

**ECONOMIC PROFITABILITY OF REGULATED VS.
UNREGULATED INDUSTRIES**

by

Glenn T. Powers
B.A., Amherst College, 1984

A PROJECT SUBMITTED IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF FINANCIAL RISK MANAGEMENT
in the Faculty
of
Business Administration

© Glenn T. Powers 2010
SIMON FRASER UNIVERSITY
Summer 2010

All rights reserved. This work may not be
reproduced in whole or in part, by photocopy
or other means, without the permission of the author.

APPROVAL

Name: Glenn T. Powers
Degree: Master of Financial Risk Management
Title of project: Economic Profitability of Regulated vs. Unregulated Industries

Examining Committee:

Dr. Aidan Vining, CNABS Professor of Business and
Government Relations
Faculty of Business Administration, Simon Fraser
University
Senior Supervisor

Dr. Andrey Pavlov, Associate Professor
Faculty of Business Administration, Simon Fraser
University
Co-Supervisor

Date Approved:

Abstract

This thesis examines whether regulated industries in North America are more or less profitable than unregulated industries. There is extensive literature on the theory of regulation and the possibility that regulated companies “capture” regulators which come to serve their interests, but much less literature on the consequences of regulation. Most empirical studies tested this hypothesis by looking at specific regulatory events. This thesis looks across 150 different sub-industries, and finds that the economic profits of regulated industries are higher than unregulated industries. This paper also finds that the annual variation in economic profit is lower for regulated industries. Using an ANOVA test, the paper shows that the differences in economic profits related to type of regulation are statistically significant.

For my parents, who have encouraged me in everything I wanted to accomplish. To our dog Guapo, who spent his final days lying by my side while I wrote this thesis. And most of all, to my wife Melanie, who means the world to me.

Acknowledgments

I would like to thank the faculty and students of MFRM program, and especially the SIAS team, for their patience, help and wit throughout this program. I also wish to thank my advisors, Aidan Vining and Andrey Pavlov, for their ideas and counsel.

Glenn Powers
Simon Fraser University
Summer 2010

Contents

Approval	ii
Abstract	iii
Dedication	iv
Acknowledgments	v
Contents	vi
1 Does Industry Regulation Lead to Higher Profits?	1
1.1 Introduction	1
1.2 Measuring the Effects of Regulation on Profitability	2
1.3 Measuring the Effects of Regulation On Stock Volatility and Returns	3
1.4 Comparing the Profitability of Regulated and Unregulated Industries	4
2 What is a Regulated Industry?	5
2.1 The Extent of Regulation in Different Industries	5
3 Empirical Results	8
3.1 Sources of Financial and Market Data	9
3.2 Survivor Bias	10
3.3 Calculating Economic Profits	10
3.4 Accounting Profitability by Type of Regulation	12
3.5 Economic Profitability is Higher for Companies Facing Greater Regulation . .	13
3.6 Variation of Profitability is Lower for Regulated Companies	16
3.7 Sum of Excess Profits vs. Average of Residual Income Observations	16

3.8	Statistical Analysis	19
3.8.1	ANOVA Test	19
3.9	Conclusion	22
A	Economic Profitability by Subindustry	23
	Bibliography	23

List of Figures

2.1	List of Regulated Industries in Financial Database	7
3.1	DuPont Analysis by Industry and Regulation Type	14
3.2	Economic Profitability by Industry and Regulation Type	15
3.3	Annual Variation of Economic Profitability by Regulation Type	17
3.4	Sum of Excess Returns vs. Average of Observations by Regulation Type . . .	18
3.5	Histogram of Economic Profitability by Regulation Type	20
3.6	Summary of ANOVA Analysis	21
A.1	Economic Profitability by Industry and Regulation Type, All Subindustries .	24

Chapter 1

Does Industry Regulation Lead to Higher Profits?

“Our primary mission is to prevent legislation.”

Comment of Samuel D. Chilcote, Jr., President of the Tobacco Institute, in a speech on January 20, 1988. Despite increasing regulation, the tobacco industry was the most profitable of the 150 industries analyzed in this paper.

1.1 Introduction

Prior to the 1970s, regulation was seen as a mechanism by which governments constrained the activities of companies to in the public interest, a term that became popular during the new deal era of American politics (McCraw 1975). Beginning with Stigler, (1971) a new theoretical perspective started to examine regulation from the perspective of supply and demand for regulation, and proposed the idea that organized interest groups – most notably the industries that are being regulated – are able to capture regulators and manipulate them to serve their interests. Peltzman (1976) formalized this idea as the Economic Theory of Regulation. Peltzman developed a framework which predicted that regulated entities are usually, but not always, the beneficiaries of government regulation.

The economic theory of regulation would provide the intellectual force behind a broad deregulatory movement in the United States and other countries in the 1980s (Peltzman 1989), and become a major theme of market economists like Milton Friedman. These ideas would come to be known as the Chicago School of economics and would profoundly influence

public policy. By one estimate, the percent of U.S. GNP produced by fully regulated industries fell from 17% to 6.6% between 1977 and 1998, as large parts of the communications, energy and financial industries were significantly deregulated (Winston 1993).

The debate between public interest theory and capture theory continues. While many authors have argued about the *motivations* and the *mechanisms* of regulation, the literature on the *consequences* of regulation is more limited.

This paper tests the hypothesis that regulated industries generate greater economic profit, *i.e.* profit in excess of their cost of capital, than unregulated industries. The paper finds that industries that face greater regulation generally have profits that exceed their cost of capital, while less regulated companies do not. Other studies have found that public companies in the U.S. have lower profits than their cost of capital (Hawawini 2002). This paper is, to our knowledge, the first to find that the *opposite* is true of regulated companies. This paper also finds that regulated companies had less annual variability in their economic profits.

The paper is organized into three sections. First, the paper briefly examines the history of regulatory theory and the previous literature measuring the affects of regulation. Second, it looks at the extent of regulation in different industries and develops a framework for categorizing industries by type of regulation. Third, it uses a database of financial data in North American companies from 2000-2009, and aggregates that data according to our estimate of the extent to which the companies are part of highly regulated industries.

1.2 Measuring the Effects of Regulation on Profitability

The economic theory of regulation does not in itself require that regulation creates economic rents. Stigler (1971) suggested that a surplus enabled by regulators could be consumed by competition between rent-seekers for regulatory benefits. Peltzman (1976) viewed regulation as lowering the cost of capital for regulated firms, and provided empirical evidence for that view.

Several authors have looked at whether surpluses from regulation flowed to employees of regulated firms. Edwards (1977) finds that bank regulation leads to expense preference behaviour that benefits employees. Black (2001) looked at banks that were in the process of deregulation, and finds that bank regulation benefited employees, and even more specifically, benefited male employees more than female employees. Rose (1987) found, by studying the

trucking industry during deregulation, that labor had been a significant beneficiary of the previous regulatory regime.

Numerous studies look at the direct costs of compliance with regulation. Most of these papers examine the costs of complying with environmental cost. Hopkins (1992) explores the compliance costs associated with regulation generally, while others (Jaffe, 1995) explore compliance costs in manufacturing and finds that they added \$1 trillion in costs over ten years, reducing American competitiveness in manufacturing. Heyes (2000) and Porter (1995) looked specifically at the cost of compliance with environment regulation. Weidenbaum (2000) puts the annual cost of compliance with regulation in the United States at \$400-700 billion.

1.3 Measuring the Effects of Regulation On Stock Volatility and Returns

Binder (1985) measured the immediate change in stock prices following regulation events. Binder tracked 20 regulatory events all the way back to the Interstate Commerce Act of 1887. The research failed to find that regulatory changes caused a significant change in equity values, noting that one challenge lay in knowing when markets started to anticipate regulatory change, and also that regulatory change typically happened over different periods in different jurisdictions.

Many studies have looked at the effect of regulatory changes by examination of asset and equity betas. Peltzman (1976) noted a decline in the beta of drug and railroad stocks after those industries were regulated. Fraser (1990) argues that the long-term nature of beta provide a better measure of regulatory changes than the more immediate stock price change. Fraser further finds statistically greater predictability of earnings (as measured by comparing analyst forecasts to actual results) in regulated companies.

Mitchell and Mulherin (1988) found that tobacco stocks had abnormal positive returns following the regulatory imposition of an advertising ban in 1970, and notes the beta of tobacco stocks declined significantly (from 0.69 to 0.54) from the years before the increase in regulation and the years afterward. Hogan, Sharpe, and Volker (1980) find that shareholder risk is negatively correlated with the intensity of regulation in Australian banks.

The literature does not universally conclude that regulation makes stocks less risky or leads to higher returns. For example, Lenway, Rehbein and Starks find (1990) find that

increases in regulation in the steel industry are not associated with decreased systematic risk. Allen and Wilhem (1988) looked at a 1980 regulation that increased reserve requirements for non-federal banks. They found that that stock returns were affected by changes in regulation of banks, but that the effect varied according to the type of financial institution.

1.4 Comparing the Profitability of Regulated and Unregulated Industries

The bulk of the empirical studies on the effects of regulation are event studies within specific industries. These studies suggest that regulation sometimes leads to higher profits and a lower cost of capital. The literature also looks at regulation from the perspective of the cost of compliance. From an economic perspective, this is like looking at the cost of tax policy based on the time required to fill out a tax form.

This paper takes a different approach, looking *across* industries to test the hypothesis that regulation is associated with higher levels of economic profit. Section 2 of this paper will show that certain industries that are more regulated than others, and establish three distinct categories of government regulation. Section 3 of the paper will divide a database of public companies by regulation type and establish that there is a significant difference in the profitability of regulated and unregulated companies. The paper will also examine the variability of profits across economic cycles and find that regulated industries have less annual variation. Finally, the paper will show that these differences are statistically significant.

Chapter 2

What is a Regulated Industry?

2.1 The Extent of Regulation in Different Industries

It is impossible to characterize any industry as either completely regulated or completely deregulated. Winston (1993) describes regulatory policy as encompassing an industry's economic conduct, from pricing to entry and exist, its social conduct, and its externalities. This paper looks exclusively at publicly traded companies in North America; each of these companies has opted in to substantial regulation by virtue of choosing to sell shares to the public. Every company in the database must conform to trade, labor, and environmental regulations.

This paper will argue that despite significant deregulation during the past twenty years, that it is possible to characterize certain industries as being subject to a greater regulatory burden than others. In general, the following criteria were used to establish whether industries are substantially regulated:

- Does the academic literature discuss regulation specific to that industry?
- Is there a specific federal agency that is devoted to regulating an industry?
- Does regulation in an industry fundamentally limit the markets a company can address and the manner in which it address those markets?

The literature does not provide an analysis of the extent to which different industries are regulated, or even of the mechanisms by which regulation is accomplished. Breyer (1982) analyzes six different types of regulation, but all are mechanisms for addressing natural monopolies.

This paper takes a relatively broad view of regulated industries. For example, we view the tobacco industry, with extensive excise taxes that are specific to its primary product, and regulation of marketing practices and packaging, as highly regulated. Gruber (2001) provides an extensive review of tobacco regulation in the United States. Using many of same criteria, we consider alcoholic beverages to be highly regulated. McGowan (1997) provides a review of alcohol industry regulation. Casino gambling, despite a significant decrease in prohibition in the last two decades, is among the most regulated industries in the United States (Sauer 2001).

We consider the pharmaceutical industry to be highly regulated. With the exception of the United States, most countries control not only whether a drug can be marketed, but the price at which it can be sold (Vernon 2005). While the United States does not generally regulate price, the activities of the industry are closely intertwined with the federal agency (the Food and Drug Administration) that regulates it.

Electric, gas and other utilities continue to be heavily regulated in the United States. A huge portion of the literature on regulation addresses these industries.

Telecommunications represents a more difficult situation however. Winston (1993) argues that cable television and telecommunications have been substantially reformed but that radio and television broadcasting remain heavily regulated. Noam (2006) argues that telecommunications providers are not heavily regulated, and argues the deregulation has significantly increased the variability of earnings in that industry.

We include insurance and deposit taking institutions as regulated companies. While insurance is generally regulated (albeit at times dysfunctionally) at the state level in the United States, it is among the most heavily regulated U.S. industries (Jost and Hall, 2005).

There is an extensive literature on regulation of banking in the U.S. and internationally. Allen and Herring (2001) suggest that bank regulation is widespread in attempt to avoid systemic financial risk and protect depositors and investors, but also to achieve goals like fighting organized crime and money laundering and facilitating home ownership.

The following table shows the list of regulated industries as it is implemented in our database, and the industry description as provided by S&P and MSCI.

Industry	Type of Regulation			Industry Description
	Rate of Return	Capital Requirements	Specific Agency	
Casinos & Gaming	0	0	1	Owners and operators of casinos and gaming facilities. Includes companies providing lottery and betting services.
Brewers	0	0	1	Producers of beer and malt liquors. Includes breweries not classified in the Restaurants sub-industry.
Distillers & Vintners	0	0	1	Distillers, vintners and producers of alcoholic beverages not classified in the Brewers sub-industry.
Tobacco	0	0	1	Manufacturers of cigarettes and other tobacco products.
Biotechnology	0	0	1	Companies primarily engaged in the research, development, manufacturing and/or marketing of products based on genetic analysis and genetic engineering. Includes companies specializing in protein-based therapeutics to treat human diseases
Pharmaceuticals	0	0	1	Companies engaged in the research, development or production of pharmaceuticals. Includes veterinary drugs.
Diversified Banks	0	1	0	Commercial banks whose businesses are derived primarily from commercial lending operations and have significant business activity in retail banking and small and medium corporate lending. Excludes banks classified in the Regional Banks and Thrifts & Mortgage Finance sub-industries. Also excludes investment banks classified in the Investment Banking & Brokerage sub-industry.
Regional Banks	0	1	0	Commercial banks whose businesses are derived primarily from commercial lending operations and have significant business activity in retail banking and small and medium corporate lending. Regional banks tend to operate in limited geographic regions. Excludes companies classified in the Diversified Banks and Thrifts & Mortgage Banks sub-industries. Also excludes investment banks classified in the Investment Banking & Brokerage sub-industry.
Thrifts & Mortgage Finance	0	1	0	Financial institutions providing mortgage and mortgage related services. These include financial institutions whose assets are primarily mortgage related, savings & loans, mortgage GSE's (government sponsored enterprises), mortgage lending institutions, building societies and companies providing insurance to mortgage banks.
Life & Health Insurance	0	1	0	Companies providing primarily life, disability, indemnity or supplemental health insurance. Excludes managed care companies classified in the Managed Health Care sub-industry.
Multi-line Insurance	0	1	0	Insurance companies with diversified interests in life, health and property and casualty insurance.
Property & Casualty Insurance	0	1	0	Companies providing primarily property and casualty insurance.
Electric Utilities	1	0	0	Companies that produce or distribute electricity. Includes both nuclear and non-nuclear facilities.
Gas Utilities	1	0	0	Companies whose main charter is to distribute and transmit natural and manufactured gas. Excludes companies primarily involved in gas exploration or production classified in the Oil & Gas Exploration & Production sub-industry. Also excludes diversified midstream natural gas companies classified in the Oil & Gas Refining, Marketing & Transportation sub-industry.
Multi-Utilities	1	0	0	Utility companies with significantly diversified activities in addition to core Electric Utility, Gas Utility and/or Water Utility operations.
Water Utilities	1	0	0	Companies that purchase and redistribute water to the end-consumer. Includes large-scale water treatment systems.

Figure 2.1: List of Regulated Industries in Financial Database

Chapter 3

Empirical Results

Our empirical analysis seeks to answer the following question: During the past ten years, have companies in more heavily regulated industries generated greater economic profits than companies in less regulated industries?

The 10,500 companies we examined, in aggregate, failed to generate an economic profit from 1999-2009. Over 10 years, these companies generated operating profit after tax of \$10.7 trillion. This is not the same, however, as economic profit. In aggregate, the companies in the database had lower profits than their cost of capital. This finding is consistent with Hawawini (2002) which looked at economic profit as measured by Stern Stewart and Companies across all industries and found a similar magnitude of shortfall in economic profit.

Did regulated industries fare better? Based on the most recent decade, they did: highly regulated industries generated economic profits, while relatively unregulated industries did not. The amount of economic profit, however, varied according to the type of regulation the companies face.

Companies that face traditional rate of return regulation, such as utilities, had economic profits that were positive but very close to zero. These companies had a very low cost of capital relative to other companies in the database, and had earnings about equal to their cost of capital. In aggregate, they were economically profitable, and fared better than unregulated companies.

Companies which faced regulation of capital requirements, like banks and insurance companies, had negative economic profits during the 10-year period. This result, however, is heavily influenced by losses in mortgage providers (especially U.S. Thrifts) in 2008 and

2009. Without these losses, companies that lend money (national banks, regional banks and thrifts) generated economic profit. Insurance companies, however, generated economic losses over the period. Overall, this category of regulated industry generated economic losses, even without the unusual banking losses in 2008 and 2009.

Finally, companies that face specific restrictions on the products they sell and the way they distribute and market their products were highly profitable economically. Brewers, vintners, distillers, tobacco companies, and pharmaceutical companies all generated significant economic profits.

3.1 Sources of Financial and Market Data

Most of the data used for this analysis was retrieved from the Compustat database of Standard and Poors. Data was collected for all North American companies that file financial data with the SEC. The only filter on the data was that companies have revenues of greater than \$1 million. There are approximately 11,800 companies in the filtered database, and 75,000 individual records, representing one year of data for each company.

The following data items, and the code with which we will refer to them, were used in our analysis:

From company income statements, as recorded in the Compustat database:

- Pretax Income (PI)
- Net Income (NI)
- Interest Expense (XINT)

From company balance sheets, as recorded in the Compustat database:

- Total Assets (AT)
- Shareholders Equity (SEQ)
- Total Liabilities (LT)
- Long-term Debt (DLTT)

From Standard and Poors/Morgan Stanley, again from the Compustat database: GICS Sub-Industry (GSUBIND)

From Bloomberg L.P.: Beta (BETA)

GICS (Global Industry Classification System) codes were developed by a joint venture of Morgan Stanley and Standard and Poors. The GICS system assigns every public company to one of 123 sub-industries that best represent, in the view of their analysts, the industry sector that best fits their mix of businesses. The GICS codes use a hierarchy. For example Industry code 1010 is Energy; Code 101010 is energy equipment and services; and code 10101010 is Oil and Gas Drilling.

3.2 Survivor Bias

The primary database, CompuStat, was chosen partially because it includes companies that are no longer publicly traded but were publicly traded in the past. Approximately 26% of the observations in the database used for this study are from companies that are not currently publicly held. The reasons they are no longer public include mergers, going private, and bankruptcy. In general, the companies that are no longer public are smaller than average; they represent 12% of the capital deployed during the study.

At the level of specific sub-industries, however, including these “deleted” companies can make a large difference in the aggregate profitability of an industry. The inclusion of now-bankrupt companies like Abitibi Bowater in paper products or General Motors in automobile manufacturing significantly changes the aggregate profitability of these industries. Both, in fact, were the largest companies within their industries in terms of capital deployed.

3.3 Calculating Economic Profits

For each record (one company, one year), the economic profit was calculated. The framework is similar to the idea of Economic Value Added as developed by Stern Stewart and Co., but differs from that firm’s proprietary EVA database by avoiding numerous adjustments to accounting data that require analysis of each company. Many of these adjustments are to compensate for timing differences between economic and accounting profits (Savarese 2000) and may become less important in our database, which is ultimately aggregated over 10 years. For this article, economic profit (EP) was defined as net operating profit after tax minus the cost of capital for that year, coded in our system as:

$$EP = NOPAT - (C * CCR) \tag{3.1}$$

We defined the tax rate, T as

$$T = (PI - NI)/PI \quad (3.2)$$

where PI is pre-tax income and NI is net income.

Net Operating Profit after Taxes (NOPAT) was defined as

$$NOPAT = NI + XINT * (1 - T) \quad (3.3)$$

where NI is net income, $XINT$ is interest expense, and T is the tax rate (see equation 3.3).

Capital, C , was defined as

$$C = SEQ + DLTT \quad (3.4)$$

where SEQ is shareholders' equity and $DLTT$ is long-term debt.

The CCR provided the greatest challenge. First, the companies was capital was divided into debt and equity companies, based on book accounting values.

The debt portion of capital, DC , was defined as

$$DC = DLTT/(SEQ + DLTT) \quad (3.5)$$

where $DLTT$ is long-term debt and SEQ is shareholders' equity.

The equity portion of capital, EC was defined as

$$EC = \begin{cases} SEQ/(SEQ + DLTT) & \text{if } SEQ > 0, \\ 100\% & \text{if } SEQ \leq 0. \end{cases} \quad (3.6)$$

The cost of debt, KD was defined as

$$KD = \max(0, XINT/DLTT) \quad (3.7)$$

where $XINT$ is interest expense and $DLTT$ is long-term debt.

The risk-free rate, RF was defined as the average, for the previous 12 months, of the 3-month US treasury bill annualized yield, as reported by the St. Louis Federal Reserve bank.

The cost of equity, KE , was defined as

$$KE = RF + BETA * 0.05 \quad (3.8)$$

with 0.05 being a somewhat arbitrary choice of market risk premium based on long-term risk premia observed in North American equity markets.

Beta was based on an OLS regression of weekly returns to either the S&P 500 index (for U.S. companies) or TSX Index (for Canadian companies) during the past two years. Where a consistent data set precluded calculation of beta, the average beta of companies in that sub-industry was used.

The cost of capital ratio, or CCR was defined as

$$CCR = (KD * DLTT) + (KE * SEQ) \quad (3.9)$$

where KD is the cost of debt, $DLTT$ the long-term debt, KE the cost of equity, and SEQ is shareholders' equity.

3.4 Accounting Profitability by Type of Regulation

For each subindustry i , data were aggregated for each year n and company j . For example, revenues were for a subindustry would be calculated as $\sum_{n=2000}^{2009} \sum_{j=1}^j (AnnualRevenue)$.

We view economic profit as more relevant than accounting profit for the purposes of establishing whether regulation has a positive economic effect on regulated on companies in regulated industry. However, it is instructive to look at the profitability of each industry in the database over a long time period from the perspective of duPont analysis.

$$ROE = \frac{NetIncome}{Revenues} * \frac{Revenues}{Assets} * \frac{Assets}{Equity} \quad (3.10)$$

The figure below shows the profitability of each industry following the DuPont analysis construct. Industries which are not highly regulated have been further aggregated from the eight digit $GSUBIND$ to the two-digit industry level.

The aggregate ROE of all companies studied was about 9%. Regulated utilities had a slightly higher ROE, even though they deployed less leverage. Companies with regulated capital requirements had the lowest ROE, despite using the greatest degree of leverage. Low profitability of insurance companies and mortgage companies were the main drivers: if these two subindustries were removed, the ROE of this regulatory group would actually be slightly higher than the aggregate for all industries.

The highest ROE regulatory group is the specific agency companies, with pharmaceuticals, alcohol and tobacco contributing to the high profitability levels. In aggregate, companies regulated by a specific government agency had a ROE double that of less regulated industries.

3.5 Economic Profitability is Higher for Companies Facing Greater Regulation

In aggregate, the companies in our database had economic profits less than their cost of capital. This was not, the case, however, for most of the more regulated industries. Regulated utilities had economic profits slightly larger than their cost of capital. Financial companies regulated according the capital requirements had less economic profits relative to capital deployed than other companies. The difference, however, came from two specific sub-industries: multi-line insurance and thrifts / mortgage finance. Without these two industries, the RI Ratio of the regulated financials changes from -2% to 6%, far greater than less regulated companies.

The financial turmoil of 2008 and 2009 was significant for this group of companies. Eliminating these two years changes the aggregate RI ratio of regulated financial companies from -2% to 0%. Multi-line insurance companies had an aggregate RI Ratio of -2.1% without 2008-2009, vs. -7% for all ten years. Thrifts and mortgage finance companies had an aggregate RI ratio of -1.2% for the eight years vs. -4.3% for all ten years.

Companies that were regulated by specific agencies had profits greatly in excess of their cost of capital. The tobacco and pharmaceutical industries were the two most profitable in the database, although there were a few less regulated industries that were nearly as profitable as pharmaceuticals, including software drinks (10.2%), IT/Consulting (10.4%) and household products (10.2%). No other sub-industry in our database approaches the excess returns of the tobacco industry.

	NI / Revenues	Revenues / Assets	Assets / Shareholders' Equity	ROE
Normal Regulatory Burden	4.1%	46.2%	460.5%	8.6%
Consumer Discretionary	1.0%	81.6%	330.1%	2.8%
Consumer Staples	4.0%	161.7%	273.1%	17.6%
Energy	7.6%	87.5%	235.6%	15.6%
Financials	8.9%	9.4%	1110.2%	9.3%
Health Care	3.5%	122.0%	273.1%	11.5%
Industrial	4.6%	70.9%	396.4%	12.8%
Information Technology	0.8%	80.7%	196.9%	1.3%
Materials	3.4%	78.8%	283.3%	7.5%
Utilities	1.8%	43.8%	542.4%	4.2%
Telecommunications Services	4.6%	43.9%	291.1%	5.9%
Rate of Return	6.3%	42.6%	367.7%	9.9%
Utilities	6.3%	42.6%	367.7%	9.9%
Electric Utilities	7.1%	38.9%	359.3%	9.9%
Gas Utilities	5.3%	65.1%	341.1%	11.8%
Multi-Utilities	5.3%	45.1%	398.9%	9.5%
Water Utilities	0.5%	22.1%	325.8%	0.4%
Reg Capital Requirement	6.6%	9.5%	1186.7%	7.4%
Financials	6.6%	9.5%	1186.7%	7.4%
Diversified Banks	13.2%	6.9%	1461.3%	13.3%
Life & Health Insurance	6.0%	11.0%	1424.2%	9.4%
Multi-line Insurance	0.1%	12.1%	1007.5%	0.1%
Property & Casualty Insurance	8.1%	30.1%	372.7%	9.1%
Regional Banks	11.2%	7.0%	1071.5%	8.4%
Thrifts & Mortgage Finance	-4.8%	5.9%	2027.6%	-5.8%
Specific Agency	13.7%	57.7%	231.8%	18.3%
Consumer Discretionary	2.8%	46.4%	434.9%	5.6%
Casinos & Gaming	2.8%	46.4%	434.9%	5.6%
Consumer Staples	14.4%	69.5%	318.6%	32.0%
Brewers	10.6%	70.8%	268.6%	20.2%
Distillers & Vintners	6.3%	65.3%	244.6%	10.0%
Tobacco	16.1%	69.6%	344.7%	38.7%
Health Care	14.9%	55.7%	198.1%	16.5%
Biotechnology	3.4%	38.2%	159.5%	2.1%
Pharmaceuticals	16.6%	59.8%	209.7%	20.9%
Grand Total	4.8%	33.3%	566.4%	9.0%

Figure 3.1: DuPont Analysis by Industry and Regulation Type

	Operating Profit After Tax	Capital Deployed	Capital Charge	Residual Income	Industry RI Ratio	Std Dev of RIRatio
Normal Regulatory Burden	7,645,958	101,383,726	9.9%	(1,549,590)	-1.5%	95%
Consumer Discretionary	605,172	14,993,547	11.1%	(823,640)	-5.5%	95%
Consumer Staples	651,577	5,148,210	9.4%	287,231	5.6%	32%
Energy	1,205,433	9,853,777	9.6%	410,944	4.2%	52%
Financials	2,862,272	33,876,322	9.8%	(632,535)	-1.9%	149%
Health Care	294,909	3,299,844	8.8%	40,009	1.2%	60%
Industrial	1,049,300	11,862,614	10.1%	64,916	0.5%	62%
Information Technology	193,011	8,425,093	8.9%	(467,221)	-5.5%	123%
Materials	360,888	5,656,071	10.4%	(147,507)	-2.6%	49%
Utilities	39,426	1,881,170	9.4%	(136,552)	-7.3%	61%
Telecommunications Services	383,970	6,387,078	11.0%	(145,234)	-2.3%	125%
Rate of Return	757,501	10,375,839	7.3%	21,404	0.2%	29%
Utilities	757,501	10,375,839	7.3%	21,404	0.2%	29%
Electric Utilities	491,156	6,594,941	7.2%	26,935	0.4%	37%
Gas Utilities	67,487	811,498	7.7%	6,608	0.8%	6%
Multi-Utilities	195,616	2,868,966	7.4%	(8,523)	-0.3%	15%
Water Utilities	3,242	100,434	7.1%	(3,617)	-3.6%	7%
Reg Capital Requirement	1,655,568	29,180,808	5.5%	(592,693)	-2.0%	43%
Financials	1,655,568	29,180,808	5.5%	(592,693)	-2.0%	43%
Diversified Banks	435,548	5,558,062	7.2%	102,261	1.8%	7%
Life & Health Insurance	229,560	2,719,602	9.7%	(41,181)	-1.5%	20%
Multi-line Insurance	63,721	2,258,489	8.4%	(160,814)	-7.1%	13%
Property & Casualty Insurance	234,518	2,852,557	7.8%	20,772	0.7%	132%
Regional Banks	177,356	4,267,091	5.1%	(23,776)	-0.6%	12%
Thrifts & Mortgage Finance	514,865	11,525,007	4.4%	(489,955)	-4.3%	23%
Specific Agency	633,496	4,627,371	9.5%	310,702	6.7%	61%
Consumer Discretionary	31,244	651,530	11.7%	(30,474)	-4.7%	31%
Casinos & Gaming	31,244	651,530	11.7%	(30,474)	-4.7%	31%
Consumer Staples	174,594	862,806	8.7%	114,468	13.3%	29%
Brewers	25,566	197,361	7.0%	13,153	6.7%	14%
Distillers & Vintners	6,267	80,434	8.6%	(26)	0.0%	19%
Tobacco	142,762	585,011	10.4%	101,342	17.3%	43%
Health Care	427,659	3,113,035	9.1%	226,708	7.3%	69%
Biotechnology	17,155	715,610	9.4%	(28,993)	-4.1%	81%
Pharmaceuticals	410,503	2,397,425	8.7%	255,702	10.7%	46%
Grand Total	10,692,524	145,567,743	9.1%	(1,810,178)	-1.2%	86%

Figure 3.2: Economic Profitability by Industry and Regulation Type

3.6 Variation of Profitability is Lower for Regulated Companies

The data for this thesis spans ten years, which includes two recessions (March to November of 2001, December 2007 to 2009). Economic profits were generally positive during periods of economic growth and negative around periods of recession.

Regulated industries showed less variability than less regulated industries. The figure below shows the RI Ratio by year, and the standard deviation of the RI ratio across the ten-year period. The unregulated sample had a standard deviation of 3.8%, while the rate-of-return and specific agency samples had a standard deviation of 1.3%. The standard deviation of the regulated financial companies was actually higher than unregulated companies, but this was influenced by the extremely losses in 2008. Without the data from 2008, the financial companies would have had a lower annual variability of economic profits than the unregulated group.

3.7 Sum of Excess Profits vs. Average of Residual Income Observations

There is a large difference between the summation of economic profits of each industry — the sum of the residual income divided by the sum of capital deployed — and the average of our observations. Within each industry, economic profitability is heterogeneous. In many cases, only a small number of firms generate economic profits while the vast majority generate profits lower than their cost of capital.

While this difference is evident in every type of regulation, the difference is most pronounced in companies that we categorize as facing regulation by specific agencies. In this group, most of the companies did *not* cover their cost of capital. A small number of highly profitable companies, however, overwhelmed the many companies with negative returns. Unlike rate-of-return regulation, where approximately neutral economic profits are the norm, this type of regulation is associated with a large number of “losers” and a small number of winners.

	Residual Income	Capital Deployed	Industry RI Ratio	Std Dev of Annual Sum
Normal Regulatory Burden	(1,549,590)	101,383,726	-1.5%	3.8%
2000	(288,856)	7,914,082	-3.6%	
2001	(759,615)	8,307,647	-9.1%	
2002	(632,958)	8,259,226	-7.7%	
2003	66,842	9,072,242	0.7%	
2004	98,522	10,080,952	1.0%	
2005	140,133	10,359,103	1.4%	
2006	146,250	11,341,127	1.3%	
2007	(106,510)	12,491,764	-0.9%	
2008	(266,224)	11,909,723	-2.2%	
2009	52,827	11,647,862	0.5%	
Rate of Return	21,404	10,375,839	0.2%	1.3%
2000	(23,194)	849,616	-2.7%	
2001	4,072	938,952	0.4%	
2002	(14,878)	957,623	-1.6%	
2003	4,091	1,000,094	0.4%	
2004	17,358	1,016,279	1.7%	
2005	3,985	1,030,011	0.4%	
2006	7,118	1,073,468	0.7%	
2007	(28)	1,117,858	0.0%	
2008	5,129	1,175,434	0.4%	
2009	17,751	1,216,504	1.5%	
Reg Capital Requirement	(592,693)	29,180,808	-2.0%	4.7%
2000	(33,202)	2,159,281	-1.5%	
2001	(29,199)	2,429,190	-1.2%	
2002	12,799	2,664,099	0.5%	
2003	38,697	2,979,291	1.3%	
2004	39,439	3,127,855	1.3%	
2005	13,598	3,043,643	0.4%	
2006	9,625	3,300,694	0.3%	
2007	(34,920)	3,449,739	-1.0%	
2008	(401,567)	2,973,908	-13.5%	
2009	(207,964)	3,053,107	-6.8%	
Specific Agency	310,702	4,627,371	6.7%	1.3%
2000	18,369	292,591	6.3%	
2001	25,544	336,619	7.6%	
2002	27,115	360,047	7.5%	
2003	20,528	431,146	4.8%	
2004	31,808	460,747	6.9%	
2005	28,279	499,032	5.7%	
2006	36,996	546,353	6.8%	
2007	28,360	567,704	5.0%	
2008	37,842	526,389	7.2%	
2009	55,860	606,744	9.2%	
Grand Total	(1,810,178)	145,567,743	-1.2%	3.7%

Figure 3.3: Annual Variation of Economic Profitability by Regulation Type

	Residual Income	Industry RI Ratio	StdDev of RIRatio	Avg of Observations
Normal Regulatory Burden	(1,641,199)	-1.5%	92%	-10.2%
Consumer Discretionary	(859,781)	-5.3%	91%	-8.9%
Consumer Staples	300,853	5.5%	31%	-2.3%
Energy	405,458	3.9%	61%	-0.3%
Financials	(666,075)	-1.9%	142%	-2.6%
Health Care	37,668	1.1%	58%	-10.2%
Industrial	68,360	0.5%	61%	-6.5%
Information Technology	(470,913)	-5.3%	118%	-24.8%
Materials	(155,918)	-2.6%	49%	-8.0%
Utilities	(138,646)	-6.9%	59%	-7.4%
Telecommunications Services	(162,206)	-2.3%	117%	-12.5%
Rate of Return	16,388	0.1%	28%	-0.5%
Utilities	16,388	0.1%	28%	-0.5%
Electric Utilities	24,091	0.3%	35%	-1.0%
Gas Utilities	5,851	0.7%	6%	0.7%
Multi-Utilities	(9,624)	-0.3%	14%	-0.4%
Water Utilities	(3,930)	-3.5%	7%	-0.8%
Reg Capital Requirement	(610,110)	-2.0%	41%	-0.5%
Financials	(610,110)	-2.0%	41%	-0.5%
Diversified Banks	110,873	1.9%	7%	-0.4%
Life & Health Insurance	(51,508)	-1.7%	19%	-3.9%
Multi-line Insurance	(163,613)	-6.9%	13%	-1.8%
Property & Casualty Insurance	14,894	0.5%	126%	1.8%
Regional Banks	(18,308)	-0.4%	11%	-0.1%
Thriffs & Mortgage Finance	(502,447)	-4.1%	22%	-1.5%
Specific Agency	335,338	6.9%	67%	-21.1%
Consumer Discretionary	(32,476)	-4.7%	31%	-6.3%
Casinos & Gaming	(32,476)	-4.7%	31%	-6.3%
Consumer Staples	125,464	13.7%	86%	8.6%
Brewers	13,981	6.7%	14%	-1.1%
Distillers & Vintners	56	0.1%	19%	-3.1%
Tobacco	111,427	17.9%	145%	30.1%
Health Care	242,350	7.4%	68%	-30.3%
Biotechnology	(31,687)	-4.3%	79%	-41.4%
Pharmaceuticals	274,037	10.9%	47%	-15.9%
Grand Total	(1,899,583)	-1.2%	84%	-8.9%

Figure 3.4: Sum of Excess Returns vs. Average of Observations by Regulation Type

3.8 Statistical Analysis

The difference between the observations of in the four different regulation types is apparent visually and is perhaps best illustrated by the histogram below. The figure below shows a histogram of the observations for each company and for each of the 10 years. Each regulation type is shown in a separate histogram.

3.8.1 ANOVA Test

The four groups of observations appear quite different in the four histograms. To test whether the difference is statistically significant, we compare the average of the observations of the four regulation types. To test this, we use a ANOVA test where the null hypothesis is that the average RI ratio is the same for all four regulation types.

The ANOVA test generally relies on each of the four samples having a normal distribution. Our samples are generally leptokurtic and left-skewed, but we are relying on the very large number of observations — more than 50,000 — to offset the lack of normality in some of the groups.

The ANOVA test compares the variability *between* the four groups to the variability *within* the groups. The between-group variability is

$$MS_{between} = \sum_i n_i (\bar{Y}_i - \bar{Y})^2 \quad (3.11)$$

where i is the regulation type, \bar{Y}_i is the average of the RI Ratios for a given regulation type, and \bar{Y} is the overall average of the RI ratios.

The within-group variability is

$$MS_{within} = \frac{\sum_{ij} (Y_{ij} - \bar{Y}_i)^2}{(N - K)} \quad (3.12)$$

where N is the total number of observations and K the number of groups.

The F-test statistic is

$$F = \frac{MS_{between}}{MS_{within}} \quad (3.13)$$

and follows an F distribution with 3 degrees of freedom.

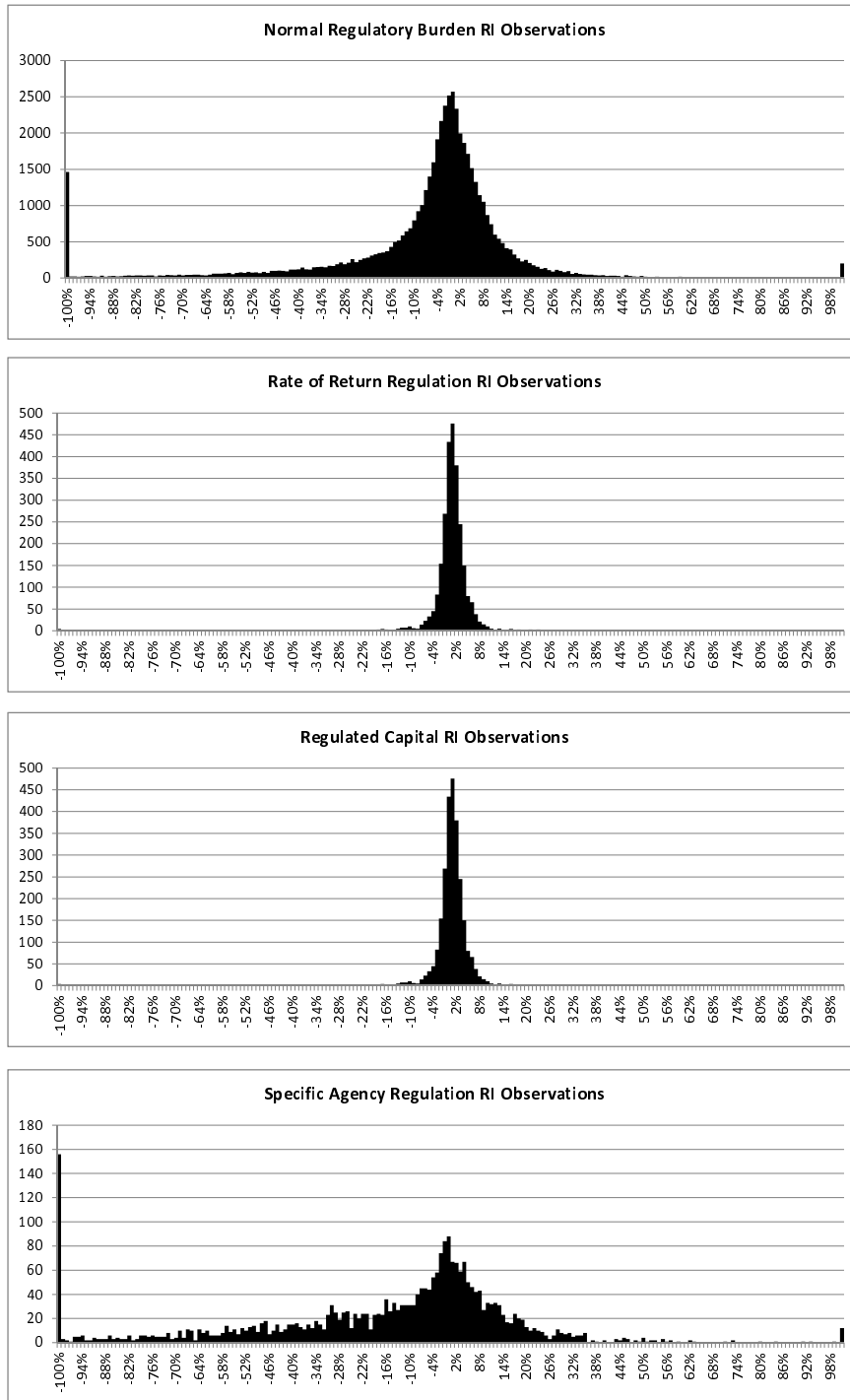


Figure 3.5: Histogram of Economic Profitability by Regulation Type

	<i>Normal Regulatory Burden</i>	<i>Rate of Return</i>	<i>Reg Capital Requirement</i>	<i>Specific Agency</i>
Average RIRatio	-10.3%	-0.5%	-0.5%	-21.1%
Count of RIRatio	52350	2672	9602	2710
Overall Average	-8.1%			
$(\bar{y}-y)^2$	0.0005	0.0057	0.0057	0.0168
$(\bar{y}-y)^2 \times n$	25.2415	15.3465	55.1647	45.5343
sum $[(\bar{y}-y)^2 \times n]$	141.2870			
degrees of freedom	3			
MS_{between}	47.1			
SS_{within}	44272.4	204.0	1625.7	1211.1
degrees of freedom	52349	2671	9601	2709
MS_{within}	0.7027			
F-Statistic	67.02			
Critical Value at 5%	2.605			
P-Value	3.01E-43			

Figure 3.6: Summary of ANOVA Analysis

3.9 Conclusion

Most of empirical studies on the effects of regulation have looked at specific events within one industry. In contrast, this study looks across 150 industries. These industries were categorized by the extent and type of regulation they face. The data show regulated industries generate returns in excess of their cost of capital, while relatively less regulated companies do not. The data also shows that regulated companies tend to have less variability in their economic profits through the business cycle.

The evidence reveals a fascinating paradox: while most managers loathe regulation, the profitability of regulated industries is higher than unregulated industries.

In the case of regulated utilities, the evidence shows that these companies generated profits approximately equal to their cost of capital, unlike unregulated companies which in aggregate do not. The regulated financial companies actually had returns that were, in aggregate, slightly lower than less regulated companies, but two sub-industries — multi-line insurance companies and thrifts and mortgage finance companies — were the only regulated financial sub-industries where this was true. Regulated financial companies were also more profitable than less regulated industries if the 2008–2009 period of financial turmoil is not included in the database. Finally, the companies facing specific product regulation had the highest returns in excess of their cost of capital. Participation in these sub-industries did not guarantee excess returns — in fact, returns were more heterogeneous than in less regulated industries — but in aggregate were greatly higher than less regulated industries and the two other categories of regulated industries. The study further finds that difference between the observation in the four categories is statistically significant, with a p-value in ANOVA testing of approximately zero.

Appendix A

Economic Profitability by Subindustry

	Operating Profit After Tax	Capital Deployed	Capital Charge	Residual Income	Industry RI Ratio	Std Dev of RIRatio
Normal Regulatory Burden	7,645,958	101,383,726	9.9%	(1,549,590)	-1.5%	95%
Consumer Discretionary	605,172	14,993,547	11.1%	(823,640)	-5.5%	95%
Advertising	2,568	219,815	11.7%	(16,400)	-7.5%	77%
Apparel Retail	39,718	300,808	10.7%	11,082	3.7%	55%
Apparel, Accessories & Luxury Goods	28,018	263,902	11.5%	(92)	0.0%	41%
Auto Parts & Equipment	28,232	619,174	11.5%	(38,317)	-6.2%	196%
Automobile Manufacturers	79,504	2,196,416	15.9%	(157,454)	-7.2%	363%
Automotive Retail	18,154	198,096	11.7%	(3,044)	-1.5%	51%
Broadcasting & Cable TV	6,034	3,369,004	13.0%	(331,780)	-9.8%	100%
Catalog Retail	(13)	111,045	14.0%	(9,664)	-8.7%	78%
Computer & Electronics Retail	14,871	120,245	8.4%	4,333	3.6%	19%
Consumer Electronics	618	21,426	10.2%	(1,434)	-6.7%	63%
Department Stores	35,981	634,509	10.0%	(24,650)	-3.9%	48%
Distributors	8,073	83,573	11.1%	496	0.6%	47%
Education Services	9,219	57,158	9.5%	5,332	9.3%	36%
Footwear	15,348	96,937	8.5%	7,428	7.7%	22%
General Merchandise Stores	34,093	316,240	8.2%	10,240	3.2%	18%
Home Furnishings	6,375	139,597	11.6%	(7,899)	-5.7%	93%
Home Improvement Retail	63,613	406,047	9.8%	30,103	7.4%	41%
Homebuilding	25,024	517,556	10.4%	(25,967)	-5.0%	28%
Homefurnishing Retail	6,922	55,406	10.9%	1,798	3.2%	43%
Hotels, Resorts & Cruise Lines	22,773	373,969	10.4%	(12,143)	-3.2%	31%
Household Appliances	11,796	99,997	11.0%	2,305	2.3%	47%
Housewares & Specialties	9,356	173,355	10.3%	(5,413)	-3.1%	42%
Internet Retail	(2,158)	97,310	8.6%	(10,610)	-10.9%	74%
Leisure Facilities	3,400	107,244	11.1%	(6,937)	-6.5%	18%
Leisure Products	8,958	130,287	9.7%	(3,000)	-2.3%	34%
Motorcycle Manufacturers	6,760	35,924	10.2%	3,344	9.3%	14%
Movies & Entertainment	(33,341)	2,146,104	10.2%	(211,576)	-9.9%	88%
Photographic Products	2,858	45,603	10.4%	(1,697)	-3.7%	19%
Publishing	60,138	886,387	10.9%	(16,025)	-1.8%	59%
Restaurants	68,608	543,199	11.7%	25,561	4.7%	32%
Specialized Consumer Services	11,932	160,233	8.9%	(1,783)	-1.1%	26%
Specialty Stores	17,411	368,564	11.8%	(22,515)	-6.1%	49%
Textiles	898	26,467	15.8%	(1,974)	-7.5%	420%
Tires & Rubber	(6,568)	71,953	12.1%	(15,290)	-21.2%	44%
Consumer Staples	651,577	5,148,210	9.4%	287,231	5.6%	32%
Agricultural Products	20,031	213,155	8.8%	2,731	1.3%	24%
Drug Retail	44,768	381,044	9.0%	16,543	4.3%	39%
Food Distributors	11,604	82,656	8.9%	5,433	6.6%	16%
Food Retail	62,671	831,366	8.6%	1,972	0.2%	28%
Household Products	126,610	766,802	7.8%	77,343	10.1%	20%
Hypermarkets & Super Centers	108,819	767,914	7.3%	59,116	7.7%	8%
Packaged Foods & Meats	139,317	1,312,443	8.8%	45,019	3.4%	33%
Personal Products	24,382	136,449	13.2%	9,965	7.3%	39%
Soft Drinks	113,374	656,381	8.3%	69,109	10.5%	27%

Figure A.1: Economic Profitability by Industry and Regulation Type, All Subindustries

	Operating Profit After Tax	Capital Deployed	Capital Charge	Residual Income	Industry RI Ratio	Std Dev of RIRatio
Energy	1,205,433	9,853,777	9.6%	410,944	4.2%	52%
Coal & Consumable Fuels	17,544	197,749	11.0%	(244)	-0.1%	77%
Integrated Oil & Gas	636,870	3,517,621	8.3%	368,121	10.5%	10%
Oil & Gas Drilling	18,660	217,196	9.6%	(1,163)	-0.5%	29%
Oil & Gas Equipment & Services	61,622	649,905	10.2%	2,601	0.4%	24%
Oil & Gas Exploration & Production	273,719	2,816,819	9.6%	37,729	1.3%	58%
Oil & Gas Refining & Marketing	40,752	399,168	9.6%	5,769	1.4%	64%
Oil & Gas Storage & Transportation	156,266	2,055,319	8.5%	(1,869)	-0.1%	58%
Financials	2,862,272	33,876,322	9.8%	(632,535)	-1.9%	149%
Asset Management & Custody						
Banks	94,827	1,212,737	9.9%	(640)	-0.1%	47%
Consumer Finance	587,845	9,065,058	10.2%	(98,529)	-1.1%	147%
Diversified Capital Markets	19	952	12.6%	(103)	-10.8%	36%
Diversified REIT's	30,447	357,199	7.7%	3,549	1.0%	7%
Industrial REIT's	15,710	228,500	8.3%	(3,161)	-1.4%	11%
Insurance Brokers	22,492	202,359	7.9%	8,737	4.3%	26%
Investment Banking & Brokerage	898,904	6,678,209	15.4%	(384,935)	-5.8%	435%
Mortgage REIT's	46,610	813,675	12.4%	(24,485)	-3.0%	38%
Multi-Sector Holdings	9,846	108,447	8.4%	(18)	0.0%	28%
Office REIT's	55,873	763,814	8.1%	(5,716)	-0.7%	22%
Other Diversified Financial Services	790,925	10,416,830	12.8%	(128,800)	-1.2%	20%
Real Estate Investment Trusts -- Discontinued effective 04/28/2006	3,147	55,422	10.4%	(1,360)	-2.5%	36%
Real Estate Management & Development	42,203	621,308	8.3%	(4,013)	-0.6%	39%
Real Estate Management & Development -- Discontinued effective 04/28/2006	754	12,001	9.8%	(345)	-2.9%	16%
Reinsurance	8,798	82,630	8.4%	2,184	2.6%	8%
Residential REIT's	74,817	582,548	7.2%	33,415	5.7%	34%
Retail REIT's	67,214	912,503	8.1%	(4,394)	-0.5%	5%
Specialized Finance	58,849	984,983	9.3%	(13,674)	-1.4%	78%
Specialized REIT's	52,991	777,148	8.6%	(10,247)	-1.3%	25%
Health Care	294,909	3,299,844	8.8%	40,009	1.2%	60%
Health Care Distributors	24,517	257,254	9.2%	7,952	3.1%	51%
Health Care Equipment	78,701	809,138	8.1%	22,798	2.8%	38%
Health Care Facilities	33,222	549,743	10.6%	(21,893)	-4.0%	45%
Health Care Services	41,071	458,132	9.4%	7,154	1.6%	100%
Health Care Supplies	5,631	103,959	8.4%	(2,161)	-2.1%	31%
Health Care Technology	3,508	42,156	8.5%	330	0.8%	79%

	Operating Profit After Tax	Capital Deployed	Capital Charge	Residual Income	Industry RI Ratio	Std Dev of RIRatio
Life Sciences Tools & Services	20,185	352,188	8.5%	(5,377)	-1.5%	48%
Managed Health Care	88,073	727,274	8.5%	31,207	4.3%	25%
Industrial	1,049,300	11,862,614	10.1%	64,916	0.5%	62%
Aerospace & Defense	166,593	1,572,716	10.0%	44,657	2.8%	42%
Air Freight & Logistics	61,566	412,946	10.8%	21,841	5.3%	115%
Airlines	34,614	813,816	10.4%	(50,741)	-6.2%	34%
Airport Services	(150)	10,268	19.6%	(1,238)	-12.1%	103%
Building Products	25,015	283,477	10.9%	(2,336)	-0.8%	35%
Commercial Printing	5,574	155,042	11.6%	(9,512)	-6.1%	102%
Construction & Engineering	15,157	211,729	10.7%	(4,315)	-2.0%	52%
Construction & Farm Machinery & Heavy Trucks	75,502	716,527	10.5%	12,211	1.7%	31%
Diversified Commercial & Professional Services	(664)	10,776	10.5%	(1,699)	-15.8%	44%
Electrical Components & Equipment	37,291	374,127	9.9%	4,618	1.2%	131%
Environmental & Facilities Services	23,741	389,479	9.4%	(4,867)	-1.2%	60%
Heavy Electrical Equipment	(489)	5,837	10.5%	(1,062)	-18.2%	43%
Highways & Railtracks	73	2,126	6.2%	(56)	-2.6%	11%
Human Resource & Employment Services	(903)	4,529	11.1%	(1,355)	-29.9%	163%
Industrial Conglomerates	327,999	3,364,800	9.2%	69,221	2.1%	18%
Industrial Machinery	70,861	757,952	10.2%	7,248	1.0%	20%
Marine	3,404	40,634	8.0%	188	0.5%	42%
Marine Ports & Services	1,429	17,337	7.5%	130	0.7%	34%
Office Services & Supplies	47,888	836,256	9.5%	(18,291)	-2.2%	55%
Railroads	100,913	1,098,164	8.0%	17,384	1.6%	12%
Trading Companies & Distributors	28,239	294,213	10.6%	2,532	0.9%	23%
Trucking	25,647	489,863	9.6%	(19,641)	-4.0%	18%
Information Technology	193,011	8,425,093	8.9%	(467,221)	-5.5%	123%
Application Software	(5,553)	404,518	8.7%	(37,234)	-9.2%	114%
Communications Equipment	(234,632)	1,402,300	8.9%	(354,006)	-25.2%	101%
Computer Hardware	83,163	710,486	8.9%	31,295	4.4%	55%
Computer Storage & Peripherals	15,500	293,639	7.9%	(7,090)	-2.4%	42%
Data Processing & Outsourced Services	82,079	841,740	8.8%	20,457	2.4%	39%
Electronic Equipment Manufacturers	26,196	413,740	9.0%	(7,223)	-1.7%	184%
Electronic Manufacturing Services	(8,707)	225,790	9.4%	(29,362)	-13.0%	33%
Home Entertainment Software	(268)	70,766	9.8%	(5,443)	-7.7%	55%
Internet Software & Services	(64,889)	674,091	9.6%	(117,414)	-17.4%	188%
IT Consulting & Other Services	102,303	595,117	9.3%	62,278	10.5%	183%
Office Electronics	14,497	171,048	9.8%	(255)	-0.1%	35%

	Operating Profit After Tax	Capital Deployed	Capital Charge	Residual Income	Industry RI Ratio	Std Dev of RIRatio
Semiconductor Equipment	10,038	295,897	9.0%	(15,546)	-5.3%	41%
Semiconductors	42,527	1,236,616	8.7%	(58,917)	-4.8%	45%
Systems Software	129,027	905,866	8.4%	65,345	7.2%	92%
Technology Distributors	1,730	183,480	9.0%	(14,107)	-7.7%	31%
Materials	360,888	5,656,071	10.4%	(147,507)	-2.6%	49%
Aluminum	17,328	331,793	13.0%	(15,919)	-4.8%	126%
Commodity Chemicals	20,041	293,698	11.1%	(7,829)	-2.7%	30%
Construction Materials	9,731	120,934	10.8%	(1,684)	-1.4%	37%
Diversified Chemicals	76,300	699,200	10.7%	13,468	1.9%	16%
Diversified Metals & Mining	42,187	492,823	11.2%	(6,124)	-1.2%	45%
Fertilizers & Agricultural Chemicals	91	248,027	9.3%	(20,955)	-8.4%	95%
Forest Products	43,973	471,090	9.7%	3,326	0.7%	23%
Gold	12,464	604,044	8.4%	(30,056)	-5.0%	39%
Industrial Gases	17,872	154,668	7.7%	6,657	4.3%	11%
Metal & Glass Containers	6,858	269,704	11.1%	(19,574)	-7.3%	18%
Paper Packaging	17,565	278,200	10.0%	(7,619)	-2.7%	29%
Paper Products	27,429	721,275	11.0%	(41,184)	-5.7%	12%
Precious Metals & Minerals	1,221	46,999	10.5%	(3,091)	-6.6%	111%
Specialty Chemicals	27,119	510,002	9.6%	(17,318)	-3.4%	50%
Steel	40,707	413,614	11.9%	396	0.1%	55%
Utilities	39,426	1,881,170	9.4%	(136,552)	-7.3%	61%
Independent Power Producers & Energy Traders	39,426	1,881,170	9.4%	(136,552)	-7.3%	61%
Telecommunications Services	383,970	6,387,078	11.0%	(145,234)	-2.3%	125%
Alternative Carriers	(22,784)	197,529	12.0%	(45,195)	-22.9%	82%
Integrated Telecommunication Services	333,042	4,245,094	10.1%	(7,648)	-0.2%	122%
Wireless Telecommunication Services	73,712	1,944,455	11.9%	(92,391)	-4.8%	147%
Rate of Return	757,501	10,375,839	7.3%	21,404	0.2%	29%
Utilities	757,501	10,375,839	7.3%	21,404	0.2%	29%
Electric Utilities	491,156	6,594,941	7.2%	26,935	0.4%	37%
Gas Utilities	67,487	811,498	7.7%	6,608	0.8%	6%
Multi-Utilities	195,616	2,868,966	7.4%	(8,523)	-0.3%	15%
Water Utilities	3,242	100,434	7.1%	(3,617)	-3.6%	7%
Reg Capital Requirement	1,655,568	29,180,808	5.5%	(592,693)	-2.0%	43%
Financials	1,655,568	29,180,808	5.5%	(592,693)	-2.0%	43%
Diversified Banks	435,548	5,558,062	7.2%	102,261	1.8%	7%
Life & Health Insurance	229,560	2,719,602	9.7%	(41,181)	-1.5%	20%
Multi-line Insurance	63,721	2,258,489	8.4%	(160,814)	-7.1%	13%
Property & Casualty Insurance	234,518	2,852,557	7.8%	20,772	0.7%	132%
Regional Banks	177,356	4,267,091	5.1%	(23,776)	-0.6%	12%
Thriffs & Mortgage Finance	514,865	11,525,007	4.4%	(489,955)	-4.3%	23%

	Operating Profit After Tax	Capital Deployed	Capital Charge	Residual Income	Industry RI Ratio	Std Dev of RIRatio
Specific Agency	633,496	4,627,371	9.5%	310,702	6.7%	61%
Consumer Discretionary	31,244	651,530	11.7%	(30,474)	-4.7%	31%
Casinos & Gaming	31,244	651,530	11.7%	(30,474)	-4.7%	31%
Consumer Staples	174,594	862,806	8.7%	114,468	13.3%	29%
Brewers	25,566	197,361	7.0%	13,153	6.7%	14%
Distillers & Vintners	6,267	80,434	8.6%	(26)	0.0%	19%
Tobacco	142,762	585,011	10.4%	101,342	17.3%	43%
Health Care	427,659	3,113,035	9.1%	226,708	7.3%	69%
Biotechnology	17,155	715,610	9.4%	(28,993)	-4.1%	81%
Pharmaceuticals	410,503	2,397,425	8.7%	255,702	10.7%	46%
Grand Total	10,692,524	145,567,743	9.1%	(1,810,178)	-1.2%	86%

Bibliography

- [1] Franklin Allen and Richard Herring. Banking regulation versus securities market regulation. Center for Financial Institutions Working Papers 01–29, Wharton School Center for Financial Institutions, University of Pennsylvania, July 2001.
- [2] Paul R. Allen and William J. Wilhelm. The impact of the 1980 depository institutions deregulation and Monetary Control Act on market value and risk: Evidence from the capital markets. *Journal of Money, Credit and Banking*, 20(3):364–380, 1988.
- [3] John J. Binder. Measuring the effects of regulation with stock price data. *The RAND Journal of Economics*, 16(2):167–183, 1985.
- [4] Sandra E. Black and Philip E. Strahan. The division of spoils: Rent-sharing and discrimination in a regulated industry. *The American Economic Review*, 91(4):814–831, 2001.
- [5] Stephen Breyer. *Regulation and Its Reform*. Harvard University Press, 1982.
- [6] Samuel D. Chilcote. Briefing of Gerald Long, Chairman, Executive Committee, The Tobacco Institute, January 20-21, 1988, comments, Samuel D. Chilcote, Jr., 1988.
- [7] Franklin R. Edwards. Managerial objectives in regulated industries: Expense-preference behavior in banking. *The Journal of Political Economy*, 85(1):147–162, 1977.
- [8] Donald R. Fraser and Srinivasan Kannan. Deregulation and risk: Evidence from earnings forecasts and stock prices. *Financial Management*, 19(4):68–76, 1990.
- [9] Jonathan Gruber. Tobacco at the crossroads: The past and future of smoking regulation in the united states. *The Journal of Economic Perspectives*, 15(2):193–212, 2001.
- [10] Gabriel Hawawini, Venkat Subramanian, and Paul Verdin. Is performance driven by industry-or firm-specific factors? A new look at the evidence. *Strategic Management Journal*, 24(1):1–16, 2002.
- [11] Anthony Heyes. Implementing environmental regulation: Enforcement and compliance. *Journal of Regulatory Economics*, 17(2):107–29, 2000.

- [12] W.P. Hogan, I.G. Sharpe, and P.A. Volker. Risk and regulation: An empirical test of the relationship. *Economics Letters*, 6(4):373–397, 1980.
- [13] Thomas D. Hopkins. Costs of regulation: Filling the gaps. *Regulatory Information Service Center*, 1992.
- [14] Adam B. Jaffe, Steven R. Peterson, Paul R. Portney, and Robert N. Stavins. Environmental regulation and the competitiveness of U.S. manufacturing: What does the evidence tell us? *Journal of Economic Literature*, 33(1):132–163, 1995.
- [15] Timothy Stoltzfus Jost and Mark A. Hall. The role of state legislation in consumer-driven health care. *American Journal of Law and Medicine*, 31:395–418, 2005.
- [16] Stefanie Lenway, Kathleen Rehbein, and Laura Starks. The impact of protectionism on firm wealth: The experience of the steel industry. *Southern Economic Journal*, 56(4):1079–1093, 1990.
- [17] Thomas K. McCraw. Regulation in America: A review article. *The Business History Review*, 49(2):159–183, 1975.
- [18] Richard McGowan. *Government Regulation of the Alcohol Industry: the search for revenue and the common good*. Quorum Books, 1997.
- [19] Mark L. Mitchell and J. Harold Mulherin. Finessing the political system: The cigarette advertising ban. *Southern Economic Journal*, 54(4):855–862, 1988.
- [20] Eli M. Noam. Deregulation and market concentration : An analysis of post-1996 consolidations. *Federal Communications Law Journal*, 58:539–560, 1996.
- [21] Sam Peltzman. Toward a more general theory of regulation. *Journal of Law and Economics*, 19(211), 1976.
- [22] Sam Peltzman, Michael E. Levine, and Roger G. Noll. The economic theory of regulation after a decade of deregulation. *Brookings Papers on Economic Activity. Microeconomics*, 1989:1–59, 1989.
- [23] Michael E. Porter and Claas van der Linde. Toward a new conception of the environment-competitiveness relationship. *The Journal of Economic Perspectives*, 9(4):97–118, 1995.
- [24] Nancy L. Rose. Labor rent sharing and regulation: Evidence from the trucking industry. *The Journal of Political Economy*, 95(6):1146–1178, 1987.
- [25] Raymond D. Sauer. The political economy of gambling regulation. *Managerial and Decision Economics*, 22(1–3):5–15, 2001.
- [26] Craig Saverse. *Economic Value Added: the practitioner’s guide to a measurement and management framework*. Busines and Professional Publishing Pty Ltd., 2000.

- [27] George J. Stigler. The theory of economic regulation. *The Bell Journal of Economics and Management Science*, 2(1):3–21, 1971.
- [28] John A. Vernon. Examining the link between price regulation and pharmaceutical R&D investment. *Health Economics*, 14(1):1–16, 2005.
- [29] Murray Weidenbaum. Federal regulatory policy, 1980-2000. *Society*, 38(1):86–89, 2000.
- [30] Clifford Winston. Economic deregulation: Days of reckoning for microeconomists. *Journal of Economic Literature*, 31(3):1263–1289, 1993.