An Examination of
Legislative Risk on Healthcare Company Valuations.

Meta Marshall

The Leonard N. Stern School of Business
Glucksman Institute for Research in Securities Markets
Faculty Advisor: Edward Altman
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I. INTRODUCTION

As the market values a security it looks at a variety of different metrics to measure the health, risk, and opportunities of the company in question. Traditional metrics such as beta and the Z score seek to put measurable values on the risks faced by the company. For the healthcare industry in particular, these measurements overlook a key risk. Missing is an additional risk component due to the industries dependence on the government as a major payor. This paper will explore how the market should take note of not only how large a company's exposure is to the government as a payor is, but how critical these firms' services are.

The healthcare industry generates a sixth of the GDP in the United States. Of the $2.1 trillion in revenue earned by the healthcare industry, 45% was paid by the government through various entitlement programs[1]. This percentage is only expected to grow as the population of the United States ages. This paper will assume the reliability of the government as a payor, however, there enters the risk that legislation changes will end or reduce the funding that companies receive. Eligibility days, diseases covered, services covered, or fee schedules could change, endangering many of the firms that make up the industry. This exposure to legislation risk is one that is typically not measured by risk models and therefore the market usually fails to appropriately value it.

The impetus for this paper was an examination of the bankruptcies that took place in the nursing home industry as a result of changes to Medicare payment schedules after the Balanced Budget Act of 1997 was passed. While many of these firms were judged to be healthy at the time

[1] Report to the Congress: Medicare Payment Policy, (Washington D.C., Medicare Payment Advisory Commission, March 2008) pg. 14.

both in terms of bankruptcy risk and overall stock performance, 5 of the 7 largest providers in the United States eventually went bankrupt because of these changes. A chart of nursing facility firms versus the S&P 500 in the 1990's are seen in Exhibit 1. While individual firms faced slightly different circumstances in their bankruptcies, and many emerged healthier, there were common signs that they were vulnerable. These firms on average had more of their revenue generated from the government, as are seen in Exhibit 2. An exception was Sun Healthcare, but the other firms followed this pattern. Additionally, they had come to depend more on providing ancillary benefits (such as physical, occupational, and speech therapy) for revenue growth instead of an increase in patients. Lehman Brothers analyst Adam Feinstein noted, "We note that BBA-97 greatly reduced the profitability of offering ancillary services, decreasing the industry's demand for these services. This hurt Skilled Nursing Facilities (SNFs) in general, but it especially hurt companies that were capitalizing on the growing and until then profitable market offering these services (such as Vencor [(now Kindred)], which had set up its Vencare division specifically to offer them—in 1997, before the Medicare cuts had been put into effect.[2]" Both the greater dependence on government revenue and the growth of their ancillary benefits were predictors that these firms faced a greater risk due to government changes than those firms that survived; however, they were ignored by the market.

This topic surfaced again, when on February 23, 2009, the Obama administration announced its intention to curb spending for Medicare-backed health plans. Immediate stock market drops occurred in managed care companies, lead by Humana's one day drop of 11% versus the market's decline of 4.3%. Analyst Dan Shove from BBDO recommended that

[2] Tom Scully, Health Care Industry Market Update – Nursing Homes, (Centers for Medicare & Medicaid Services, February 2, 2002) pg. 10.

investors buy shares of Aetna and Cigna, because they were "who among the commercial providers maintain the lowest level of Medicare Advantage exposure."[3] As the new administration seeks to tackle entitlement reform in the coming years, Mr. Shove's statement is proof that the government as a payor carries additional risk to revenue models, and that firms with larger than average government payor exposure will be penalized by the market when such changes occur.

II. TRADITIONAL MODELS

Traditionally the market will look at indicators like beta or a Z score to determine the financial risk embedded in the company. The Z score is an established model of predicting bankruptcy within two years. A multivariate model that incorporates ratios relating to liquidity, profitability, leverage, solvency, and activity, the Z score, developed by Dr. Edward Altman, measures the likelihood that a company may suffer financial problems in the near term. The model does not explicitly consider that healthcare companies financial troubles are a result of previous legislative changes. These changes can be announced but take time to impact financial results. Additionally, as legislative changes generally come in the form of reduced reimbursement, not service erasures, the full financial effect can take years to develop. In the case of nursing home companies, changes were known to be coming in 1997, yet it took until 2000 for some of the companies to finally be in poor enough financial condition to go bankrupt. In the case of the recent Medicare Advantage changes, these changes will not go into effect until 2010. However, there was an immediate stock price reaction to the financial stress that will take

[3] Tom Randall, "Humana Leads Drop in Managed Care on Medicare Limits", Bloomberg, 23 February 2009 <http://www.bloomberg.com/apps/news?pid=20601087&sid=agWtY1rCRUns&refer=home>

many years to become material for these organizations. A Z score in 1997 for the nursing home companies or 2009 for managed care companies will incorporate this risk only through a decrease in the solvency caused from the decrease in stock price, but will not fully embed the impact.

Another traditional measure of the risk of a company is its beta. Measuring the relative volatility of a security in relation to the market, the beta hopes to tell us how risky the security is relative to the systemic risk in the market. However, betas are based on historical regression results, and health care companies traditionally have very low betas as healthcare spending is not highly correlated with overall market conditions. The betas can give artificially low costs of equity for these firms because they assume that past conditions will continue into the future.

III. EXAMINATION

While the market will never be able to predict which sectors of healthcare will be hit with legislative changes, there are some macro measures to see which companies have potential to be affected and how companies will react. Companies that focus more on ancillary rather than critical care face added risks (ex. Physical therapy would be classified as ancillary whereas dialysis would be classified as critical). Firms that have higher than industry-norm government payor exposure also face additional risks. These two attributes, particularly the government payor exposure, can be easily measured. This paper examines the markets reflection of these factors in valuations of healthcare firms.

In order to measure whether the market takes these observations into account, 2008 performance for a large group of health care companies was examined. While this paper would have liked to isolate the impact due to the administration change, instead of looking at 2008 in

general, it is difficult to measure when the market believed that Obama would win the election, and that healthcare reform would be more likely than if McCain were to have won. While no major legislative changes occurred in 2008, the recession and administration change have ensured that entitlement reform is on the way. If the market monitors healthcare companies with payor and ancillary benefit concentration risk as part of their valuation, there should be a differentiation in the performance of companies with more observed risk.

This paper completes five separate regressions to explain 2008 performance. The first regression will measure 2008 stock performance as explained by the Z score of the company. The reasoning is that firms already experiencing financial strain will be less likely to survive the recession and the market will respond accordingly. The Z score is designed to measure risk for manufacturing firms, therefore a regression is also completed using the Z" score, a model applicable to all firms. The third regression measures 2008 performance as explained by government payor concentration. The hypothesis is that firms with higher government payor concentration should be viewed as more at risk with the coming administration and would have performed poorer. The fourth regression measures 2008 performance as explained by subsector. This regression should measure whether subsectors that are deemed more critical performed better than those that offer a greater degree of ancillary benefits. The hypothesis is that ancillary benefits would be most likely to be cut in reforms, and that firms focused on those benefits will perform worse. The final two regressions look at the effect of using multiple variables. The first of these regressions seeks to explain 2008 performance with the Z score and the government payor concentration. The final regression seeks to explain 2008 performance with the Z score, government payor concentration, and subsector.

In assembling the set of companies to look at, the sample was drawn from companies where the government is a direct payor. The sample includes companies from the dialysis, emergency services, home health care, hospitals, long term acute care (LTAC), nursing homes, oxygen providers, physical therapy, skilled nursing, and surgical centers sectors. It does not include other large companies dependent on government reimbursement, where that money first goes through a third party payor or is for their payment to a third party. The industries ignored are biotechnology, distribution, managed care, medical equipment, pharmaceuticals, and REIT's. These companies face similar risks, but it is difficult to measure their direct exposure.

IV. ANALYSIS

The dataset included 39 companies that were public and for which government payor percentages were released. The companies can be seen in Exhibit 3. The government payor concentration was calculated as individual firm's percentage of revenues coming from the government. The regression involving subsectors used dummy variables to indicate which subsector each company fell into. The results of the six regressions along with residual charts are seen in Exhibits 4-7, 9-10.

V. RESULTS

The first regression shows that the higher the Z score, and therefore the greater the financial health of the company, the greater the 2008 performance. The regression, with an R-squared value of 29.1% (Ex.4), shows that the Z score was a strong predictor of 2008 performance. This is supported by the results of investment strategies of various investment banks. In 2008, Goldman Sachs sold a strategy basket product with a long/short trade based on Z scores. This product has returned 12.9% since its inception in February 2008 versus the S&P 500

performance of -29.8%[4]. The second regression looks at the Z" scores predictive power of 2008 performance. Since Z scores typically are used to measure the risk of manufacturing firms, the Z" score, used for all types of firms, was also tested. While it also has predictive power, the R-squared score is lower (24.5%, Ex.5) and therefore the Z score was judged to be a better predictor and will be used going forward in this paper.

The third regression looks at the predictive power of government payor percentages for 2008 performance. The hypothesis is that the higher the payor percentage, the more at risk the company is, and therefore the 2008 performance of those at risk companies should be worse. With a relatively low R-squared value (7.2%, Ex.6), the regression points to the opposite result. The higher the government payor percentage the greater the 2008 stock performance.

The fourth regression measures whether there was any correlation between subsectors and 2008 performance. The hypothesis is that subsectors focused on more ancillary benefits would perform worse than those with more critical offerings. While the regression has a fairly significant R-squared value (25.3%, Ex. 7) the results do not present a clear theory. According to MedPAC, ancillary benefits are defined to include respiratory, physical, and occupational therapy[5]. The subsectors therefore that would have been deemed to provide more ancillary benefits and therefore be expected to perform worse were: oxygen, nursing homes, home health care, and physical therapy. Some of the subsectors that would have been predicted to be critical were: dialysis, hospitals, LTAC, surgical centers, and emergency services. Because percentage of

[4] Kostin, D., Fox, N., Maasry, C., Sneider, A. "United States: Portfolio Strategy, Strategy Baskets, Basket Update – Themes for 2009." Goldman Sachs Group, Inc. Global Investment Research (11 December 2008) 19.

[5] Report to the Congress: Medicare Payment Policy, (Washington D.C., Medicare Payment Advisory Commission, March 2008) pg. 145-146.

ancillary benefits by subsector is not readily accessible, this regression was run to test the direction of coefficients versus the magnitude. Exhibit 8 shows that the sign of these coefficients is not consistent with the grouping as ancillary or critical. It does not clearly point to any sort of correlation between ancillary benefit concentration and 2008 performance.

With isolated regressions run testing the predictive power of the Z score, government payor concentration, and subsector, two additional regressions were run combining the predictive power of the variables. The first of these regressions measures 2008 performance as explained by the Z score and government payor percentage. The predictive power increased with the combination of these variables, as the R-squared increased to 31.6% (Ex. 8). The coefficient on the government payor concentration remained positive, at odds with the hypothesis of this paper. The final regression measures 2008 performance as explained by the Z score, government payor percentage, and the subsector. The highest R-squared of any of the regressions, 45.0% (Ex. 9), pointed to this model being the best predictor of 2008 performance. Again, the market data does use government payor percentages and subsector as a part of its valuation, but not in the way anticipated.

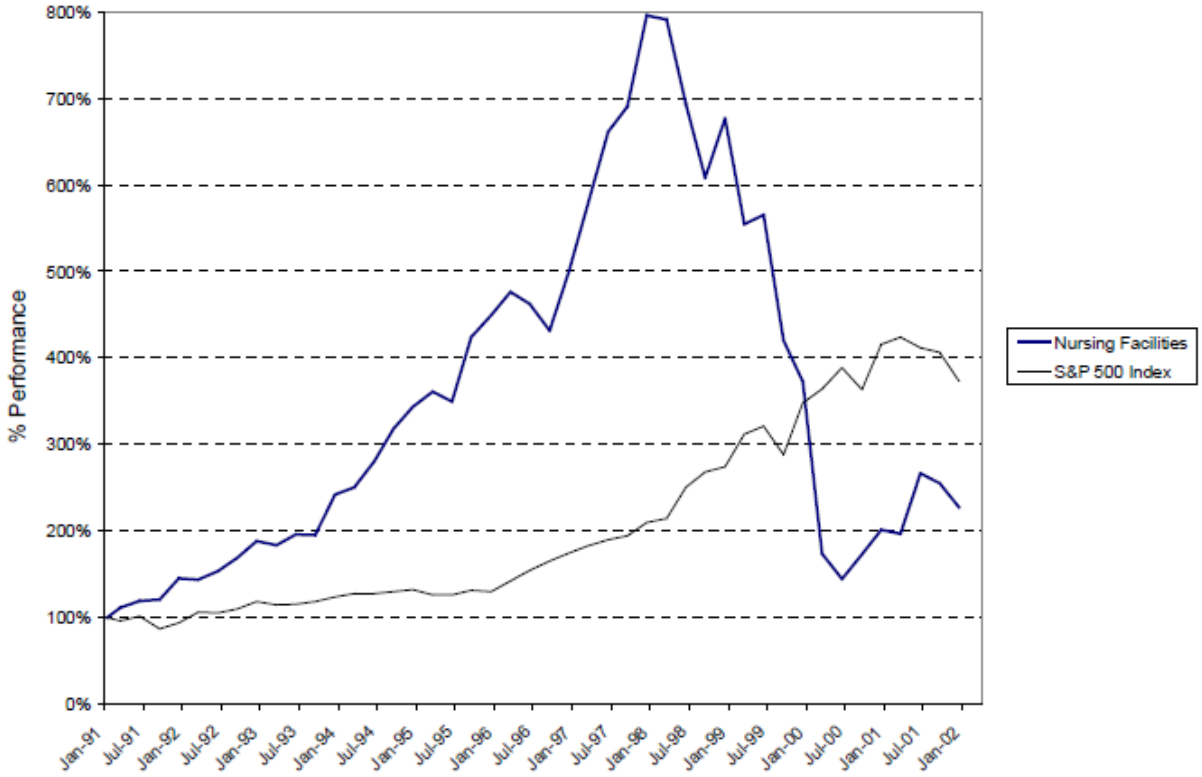
VI. CONCLUSION

2008 proved to be a year where the state of the economy and the change of administration increased the likelihood that future changes will take place in healthcare spending. While the market did incorporate measures of financial health, it did not incorporate a measure of what companies would be most at risk of changes to legislative changes coming due to increased budget deficits and the current administrations focus on healthcare reform. Instead of viewing the legislative risk brought about by government payor concentration, the market instead focused on

the reliability of the government as a payor. In a time when customers may not be able to pay for services, the government as a payor creates reliable demand, and firms with concentration of government revenue were rewarded. Additionally, while firms that may offer more ancillary benefits may be more vulnerable to future legislative changes, the market was not concerned with that in a year when the demand for services was still being supported by the government. Whether this pattern will continue in a year without a market shock is not known.

The hypothesis of this paper remains the same, these metrics are important, but they are currently being ignored. In the past, with nursing homes and currently with managed care, these risks are real, and can be measured. A financial health model should seek to incorporate these metrics when measuring the financial health of a firm.

Exhibit 1 - Nursing Facility Firm Value Performance vs. S&P 500, 1991-2001[6]



Source: Factset Research
Nursing Facilities: Beverly, Centennial, Extendicare, Genesis, Integrated, Kindred & Ventas, Manor Care, Mariner, National, & Sun

[6] Scully, pg. 10.

Exhibit 2 - Largest Nursing Homes Government Payor Percentages as of 12/31/1996

Name	Medicare	Medicaid	Total	Bankruptcy Eventually Filed
Beverly	12%	42%	54%	No
Mariner Post-Acute Network	26%	41%	67%	Yes
Manor Care	26%	30%	56%	No
Kindred / Vencor	32%	43%	75%	Yes
IHS	24%	47%	72%	Yes
Sun	24%	29%	53%	Yes
Genesis	24%	37%	61%	Yes
Average of those that went bankrupt	26%	39%	**65%**	
Average of those who remained in business	19%	36%	**55%**	

Exhibit 3 - Database of Healthcare Companies Analyzed

Name	Ticker	Data Collection Date	Z Score [1]	Z" Score [2]	Total Government Payor Percentage [3]	Subsector
Adcare Health Systems	ADK	12/31/2007	0.515	2.692	79%	Nursing Homes
Advocat Inc.	AVCA	12/31/2007	3.345	3.606	87%	Skilled Nursing
Almost Family	AFAM	12/31/2007	4.950	5.842	90%	Home Health Care
Amedisys	AMED	12/31/2007	7.665	7.835	89%	Home Health Care
American Homepatient Inc.	AHOM	12/31/2007	0.310	0.371	61%	Oxygen
AmSurg	AMSG	12/31/2007	3.398	6.341	34%	Hospitals
Assisted Living Concepts	ALC	12/31/2007	2.362	5.901	85%	Nursing Homes
Brookdale Senior Living	BKD	12/31/2007	0.724	3.779	89%	Nursing Homes
Capital Senior Living Group	CSU	12/31/2007	1.401	4.149	6%	Nursing Homes
Community Health Systems	CYH	12/31/2007	0.982	3.242	39%	Hospitals
DaVita	DVA	12/31/2007	2.314	4.295	62%	Dialysis
DCAI	DCAI	12/31/2007	4.667	4.178	57%	Dialysis
Dynacq HelathCare Inc.	DYII	8/31/2007	3.416	7.969	10%	Hospitals
Emergency Medical Services Corp	EMS	12/31/2007	2.840	2.969	31%	Emergency Services
Emeritus Group	ESC	12/31/2007	0.525	3.322	11%	Nursing Homes
Five Star Quality Care	FVE	12/31/2007	3.001	0.762	14%	Nursing Homes
Fresenius	FRE3	12/31/2007	1.749	4.267	36%	Dialysis
Gentiva Health Services	GTIV	12/31/2007	2.458	3.556	83%	Home Health Care
Health Management Associates	HMA	12/31/2007	1.568	3.248	40%	Hospitals
healthSouth	HLS	12/31/2007	-1.504	-1.909	70%	Hospitals
IPC The Hospitalist Co.	IPCM	12/31/2007	5.859	2.502	54%	Surgical Centers

Kindred Healthcare	KND	12/31/2007	2.855	3.070	72%	Nursing Homes
LHC Group	LHCG	12/31/2007	11.904	8.408	87%	Home Health Care
Lifepoint Hospitals	LPNT	12/31/2007	1.817	4.455	42%	Nursing Homes
Lincare	LNCR	12/31/2007	3.054	5.944	64%	Oxygen
MedCath Corp	MDTH	9/30/2007	2.687	3.269	46%	LTAC
National Healthcare Corp	NHC	12/31/2007	2.950	5.637	70%	LTAC
New York Helathcare	BBAL	12/31/2007	-1.523	-5.638	99%	Home Health Care
Odyssey Healthcare	ODSY	12/31/2007	5.103	5.778	92%	Nursing Homes
PainCare Holdings	PRXZ	12/31/2007	-6.789	-14.121	24%	Surgical Centers
Psychiartic Solutions	PSYS	12/31/2007	1.950	4.243	61%	Hospitals
Rotech Healthcare	ROHI	12/31/2007	-0.036	-0.716	66%	Oxygen
Rural / Metro Corp	RURL	6/30/2008	1.131	-0.102	57%	Emergency Services
Skilled Healthcare Group	SKH	12/31/2007	1.562	4.144	68%	LTAC
SunLink Health Systems	SSY	6/30/2008	2.368	4.438	56%	Home Health Care
Tenet Healthcare Corp	THC	12/31/2007	0.953	2.009	34%	Hospitals
The Ensign Group	ENSG	12/31/2007	3.479	4.495	74%	LTAC
Universal Health Services	UHS	12/31/2007	3.129	5.556	45%	Hospitals
US Phsyical Therapy	USPH	12/31/2007	7.234	7.704	22%	Physical Therapy

[1] Z Score - Formula - 1.2*(Working Capital / Total Assets) + 1.4*(Retained Earnings / Total Assets) +
3.3*(Earnings before Interest and Taxes (EBIT) / Total Assets) +
.6*(Market Value of Equity / Total Liabilities) + .999*(Sales / Total Assets)

[1] Z" Score Synthetic Bond Rating - Formula - 3.25 - 6.25*(Working Capital / Total Assets) +
3.26*(Retained Earnings/Total Assets) +
6.72*(EBIT / Total Assets) + 1.05*(Book Value of Equity / Total Liabilities)

[2] Total Government Payor Percentages From 10-K (Includes Medicare, Medicaid, Veteran Affairs, etc.)

Exhibit 4 – 2008 Performance as determined by Z Score

The regression equation is
Annualized Return = - 0.522 + 0.0881 Z Score

Predictor	Coef	SE Coef	T	P
Constant	-0.52177	0.08579	-6.08	0.000
Z Score	0.08815	0.02262	3.90	0.000

S = 0.406357 R-Sq = 29.1% R-Sq(adj) = 27.2%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	1	2.5070	2.5070	15.18	0.000
Residual Error	37	6.1097	0.1651		
Total	38	8.6167			

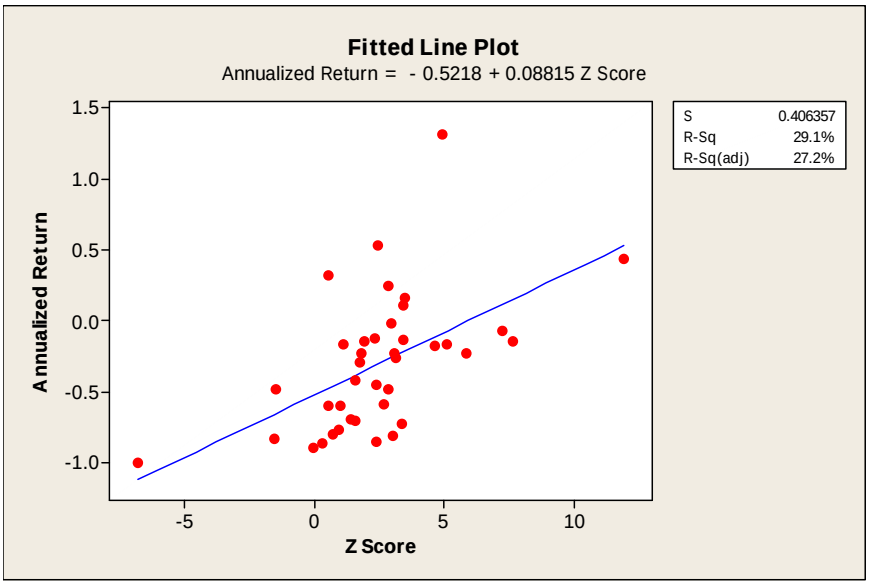


Exhibit 5 – 2008 Performance as determined by Z" Score

The regression equation is
Annualized Return = - 0.498 + 0.0593 Z" Score

Predictor	Coef	SE Coef	T	P
Constant	-0.49783	0.08744	-5.69	0.000
Z" Score	0.05931	0.01713	3.46	0.001

S = 0.419397 R-Sq = 24.5% R-Sq(adj) = 22.4%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	1	2.1086	2.1086	11.99	0.001
Residual Error	37	6.5081	0.1759		
Total	38	8.6167			

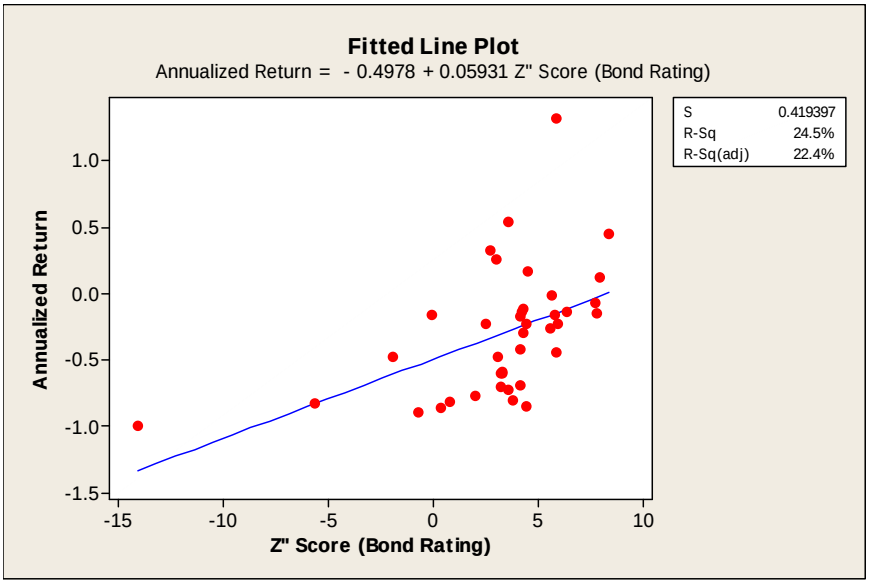


Exhibit 6 – 2008 Performance as determined by Government Revenue Concentration

The regression equation is
Annualized Return = - 0.5825 + 0.4922 Total Gov

S = 0.465005 R-Sq = 7.2% R-Sq(adj) = 4.6%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	1	0.61619	0.616191	2.85	0.100
Error	37	8.00050	0.216230		
Total	38	8.61670			

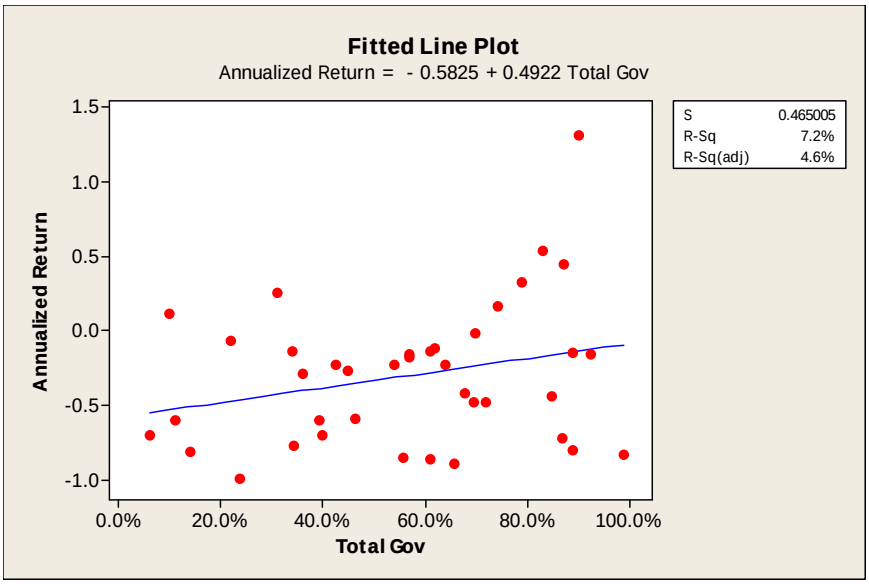


Exhibit 7 – 2008 Performance as determined by Subsector

The regression equation is

Annualized Return = - 0.614 - 0.051 Oxygen + 0.179 Nursing Homes
+ 0.690 Home Health Care + 0.396 LTAC + 0.240 Hospitals
+ 0.417 Dialysis + 0.657 Emergency Services
+ 0.542 Physical Therapy - 0.116 Skilled Nursing

Predictor	Coef	SE Coef	T	P
Constant	-0.6140	0.3331	-1.84	0.076
Oxygen	-0.0512	0.4300	-0.12	0.906
Nursing Homes	0.1788	0.3682	0.49	0.631
Home Health Care	0.6896	0.3846	1.79	0.083
LTAC	0.3962	0.4079	0.97	0.339
Hospitals	0.2402	0.3724	0.65	0.524
Dialysis	0.4168	0.4300	0.97	0.340
Emergency Services	0.6574	0.4710	1.40	0.173
Physical Therapy	0.5416	0.5769	0.94	0.356
Skilled Nursing	-0.1156	0.5769	-0.20	0.843

S = 0.471047 R-Sq = 25.3% R-Sq(adj) = 2.1%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	9	2.1820	0.2424	1.09	0.398
Residual Error	29	6.4347	0.2219		
Total	38	8.6167			

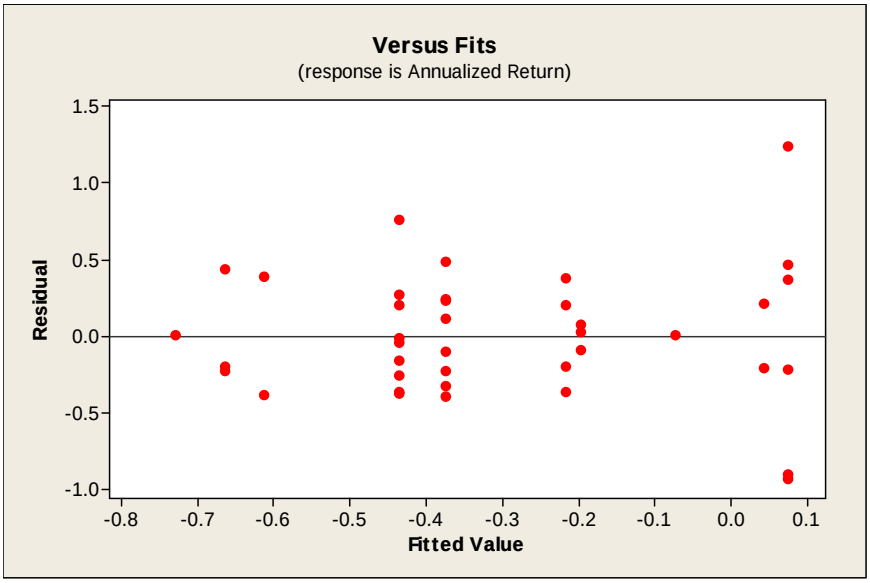


Exhibit 8 – Examination of Subsectors

Subsectors	Coefficient	Critical	Expected Result
Oxygen	-0.0512	No	Yes
Nursing Homes	0.1788	No	No
Home Health Care	0.6896	No	No
LTAC	0.3962	Yes	Yes
Hospitals	0.2402	Yes	Yes
Dialysis	0.4168	Yes	Yes
Emergency Services	0.6574	Yes	Yes
Physical Therapy	0.5416	No	No
Skilled Nursing	-0.1156	No	Yes
Surgical Centers [1]	0.0000	Yes	Yes
Constant	-0.6140		

[1] Surgical Centers did not have a coefficient in the regression because it is represents the null case.

Exhibit 9 – 2008 Performance as determined by Z Score and Government Revenue Concentration

The regression equation is
Annualized Return = - 0.678 + 0.0826 Z Score + 0.300 Total Gov

Predictor	Coef	SE Coef	T	P
Constant	-0.6777	0.1597	-4.24	0.000
Z Score	0.08264	0.02302	3.59	0.001
Total Gov	0.2995	0.2593	1.16	0.256

S = 0.404532 R-Sq = 31.6% R-Sq(adj) = 27.8%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	2	2.7254	1.3627	8.33	0.001
Residual Error	36	5.8913	0.1636		
Total	38	8.6167			

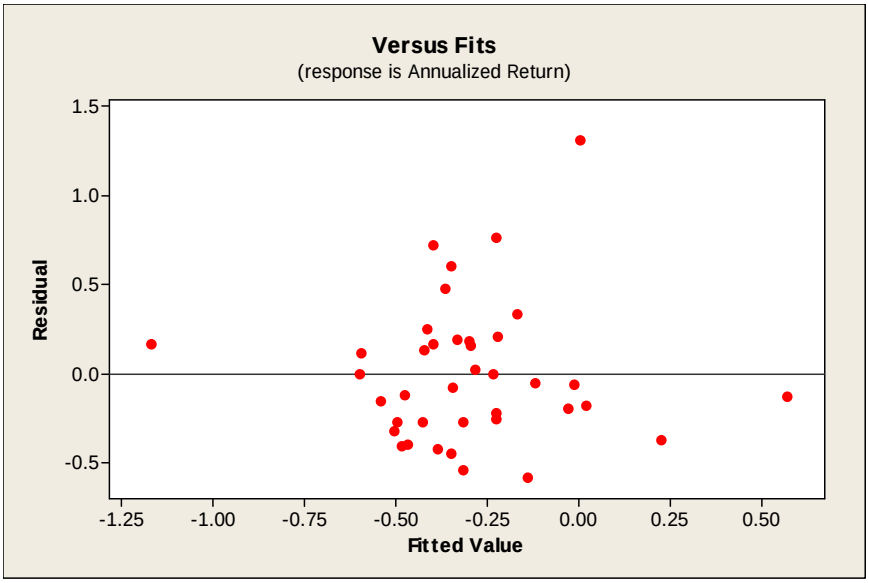


Exhibit 10 – 2008 Performance as determined by Z Score, Government Revenue Concentration, and Subsector

The regression equation is

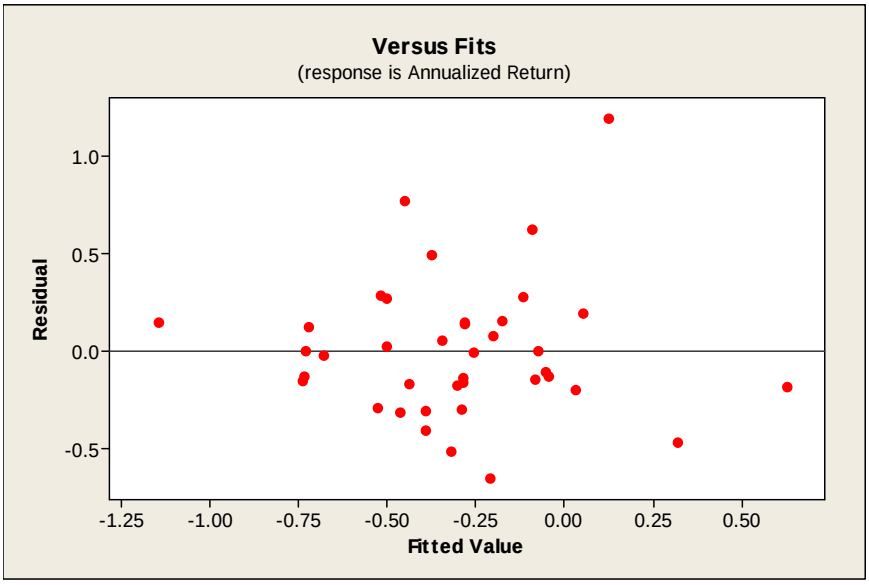
Annualized Return = - 0.736 + 0.0743 Z Score + 0.404 Total Gov - 0.268 Oxygen
- 0.070 Nursing Homes + 0.128 Home Health Care + 0.059 LTAC
+ 0.065 Hospitals + 0.114 Dialysis
+ 0.454 Emergency Services + 0.037 Physical Therapy
- 0.593 Skilled Nursing

Predictor	Coef	SE Coef	T	P
Constant	-0.7362	0.3245	-2.27	0.032
Z Score	0.07433	0.02711	2.74	0.011
Total Gov	0.4039	0.3375	1.20	0.242
Oxygen	-0.2685	0.3928	-0.68	0.500
Nursing Homes	-0.0705	0.3375	-0.21	0.836
Home Health Care	0.1277	0.3940	0.32	0.748
LTAC	0.0589	0.3806	0.15	0.878
Hospitals	0.0652	0.3364	0.19	0.848
Dialysis	0.1139	0.3945	0.29	0.775
Emergency Services	0.4542	0.4241	1.07	0.294
Physical Therapy	0.0368	0.5587	0.07	0.948
Skilled Nursing	-0.5931	0.5448	-1.09	0.286

S = 0.418781 R-Sq = 45.0% R-Sq(adj) = 22.7%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	11	3.8815	0.3529	2.01	0.068
Residual Error	27	4.7352	0.1754		
Total	38	8.6167			



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