm size

a= Significant at .01 level
b= Significant at .10 level

Sample= 42 steel industry firms and 30 DJIA firms
Study Period 2006-2015

Sensitivity Analysis of H3

As Cox, Ingersoll, and Ross (2009) point out, a funding status average of 80% or greater is considered sufficient to cover liabilities and, therefore, becomes the measuring parameter for determining if a pension fund is underfunded. Since this is an average, it implies that some firms may in fact be underfunded while others are not. In the case of the steel industry firms, it has already been determined that from the sample group of 42 firms, 28 firms are underfunded when using the Cox, Ingersoll and Ross (2009) measuring stick. In addition, with respect to the 30 DJIA firms, and using the same standard, it was subsequently determined that 13 of these 30 firms are also underfunded. This permits a sensitivity analysis of H3 to be conducted on sub-samples.

Comparison of Firms Underfunded

The first sub-sample comparison consists of comparing the underfunded steel industry firms to the underfunded DJIA firms. This results in the following model:

$$CARit = a + b_1(UESUit) + b_2(UEDUit) + b_3Bit + b_3MVit + eit \quad (5)$$

Where:

CARit = Cumulative abnormal return firm i, time t
a = Intercept term
UESit = Unexpected Earnings for firm i, time t for steel industry firms underfunded
UEDit = Unexpected Earnings for firm i, time t for DJIA firms underfunded
Bit = Market model slope coefficient as proxy for systematic risk
MVit = Market value of equity as proxy for firm size
eit = error term for firm i, time

Results

As indicated in Table 5, the response coefficient b_1, representing unexpected earnings for underfunded steel industry firms during the study period was .03 with a p-value of .15, which is non-significant at conventional levels. The response coefficient b_2, representing underfunded DJIA firms was .09 with a p-value of .05. These findings indicate that while the earnings response coefficient has greater positive value for DJIA firms versus steel industry firms, the impact on stock prices for underfunded firms in both groups does not have as significant an impact on stock prices when compared to samples for each group in total. Investors seem to place less emphasis on firms with underfunded pension plans, but still provide even less preference to steel industry firms' stock when the two groups are compared.

To assess the presence of multicollinearity, the Variance Inflation Factor (VIF) was utilized. In the test of this sensitivity analysis, a VIF of 2.0 was observed, thus indicating the non-presence of significant multicollinearity.

TABLE 5
SUBSAMPLE TEST 1 OF HYPOTHESIS 3
MODEL: CARit = $a + b_1(UESUit) + b_2(UEDUit) + b_3Bit + b_3MVit + eit$

a	b_1	b_2	b_3	b_4	Adj. R^2
04	.03	.09	.14	.08	.215
(.75)	(2.29)	(1.81)[a]	(.31)	(.29)	

b_1= information content of steel industry firms underfunded
b_2= information content of DJIA firms underfunded
b_3= control variable systematic risk
b_4= control variable firm size

a= Significant at .05 level

Sample= 28 steel industry firms and 13 DJIA firms
Study Period 2006-2015

Comparison of Firms Not Underfunded

This second sub-sample consists of comparing the firms in each sample group (14 in the steel industry sample and 17 in the DJIA sample) that do not have underfunded pension plans. This results in the following model:

$$CARit = a + b_1(UESNUit) + b_2(UEDNUit) + b_3Bit + b_3MVit + eit \quad (6)$$

Where:

CARit = Cumulative abnormal return firm i, time t
a = Intercept term
UESit = Unexpected Earnings for firm i, time t for steel industry firms not underfunded
UEDit = Unexpected Earnings for firm i, time t for DJIA firms not underfunded
Bit = Market model slope coefficient as proxy for systematic risk
MVit = Market value of equity as proxy for firm size
eit = error term for firm i, time

Results

As indicated in Table 6, the response coefficient b_1, representing unexpected earnings for steel industry firms without underfunded pension plans during the study period was .08 with a p-value of .05. The response coefficient b_2, representing DJIA firms without underfunded pension plans during the study period was .15 with a p-value of .01. These findings indicate that the earnings response coefficient of both groups greatly improves when the pension plans of the firms are determined not to be underfunded. Although the DJIA firms still have a slight edge in stock price response, both groups exhibit significance at conventional levels.

To assess the presence of multicollinearity, the Variance Inflation Factor (VIF) was utilized. In the test of this sensitivity analysis, a VIF of 2.4 was observed, thus indicating the non-presence of significant multicollinearity.

TABLE 6
SUBSAMPLE TEST 2 OF HYPOTHESIS 3
MODEL: $CAR_{it} = a + b_1(UESU_{it}) + b_2(UEDU_{it}) + b_3B_{it} + b_3MV_{it} + e_{it}$

a	b_1	b_2	b_3	b_4	Adj. R^2
05	.08	.15	.17	.12	.233
(.79)	(1.86)[b]	(1.62)[a]	(.29)	(.40)	

b_1= information content of steel industry firms without underfunded plans
b_2= information content of DJIA firms without underfunded plans
b_3= control variable systematic risk
b_4= control variable firm size

a= Significant at .01 level
b= Significant at .05 level

Sample= 14 steel industry firms and 17 DJIA firms
Study Period 2006-2015

CONCLUSIONS

The purpose of this study was to analyze pension plan issues facing the American steel industry and the associated impact on stock prices. The study analyzed 42 American steel industry firms between the years 2006-2015. Analysis relating the information content of accounting earnings to stock prices for the full sample indicates that there is significant positive correlation between earnings and stock price for the firms in total.

When the steel industry sample is portioned between firms that contain underfunded pension plans and firms that do not, the underfunded plan firms' earnings are not significantly related to stock price. Those firms with pension plans not underfunded are significantly related to stock price, and are positive in their correlation.

These steel industry firms are then assessed against the DJIA 30 firms during the test period. Findings show greater positive correlation between earnings and stock prices for the DJIA firms. When a subsample comparing underfunded firms in each group are assessed, samples from both groups show a reduced correlation but DJIA firms are still positive and significant in correlation, but the steel industry firms show no significance at conventional level. A subsample of firms from each group with pension plans not underfunded are then analyzed. Both groups are significant and positive in correlation between earnings and stock price, but the DJIA firms still possess an edge in information content.

This study is somewhat hampered by sample sizes, since they samples are relative small in number. However, considering the time frame evaluated (i.e., ten years) results seem to be consistent in indicating that firms within the steel industry are outperformed, from an earnings information content, when compared to DJIA firms. In addition, steel industry firms with underfunded pension plans do not display information content of earnings that is significant at conventional levels. These results are indicative of the decline of the steel industry over the past few decades and merit interest from investors and managers associating with those firms.

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