Utility Deregulation and Capital Structure

by

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Abstract: This is a study on the affect United States energy deregulation has had on the capital structure of utility corporations. Through the use of quantitative analyses of the debt to equity, debt to firm, and total debt to total asset ratios this research tries to see how utility firms have changed their capital structure. This research also shows that energy firms have chosen to increase their debt levels to unprecedented levels and it tries to understand why utility managers and directors have chosen to do so.

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History and Background of Electrical Utility Deregulation

Utility deregulation in the United States is the process of transforming electrical utility companies from regulated monopolies to market driven suppliers of electrical energy and other services[1]. Initially, the idea of regulatory reform was introduced to the United States by the success of Energy Reform in Great Britain during the 1990[2]. This reform essentially created a competitive environment in the electrical utilities industry in Great Britain that was non-existence prior to deregulation. In this environment, new companies entered the electrical utility industry and gave residential and commercial customers the ability to choose service providers. Inevitably because of this legislation, residential customers began to enjoy lower rates in their electricity bills and commercial customers received an increase in profit.

Like Great Britain, the purpose of electrical deregulation has been to allow customers to choose their energy services providers by allowing competition to exist among electrical service providers. Prior to this initiative, the United States Federal, State, and local governments designated energy service providers for certain regions. For example, New York City residents could only choose Consolidated Edison as their electrical service provider prior to 1998. In return for this regional monopoly, electrical companies were obliged to follow strict guidelines by that respective state's energy regulatory commission and the Federal Energy Regulatory Commission (FERC). These guidelines included a restriction on utility profits. In addition, energy companies were restricted from participating in regions in which they were not regulated to enter.

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[1] William Peterson (1999) "Electrical Utility Deregulation and Stranded Utility Costs" *Power Watch* Volume 3 No.1

[2] Jack Belcher (2000) **"**It Takes Time In Europe And The United States" *Energy Markets* EM Deregulation Update

Although there seems to be a lot of benefits to energy deregulation, the Federal Energy Regulatory Commission has slowly adapted deregulatory policies. Currently, there are only about 15 states that have officially deregulated. These states include Arizona, Connecticut, California, Illinois, Massachusetts, Montana, New Jersey, New York, Pennsylvania, Rhode Island, and Texas. Although these states have deregulated, each deregulated at different times. The earliest state to sign and implement deregulatory policy was California in late 1995[3].

Before the United States introduced the concept of energy deregulation, the executives of the nation's largest utility companies enjoyed the comforts of their stable position. Many of these executives enjoyed monopoly positions because their respective companies were protected by United States legislation. Most of this legislation was anti-competitive in nature and gave most utility companies exclusive rights in certain regions of the country. For this reason, many utility stocks were considered "old economy stocks", which paid very high dividends relative to the stock market. Many investors considered these stocks very stable and allowed they would purchase equity in many utility companies[4]. It was a sure bet and energy stocks were a favorite to many risk averse investors. Since utility company executives did not want this notion of their stock, many did not change their capital structures. Unless these executives planned to acquire another utility company, they continued to pay out their high dividends. The payment of high dividends to shareholders has a strong signaling affect to the market that a company is stable and robust.

[3] http://www.eia.doe.gov/cneaf/electricity/chg_str/regmap.html
[4] Mary M. Timney (2003) Power for the People: Protecting States' Energy Policy Interests in an Era of Deregulation, *M.E.Sharpe*

My Hypothesis

For the above reasons, I expected that utility firms would finance the majority of its projects with equity issuances- therefore causing the debt to equity ratios of deregulated utility companies to lower. I expected this would happen by debt levels remaining constant or lowering and equity levels growing. I held this intuition strongly because it was my perception that utility managers are risk averse to their shareholders and would not want the additional risk that usually comes with the issuances of debt[5]. In order to see and understand if my theory was true, I chose to review the capital structures of deregulated utility firms, before and after deregulation. This required me to research and analyze the debt to equity, debt to firm value, total debt to total assets, and equity multiplier ratios of all utility deregulated companies.

Analysis

Since deregulation has occurred in only about a third of states in the United States, I chose the states that have already deregulated to be in my sample set. In addition, I chose states in my sample that have deregulated on or before the year 2000. The reason for this decision was that I found states that deregulated after 2001 provided me with insubstantial evidence to make a logical conclusion from my date. For this reason, all states in my thesis deregulated before the year 2000. These states include: New York, Pennsylvania, Ohio, New Jersey, and California. In addition, I chose all major utility companies that had data available for the last ten years. This guideline in my research was necessary in order to get an accurate assessment of how debt levels have

changed since the inception of deregulation in that particular state. For these reasons, I was able to analyze 4 to 5 companies for every deregulated state. I feel that this is a sufficient number for every state as each deregulated state had only about 6-7 companies before deregulation. These numbers are small for the obvious reason that states allowed monopolies to run within their state, preventing any new market entries.

Lastly, my thesis could only have been completed without analyzing the before and after affects of deregulation within each respective state. The reason for this is because deregulation occurred during different times and different places and had different pretenses within each state. Therefore, my analysis is approached on a state by state basis, with a separate analysis for New York, Pennsylvania, Ohio, New Jersey, and California. At the end of my analysis, I aggregated all the information for each state and come up with a conclusion to my analysis. Each state is analyzed by its history, quantitative analysis, and conclusion. The history is a necessary component in my analysis as it shows how the changes in the competitive nature of the state before and after deregulation and it pinpointed the exact date of deregulation within that state.

New York

New York was an early leader in electricity restructuring. It was one of the first states to implement corporate safeguards that enhanced competition when its utilities unbundled their generation, transmission and distribution functions. The Public Service Commission of New York (PSC) was the group responsible for initiating electricity restructuring in New York State. This initiation took place in 1996. In May 1996 the PSC stated a goal of full retail competition by 1998, motivated largely by the high cost of

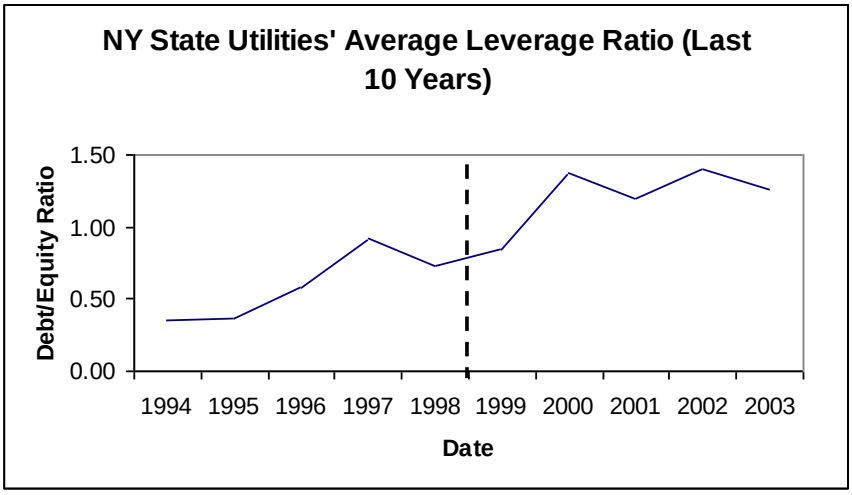
electricity for New York customers. New York's utilities submitted restructuring plans in late 1996 and early 1997, but because of revisions to these plans, the retail access phase-in process did not start until the ***middle of 1998***. One important trait of New York's restructuring that encourages competition is its use of market-based shopping credits to encourage customers to switch suppliers. As of February 2001, 97 percent of New York's customers were eligible for retail choice, and 17 percent of total load had switched electricity providers. Only Maine and Pennsylvania have had a larger percentage of their customers switch providers. Since New York state reached retail competition in 1998, I analyze the years after 1998 as deregulated years and anything prior to 1998 is considered regulated.

In reviewing New York State I looked at the state's top four electricity suppliers, Con Edison, Energy East, Keyspan, and CH Energy. All four of these companies are public and have had a dominant presence in their respective areas of New York for over the last ten years. The largest of these companies is Consolidate Edison with a market cap of over $20,966,000. Prior to deregulation, in 1995, Consolidated Edison had a Debt to firm value ratio of about 40%. Since that time, this ratio has increased by 3% (geometric mean) each year to a current debt to firm value ratio of 52%. In addition to this significant rise in Debt to Firm value, there has been a significant rise in the proportion of debt to equity. As of last year, Consolidated Edison had a debt to equity 1.064, a 38% rise in this figure. The same results hold true, for the other three major utility companies in New York. As the figure below illustrates, each firm has had a significant rise in their leverage figures, after deregulation.

	Consoldiated Edison		Energy East	
	Post Deregulation (1998)	Pre Deregulation	Post Deregulation (1998)	Pre Deregulation
Debt/Equity	5.87%	0.96%	12.41%	1.34%
Debt/Firm Value	3.06%	0.57%	5.42%	0.70%
Debt/Ratio (Total Debt/Total Assets)	0.82%	0.24%	4.20%	-2.94%
Equity Multiplier (Total Assets/Total Equity)	5.01%	0.71%	7.88%	4.41%
Assets	6.07%	1.17%	14.46%	-1.61%
.	CH Energy		Key Span	
	Post Deregulation (1998)	Pre Deregulation	Post Deregulation (1998)	Pre Deregulation
Debt/Equity	-1.77%	0.65%	2.66%	-58.19%
Debt/Firm Value	-1.08%	0.36%	1.05%	-36.80%
Debt/Ratio (Total Debt/Total Assets)	-3.22%	-0.13%	1.69%	-22.34%
Equity Multiplier (Total Assets/Total Equity)	1.50%	0.77%	0.95%	-46.17%
Assets	0.63%	1.28%	3.50%	-42.06%

As can see from the figures above every company, with the exception of exception of CH Energy, experienced a rise in leverage levels. However, it is worth noting that Energy East Company has had an average yearly rise in its debt levels, with a significant increase in assets purchased.

After aggregating all New York State numbers together, I found that the year prior to deregulation, the average Debt/Equity ratio of New York State utility companies was about .74. In looking at the chart below, that number has now grown to 1.26. This is a rise of about ((1.26-.74)/.74) 70% in the average debt to equity ratio of New York State Companies after deregulation. This is a significant jump and the reasons to this jump will be explored later.



Pennsylvania

In 1996, the former Governor of Pennsylvania, Tom Ridge, signed electricity deregulation legislation in Pennsylvania. Under this legislation consumers could choose an electricity generator to provide them with power, but transmission and distribution would still occur through regulated utility companies. Importantly, the legislation did not mandate that incumbent utilities divest their generating capacity: *"Electric utilities are permitted to divest themselves of facilities or to reorganize their corporate structures, but unbundling of services [separating services, such as generation from distribution] is required."* [6] Pennsylvania also used market models and forecasts to set the standard offer price, instead of setting a low standard offer price that would benefit incumbents. Pennsylvania officially had started implementing deregulation in January 1999 and by January 2000 all Pennsylvania consumers could choose their electricity supplier. This was two-phase process brought all of the state's consumer's competitive choices more quickly than in other states. It is an important to note each stage in reviewing how the capital structure has changed over the 1999 and 2000 period. The major public utility

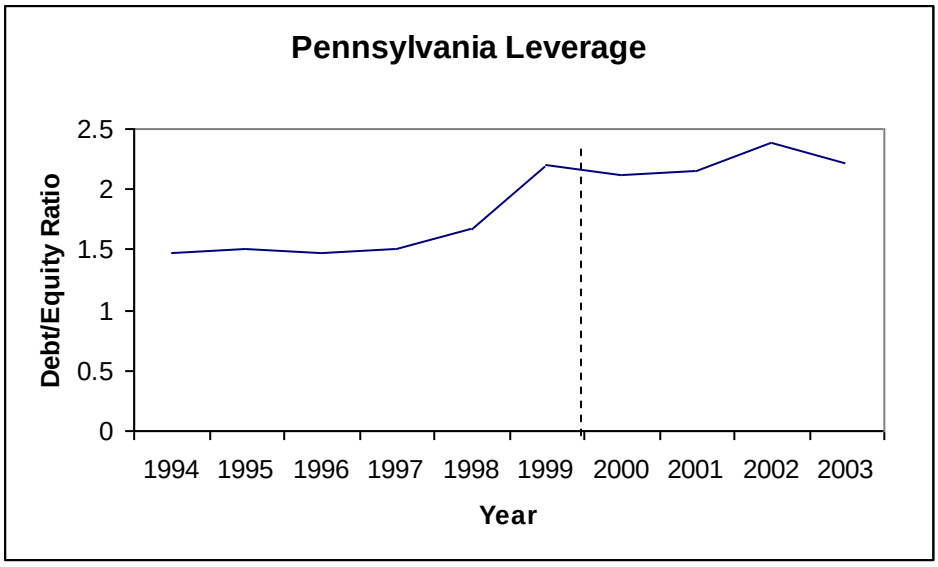
[6] http://www.rppi.org/kieslingtes.html

companies that are currently present in Pennsylvania are PPL, Exelon, Duquesne, and Allegeny Energy.

	PPL		Duquesne		Allegeny	
	Post Deregulation (1999)	Pre-Deregulation	Post Deregulation (1999)	Pre-Deregulation	Post Deregulation (1999)	Pre-Deregulation
Debt/Equity	15.88%	-1.46%	15.42%	-2.34%	19.88%	12.24%
Debt/Firm Value	6.01%	-0.73%	6.44%	-1.16%	5.34%	5.14%
Debt/Ratio (Total Debt/Total Assets)	7.32%	-2.02%	9.02%	-3.71%	5.74%	4.18%
Equity Multiplier (Total Assets/Total Equity)	7.98%	0.57%	5.87%	1.42%	13.37%	7.74%
Assets	10.35%	0.40%	-14.92%	3.35%	10.38%	1.50%

In the deregulation world, Pennsylvania is considered the prototype of utility deregulation. According to most industry experts, Pennsylvania has had the smoothest and most promising shift from regulated utility operations to deregulation. This is an interesting fact about Pennsylvania, as my research pointed out that Pennsylvania is the state that had the most change in their capital structure. The largest utility company in Pennsylvania, Exelon, had a 337% rise in its total debt level. Pre-Deregulation, Exelon had an average annual increase of -2.37% in its debt to equity ratio. After deregulation was a different story. Exelon posted about a 15% rise in its debt to equity levels. A strange fact about this 15% rise was the fact that the total asset totals for Exelon great at a -14.92%. The other two Pennsylvania utility companies, PPL and Allegeny, did not produce much different results than Exelon. PPL had a 15.88% annual average rise in its debt to equity levels and Allegeny had the largest rise in debt to equity levels than any other company is my research at a 19.88% growth rate.

It can be observed from the chart below that Pennsylvania utility companies had stable debt to equity ratios which were around 1.5x. Immediately following deregulation this number sky rocketed to about 2.3x. To understand better how high the debt levels for Pennsylvania utility companies are, a debt to equity of 2.3 equals a .70 debt to firm value. This was a significant jump from an average debt to equity ratio of 1.5x, which represented a 60% debt to firm value ratio.



Ohio

Ohio's electricity restructuring legislation, SB 3, was signed into law on July 6, 1999, and the Public Utilities Commission's rules governing restructuring were finalized in November 1999. The legislation provided for customer choice of electricity generators, with the final phase beginning on January 1, 2001. The historically regulated investor-owned utilities were required to file restructuring plans that incorporated a five percent

rate reduction and a five-year rate cap for residential customers; most plans also proposed transparent billing, with the unbundling of charges for generation, transmission and distribution of electricity. Ohio's restructuring has two features relative to other states that merit attention: the consumer education program and the use of consumer buying consortia to negotiate lower retail prices. Ohio had officially deregulated in ***January 2001.***[7]

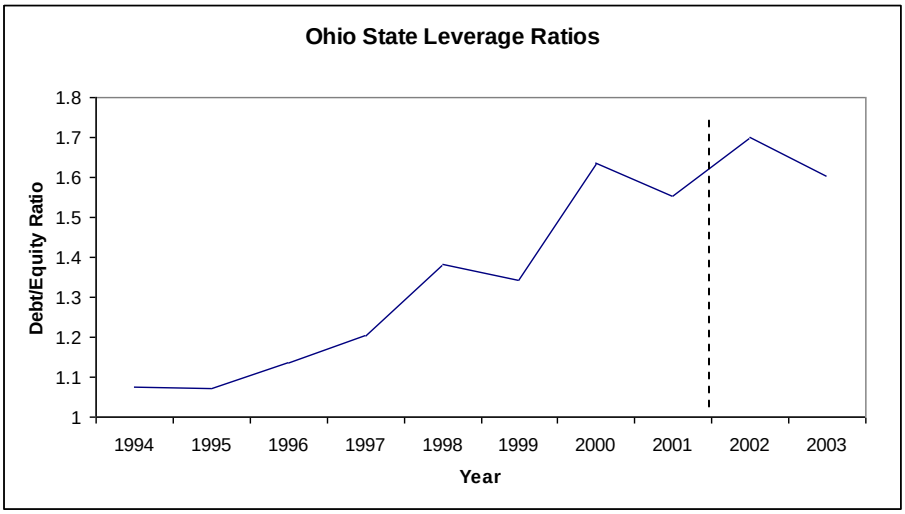
	AEP		Cinergy		First Energy		Vectren
	Post Deregulation (1999)	Pre-Deregulation	Post Deregulation (1999)	Pre-Deregulation	Post Deregulation (1999)	Pre-Deregulation	Post Deregulation (1999)
Debt/Equity	2.19%	9.83%	2.13%	4.59%	7.64%	-0.35%	6.74%
Debt/Firm Value	0.79%	4.12%	0.90%	2.10%	2.83%	-0.16%	3.13%
Debt/Ratio (Total Debt/Total Assets)	-0.76%	3.87%	0.38%	0.14%	-0.12%	-0.85%	3.73%
Equity Multiplier (Total Assets/Total Equity)	2.97%	5.74%	1.74%	4.44%	7.77%	0.51%	2.90%
Assets	0.71%	17.81%	10.08%	3.37%	17.25%	7.92%	14.07%

Since it regulated in 2001, Ohio is still in the nascent stages of the deregulatory process. Of the four deregulated utility service providers in Ohio, only two have experienced a drop in the rise of their debt levels, these companies are AEP and Cinergy. However, it is worth noting that, these were positive rise in debt to equity levels.

In summarizing Ohio's debt to equity ratios, it can be seen from the data below that Ohio had a consistent rise in the debt to equity ratios of its utility companies prior to deregulation and post deregulation. This rise was from an average debt to equity ratio of 1.1 in 1994 to a debt to equity ratio of about 1.6 just last year. This was a rise of a little

[7] See footnote 6

bit over ((1.6-1.1)/1.1) 45%. Consistent with the first two states, Ohio posted a dramatic rise in its leverage ratios.



New Jersey

In 1999, the State Legislature partially deregulated New Jersey's electric and gas industries when it enacted the Electric Discount and Energy Competition Act (EDECA). EDECA contained the following provisions:

1. EDECA mandated energy rate reductions, independent of how much it cost to provide you with electricity over the four last years. In the case of some New Jersey Utility Companies, rates were reduced by about 14%. This mandated rate reduction automatically expired August 1, 2003.

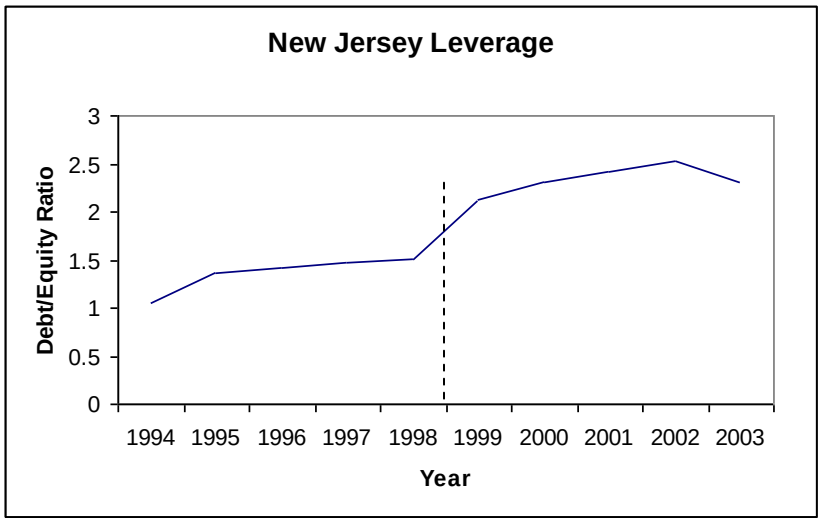
2. When the cost of providing energy dramatically increased above the mandated rate reductions, utilities incurred debts. EDECA mandated that utilities would be able to recover from customers any such debts that were reasonably incurred, plus

interest, beginning August 1, 2003. The total debt among all New Jersey electric utilities is more than $1 billion, of which the smallest relative portion is owed by PSE&G customers.

3. EDECA also prohibited utilities from recovering additional expenditures for normal maintenance, and for upgrading and securing its electric transmission and delivery system until August 1, 2003.[8]

In reviewing New Jersey Leverage Ratios, I chose to analyze the following companies: UGI Corporation, MiddleSex, Public Service Enterprises Group, and FirstEnergy Corporation. In the deregulation marketplace, New Jersey has been considered with Pennsylvania as one of the smoother deregulation experiences. Despite this being true, it can be observed from the chart below that New Jersey has seen a tremendous rise in its debt levels. From the chart below, New Jersey had about a 1.5 average debt to equity ratio prior to deregulation. After deregulation, this number sky rocketed to about 2.3. This was a change of about 53% ((2.3-1.5)/1.5).

[8] http://www.pseg.com/about/overview.html



The summary results of New Jersey can be seen below.

	UGI Corporation		Peg Corporation	
	Post Deregulation	Pre-Deregulation	Post Deregulation	Pre-Deregulation
Debt/Equity	-0.88%	3.67%	7.45%	6.99%
Debt/Firm Value	-0.27%	1.10%	2.82%	3.18%
Debt/Ratio (Total Debt/Total Assets)	0.40%	3.03%	0.97%	-0.28%
Equity Multiplier (Total Assets/Total Equity)	-1.27%	0.61%	6.42%	7.29%
Assets	4.37%	-0.28%	7.73%	2.39%
	MiddleSex		First Energy	
	Post Deregulation	Pre-Deregulation	Post Deregulation	Pre-Deregulation
Debt/Equity	4.45%	2.30%	7.64%	-0.35%
Debt/Firm Value	2.00%	1.12%	2.83%	-0.16%
Debt/Ratio (Total Debt/Total Assets)	2.70%	1.18%	-0.12%	-0.85%
Equity Multiplier (Total Assets/Total Equity)	1.71%	1.10%	7.77%	0.51%
Assets	4.71%	10.12%	17.25%	7.92%

California

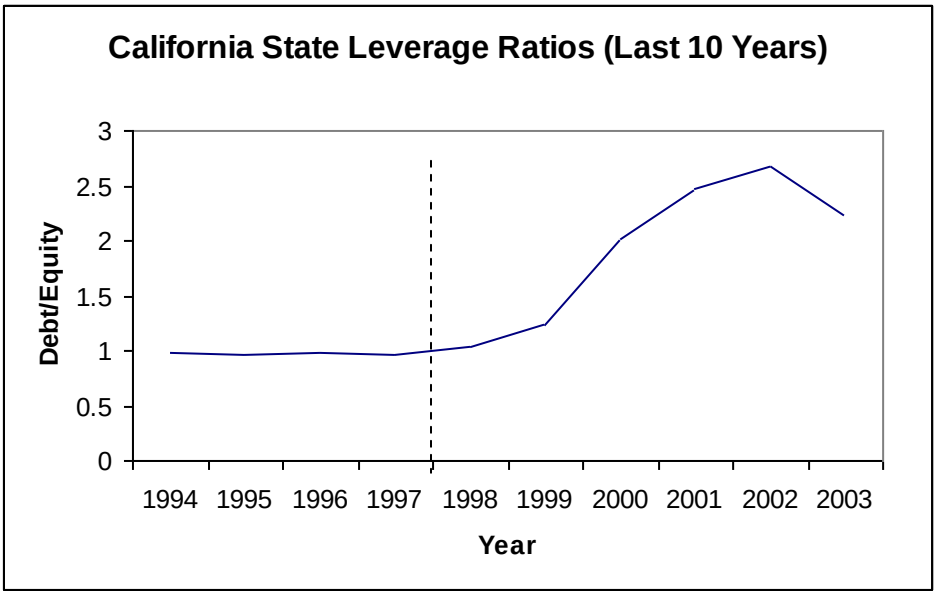
In 1996, the California Legislature unanimously approved legislation backed by the utility industry to deregulate electricity. The Legislation promised competition and at least 20% lower electricity rates by 2002. Under the 1996 plan, electricity rates would be frozen at rates roughly 50% higher than the national average for up to four years (1998-2002), during which time residential and small business ratepayers were required to pay off the utilities' "stranded assets" -- debts from dirty, non-economic power plants, including nuclear. Money was borrowed to lock in these payments -- and to finance a "rate reduction" for ratepayers. In addition, under this legislation, the Public Utilities Commission encouraged the utility companies to sell off their power generation facilities. However, some nuclear and hydropower facilities were retained by the utilities. Under the 1996 law, California was supposed to open its electricity markets to competition in April 1998.[9] Because the California deregulation scheme provided billions of dollars to the in-state utility companies, competition never materialized. Less than 2 percent of all California customers, including large industrial customers, have switched suppliers. Almost no residential customers have switched. Thus, nearly everyone in California is now being served by a largely unregulated monopoly. In hindsight, the California law became the model for similar efforts nationwide (more than twenty states have deregulated electricity) as well as preemptive federal legislation, a portion of which will be the subject of congressional hearings shortly. The four companies which I chose to study for California PGE corporation, Edison International, Sierra Pacific, and Avista corporation.

[9] See Footnote 6

In looking over the risk management activity of corporations in California, I received consistent results as I did with the previous three states. There was a steady rise of debt to equity, debt to firm, debt ratio, and Equity Multiplier. PGE corporation had an amazing 22.6% average rise in its debt equity levels post deregulation. This was a 32% difference from the average -10% decreases in its capital structure.

	PGE Corporation		Edison International	
	Post Deregulation	Pre-Deregulation	Post Deregulation	Pre Deregulation
Debt/Equity	22.60%	-10.02%	14.45%	12.63%
Debt/Firm Value	8.39%	-5.31%	4.66%	5.01%
Debt/Ratio (Total Debt/Total Assets)	8.40%	-12.51%	3.87%	4.08%
Equity Multiplier (Total Assets/Total Equity)	13.10%	2.84%	10.19%	8.21%
Assets	3.08%	-3.22%	5.20%	3.88%
	Sierra Pacific		Avista Corporation	
	Post Deregulation	Pre-Deregulation	Post Deregulation	Pre Deregulation
Debt/Equity	18.30%	-2.90%	7.81%	-1.69%
Debt/Firm Value	6.81%	-1.47%	3.73%	-0.91%
Debt/Ratio (Total Debt/Total Assets)	6.72%	-1.08%	-1.91%	-4.39%
Equity Multiplier (Total Assets/Total Equity)	10.84%	-1.84%	9.85%	2.83%
Assets	24.08%	5.84%	7.21%	6.54%

In my opinion, it was interesting to study the impact of deregulation on California because no state was impacted more by deregulation. This was not because of the massive blackouts that the state experienced as a result of deregulation. But it was because of the massive debt levels that California Utility companies amassed during the first three years of deregulation. As seen below, California Utilities had an average debt to equity ratio of about 1 for the five years prior to deregulation. This number nearly tripled after deregulation to about 2.6.



Summary of Deregulated Results

It is clear from the above results from New York, Pennsylvania, Ohio, and California that deregulated energy companies have taken a relatively substantial amount of debt. Although it is impossible to get one aggregate total of how much debt has risen in the deregulated sector because deregulation occurred at different times, these capital structure numbers can be summarized by each respective state. In New York total debt to equity numbers have risen 71% since deregulation from .74 D/E in 1998 to 1.26 in 2003. Looking at the Debt to Equity ratio in New York State from the perspective of the last 10 years, it has risen by 254% from .36 in 1994 to 1.26 in 2003. The rest of the changes in debt to equity ratios for the rest of the states can be seen by the chart below.

State	D/E on 12/31/2003	D/E prior to deregulation	D/E on 12/31/1994	Change In D/E Since Deregulation	Change In D/E Last 10 years
New York	1.26	0.74	0.36	71%	254%
Pennsylvania	2.23	1.67	1.48	34%	50%
New Jersey	2.31	1.50	1.05	53%	118%
California	2.21	1.03	0.98	115%	125%
Ohio	1.60	1.34	1.08	19%	49%

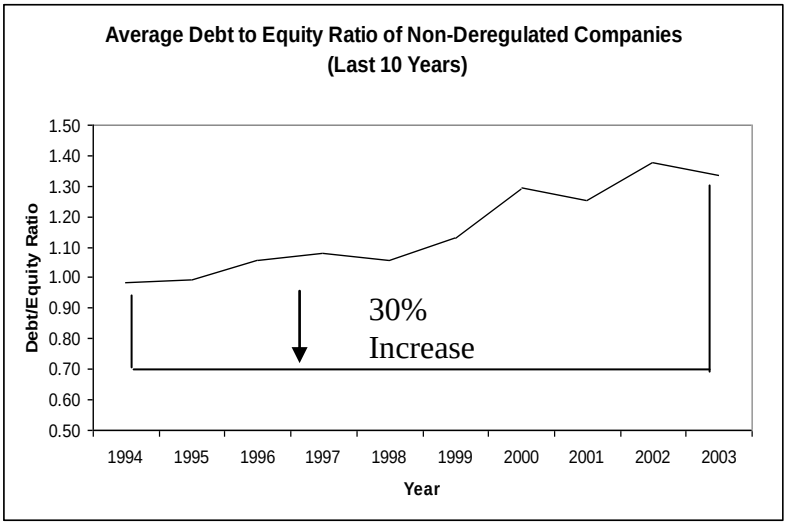
Since all deregulated states consistently posted a rise in their debt level within their capital structure, my original hypothesis that the equity levels of deregulated firms would raise was wrong. It appears that companies indeed are willing to take on the extra risks of the debt into their capital structure. The reasons for this phenomenon can't be explained immediately by the results shown thus far. The rise in debt levels of these energy firms might have merely been an industry phenomenon that was independent of deregulation. A careful analysis of other factors surrounding deregulation need to be further examined in order to come up with a meaningful conclusion into what has caused this rise in debt levels. I will proceed to analyze the actions of regulated utility companies in the United State, the interest rate environment, and corporate policies of deregulated energy firms.

Regulated Utility Industry

Although my hypothesis predicted that there would be a rise in equity by deregulated firms, I feel that it is important to take a look at the activities in the regulated sector. If there is a similar trend in the rise of debt in the regulated sector, there is

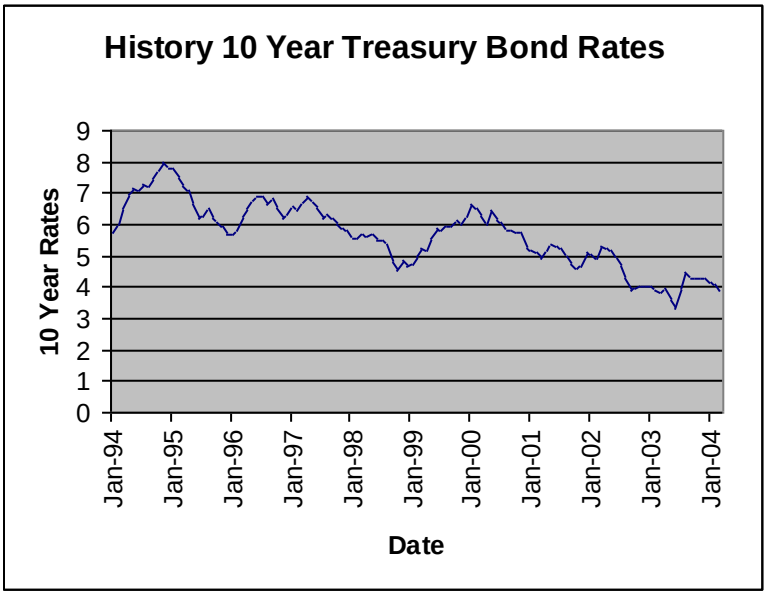
probably an industry wide reason for the rise in debt of regulated firms. I proceeded to look at about 30 other utility firms in the industry and took into account their debt to equity ratios, debt to firm ratios, and total debt to total assets. These thirty firms compose about 90% of the utility industry market share. Each of these firms sells their stock to the public and is in a regulated market place.

In looking at the chart below, it can be observed that the Regulated market place has also seen a rise in its debt levels. In the early 1990's the debt to equity ratios of these firms was about 1.0 and since then has rise to an amount of 1.30. This rise was about 30% in the last ten years. These figures can be seen from the chart below. Please note that there is no line denoting deregulation.



In explaining the rise in debt in the deregulated market, I feel that it can be partially explained by the rise in debt in the regulated sector. The reason for this assumption is the fact that the United States has experienced a falling interest rate environment and a rise in debt is expected for any industry. Moreover, in a regulated marketplace firms are not experiencing the same change as a deregulated firm and are not

going to make the drastic changes in their debt levels as would a deregulated firm. In looking at the interest rate environment of the United States, the U.S. has experienced a decrease in its interest rates allowing firms to take on more debt for cheaper. For obvious reasons, lower interest rates will cause firms to put on more debt on its balance sheet, whether the firm is deregulated or not.



In comparing the interest rate environment to the debt to equity ratios of regulated firms, it can be observed that the lowest debt to equity ratios occurred when interest rates were the highest- hence, regulated firms had less debt with higher interest rates. The reverse was true in the low interest rate environment, in which debt levels rose as interest rates decreased. In my opinion some of the increase in debt in the deregulated sector can be explained by this phenomenon, but not all of the increase.

The reason I feel that not all of the rise in debt can be explained by the interest rate environment and the regulated sector is because most states in my analysis

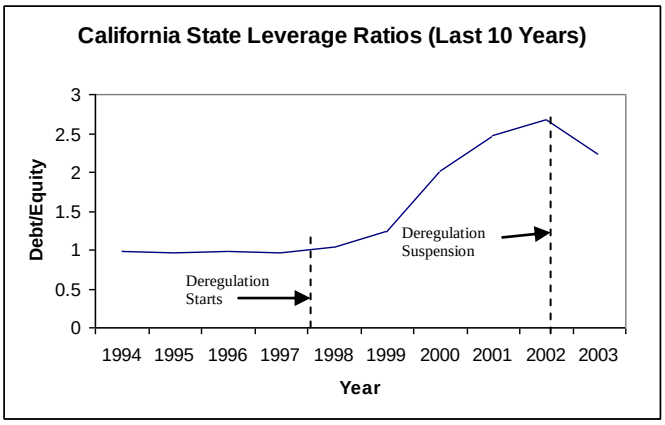
deregulated in a time where interest rates were at its highest. For example, California experienced a 64% ((2.02-1.23)/1.23) rise in its debt to equity ratios in 1999. In that same year, interest rates rose 35% from 4.65% in December 1998 to 6.28% in December 1999. The same was true in other states during this time. In New York State, there was a 62% rise in its debt to equity ratios during this period. Ohio experienced a 22% rise and Pennsylvania had a 32% rise in its debt to equity.

After the 1999-2000 period interest rates did decrease and the debt to equity ratios of deregulated states continued to rise. I feel that, at least partially, that the interest rate environment could explain the rise in debt in the deregulated sector. However, it seems that there was a trend that no matter what the interest rate environment is, there has been a tendency of utility firms to lever up the year after deregulation. Despite rising rates, deregulated utility firms took on more debt onto their balance sheet because deregulation in their state occurred. Therefore, I will explore other possibilities in explaining the increase in leverage by utility firms.

Managerial Fright Tactics

One possibility for the rise of debt could be a result of utility managers trying to ward off competition before new entrants come into the utility market place. A way managers could do this is by loading up their balance sheet with debt, exhibiting their ability to acquire cash and assets at a very high rate. As new entrants to enter the market place they could become daunted by the strength of the incumbent firms in the market. Although this theory needs more developing, one state could be a prototype for this theory, this state is California.

In the last 5 years, California has experienced a turbulent deregulation process that saw its share of corruption. Many of the utility companies in the state colluded in order to keep utility prices higher than what the California state market demanded. For this reason, many power plants were purposefully closed to decrease supply in the market.[10] Thus, market prices were kept high, although there was a rise in the number of new firms in the market place. This phenomenon occurred until an expected rise in electricity demand overworked the current plants and eventually lead to massive blackouts throughout California State. Many utility state customers cried foul and blamed deregulation for this tragedy. For this reason, in 2002 California suspended its deregulation process.



An interesting result from California's experience was the rapid rise of debt after deregulation was in a effect and the rapid decrease in debt after deregulation was suspended. It can be seen from the graph above that California utility firms immediately decreased its debt levels as soon as deregulation occurred. The same was true for every other deregulated state in the United States. As soon as deregulation occurred there was a

[10] Elaine M. Howell (2000) Energy Deregulation in California: Benefits of Competition Were Undermined by Structural Flaws in the Market, Unsuccessful Oversight, and Uncontrolled Competitive Forces. Diane Publishing, Co.

rapid increase in the debt levels of the firms in that respective state the year afterwards. The reason why California's result is interesting to this analysis is because they actually halted deregulation and then immediately had its debt to equity ratios decrease by 20% from about 2.7 to 2.2.

Although this theory has an interesting correlation to deregulation and the rise and fall of debt to equity ratios of utility firms before and after deregulation, it unfortunately can't be substantiated by just one state in California. However, it is valuable to note that all 5 states in my analysis had their debt to equity ratios rise by average of 50% the year after deregulation. It is also viable

Managers Becoming More Efficient

There is a theory by Modigliani and Miller that states that some firms are more likely to take on debt than other firms because equity financing is inefficient. In order to understand this inefficiency, it is important to review the Modigliani and Miller: Proposition II model with taxes. This model helps to see the benefits of debt and states a corporation's value will increase with an increase in debt and a presence of corporate income taxes. This benefit is measured by the equation:

$$T_c * r_b * B$$

or

Corporate Tax Rate * Dollar Amount of Interest

This model effectively allowed corporate managers realize that, in addition to the total firm value that is assigned by the total market value of debt + equity of a corporation, this tax "shield" is additional value to a corporation's total value.

Although an immediate question may be raised to why all firms may take advantage of this tax shield, there is a caveat to this benefit. According to the Modigliani and Miller Proposition II, additional debt on the balance sheet of any company will cause the current equity of the company to become riskier[11]. This additional risk was not exactly what corporate managers at the United States' prominent utility companies wanted to bring to their shareholders. These risk averse investors wanted their investments to have the same risk levels that they had experienced for many years beforehand. For this reason, the capital structure of these firms stayed stagnant and, as was the case for most utility firms, inefficient. Most markets would correct this error in most industries. As firms would try to find the optimal capital structure as they are competing with other firms in a certain market or region. However, since the utility industry was regulated, many firms did not change their capital structure to a more efficient model. Therefore, they kept older and more inefficient model.

In my opinion, after deregulation firms went to a more efficient model and took advantage of the tax benefits of debt. Although this theory can only be proven by speaking to utility managers and executives, the drastic rise in debt of the five states studied over the course of my analysis. This theory can be one of many in order to explain the rise in debt; however, it is the most practical for utility managers and executives. If there is going to be an industry wide acquisition of debt, I feel that most

[11] S. Ross, R. Westerfield and J. Jaffe (RWJ), 2001, *Corporate Finance*, 6th edition, Irwin McGraw-Hill.

managers will choose to do so only to make themselves more efficient. Even if a managers is storing debt to scare off other utility firms, this tactic may or may not be the strategy of all firms in the industry.

Conclusion:

Although my original hypothesis was proven wrong by my research, it was interesting to document the change in the capital structure of utility before and after deregulation. Whether the rise in debt was due to interest rates, managerial tactics, or the need for firms to have a more efficient capital structure, energy deregulation has been a tremendous benefit to the typical utility consumer. Deregulation consumers have been able to experience the freedom to choose their energy providers and experience lower utility bills as a result of this competition. In addition to these benefits, customers and stockholder have indeed benefited by the changes in the capital structure of utility firms. The added cash made by tax benefits are enough to justify the debt that has been added to energy firm's balance sheet. As states continue to deregulate, I expect virtually all deregulated utility firms to take advantage of this benefit. I feel that it will be interesting to look how analysts will factor this trend and deregulation as a whole into their valuations. On one hand, firms are experiencing a great cash benefit from the increase in their debt levels and on the other hand increase competition in the industry will cause utility profits to decrease. I expect, however, that deregulated utility firms to become more not only in their capital structure but also in their operations. I expect many variable costs to decrease and reduce the profit shock of deregulation. Time will tell the story in

the utility industry, but it is safe to say these changes will inevitable benefit the industry and its customers.