Market Protection, Deregulation, and the Question of Industry Losses

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I. INTRODUCTION

Government regulation of industry has continuously been a subject of concern to economists and policymakers. As one important instance of economic regulation, Interstate Commerce Commission (ICC) regulation of motor carriers has received particular scrutiny from some economists.[1] Critics of motor carrier regulation often contend that regulatory rate and entry controls restrain competition, raise the price of transportation services, redistribute income from consumers to carriers, misallocate traffic amongst transportation modes, and allow firms to achieve monop-

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oly gains. Indeed, part of the inefficiency of regulation is commonly measured by the aggregate value of interstate motor carrier operating rights.[2] Although discussed more fully in the next section of this paper, operating rights are basically government permits which allow motor carriers to operate in specified transportation markets with limited competition.[3] To most economists, the value of these operating authorities represents the capitalized value of excess profits made possible by protected markets and excessive rate levels.[4]

Because of continuing doubts over the efficiency of regulation, the U.S. Congress enacted the Motor Carrier Act of 1980 (MCA) which significantly increases competition in the motor carrier field.[5] Thus, in implementing this legislation, the ICC has relaxed both rate and entry controls and has allowed a proliferation of less restrictive versions of operating authorities.[6] However, an important question for deregulation as well as any future regulatory reform proposals is whether the removal of regulatory protection means that motor carriers have suffered a net economic loss from deregulation. Although carriers have lost protection from open competition and the resale and collateral values of their interstate operating rights,[7] they have also gained new opportunities to achieve efficiency in operations, to adjust freight rates to market forces, to reduce costly service competition, and to expand markets.[8] Furthermore, while an artificial barrier to entry has been removed, it is not clear whether all barriers of economic substance have been eliminated. Because reform legislation

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2. Frew, *The Existence of Monopoly Profits in the Motor Carrier Industry*, 24 J. LAW & ECON. 289 (1981); Breen, *The Monopoly Value of Household-Goods Carrier Operating Certificates*, 20 J. LAW & ECON. 153 (1977).

3. Operating rights are also referred to as operating authorities or "certificates of public convenience and necessity." This paper will use these terms interchangeably. Similar regulatory permits in other industries would include taxicab medallions, stock exchange memberships, tobacco acreage allotments, broadcasting rights, liquor store licenses, and zoning permits. *See* Breen, *supra* note 2, at 158 and INTERSTATE COMMERCE COMMISSION, THE VALUE OF MOTOR CARRIER OPERATING RIGHTS 179-86 (Washington, D.C.: Office of Policy and Analysis, October 1979).

4. Frew, *supra* note 2, at 290; *G. Wilson, Economic Analysis of Intercity Freight Transportation* 213 (1980); Denis A. Breen, *supra* note 2, at 163; and Kafoglis, *A Pardox of Regulated Trucking: Valuable Operating Rights in a 'Competitive' Industry*, 1 REG. 27, 32 (1977).

5. Motor Carrier Act of 1980, Pub. L. No. 92-296, 94 Stat. 793 (1980) (Codified as amended at 49 U.S.C. §§ 10101-11901).

6. INTERSTATE COMMERCE COMMISSION, THE EFFECT OF REGULATORY REFORM ON THE TRUCKING INDUSTRY: STRUCTURE CONDUCT, AND PERFORMANCE 93 (Washington, D.C.: Office of Policy and Analysis, June 1981).

7. *Supra* note 6, at 94; INTERSTATE COMMERCE COMMISSION, MOTOR CARRIER CERTIFICATE SALES 1-7 (Washington, D.C.: Office of Policy and Analysis, internal report, October 1981).

8. Motor Carrier Act of 1980, Pub. L. No. 96-296, 94 Stat. 793 (Codified as amended at 49 U.S.C. §§ 10101-11901); Interstate Commerce Commission, Ex Parte No. MC-142 (Sub-No. 1), *Removal of Restrictions from Authorities of Motor Carriers of Property* 49 C.F.R. 1137, Final Rule December 24, 1980.

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such as the MCA of 1980 is a package of economic trade-offs, it is possible that its advantages could offset its disadvantages so that little or no industry-wide economic losses would result.[9] In the present paper, this issue will be examined within the context of the efficient-markets/rational-expectations framework.

The next section of this paper will briefly discuss the economic nature of interstate motor carrier operating rights. Also discussed are issues relevant to deregulation and barriers to entry. Section II will then outline the empirical market based methodology employed in this study to ascertain the real economic consequences of deregulation for the motor carrier industry. Section III will present the findings of the research, while Section IV will set forth conclusions for deregulation as well as implications for future regulatory reform proposals.

A. MOTOR CARRIER OPERATING RIGHTS

Operating rights are permits which allow motor carriers to haul specified commodities with limited competition over designated routes or within prescribed geographical areas.[10] In the past, these operating authorities or "certificates of public convenience and necessity" were acquired either directly from the ICC, from another carrier, or through mergers. Carriers which were in substantial operation at the time of motor carrier deregulation in 1935 almost automatically received their "grandfather" operating rights. However, since that time, new carriers or carriers wishing to expand their operations had to prove that existing carriers would not be hurt, that existing carriers could not provide the service, and that there was a compelling public need.[11]

Because of the difficulty in obtaining new or expanded operating authority from the ICC, a large resale market has existed for these certificates. For example, at the time of bankruptcy of Associated Freight Lines, their operating rights were separately sold for 20 million dollars.[12] Operating rights were regularly advertised in such trade publications as *Transport Topics* and certain persons specialized in the matching of both buyers and sellers of these certificates.

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9. *See, e.g.*, Wilson, *supra* note 4, at 244, 258; William T. Coleman, Jr., U.S. Secretary of Transportation, A Discussion of the Relationship Between Entry Liberalization and the Value of Operating Certificates 1-2 (U.S. Department of Transportation, January 19, 1977); J. C. NELSON, REGULATION AND COMPETITION IN TRANSPORTATION) 382 (1983); and J. W. SNOW, *The Problem of Motor Carrier Regulation and the Ford Administration's Proposal for Reform*, in REGULATION OF ENTRY AND PRICING IN TRUCK TRANSPORTATION 41 (P. MacAvoy and J. Snow, eds. 1977).

10. Harper, *The Federal Motor Carrier Act of 1980: Review and Analysis*, 20 TRANSP. J. 11 (1980).

11. Pan American Bus Lines Operation, 1 M.C.C. 190, 203 (1936); and J.H. Rose Truck Line, Inc., 110 M.C.C. 180, 184-85 (1969).

12. Wilson, *supra* note 4, at 213.

B. DEREGULATION AND OPERATING RIGHTS

The Motor Carrier Act of 1980 was a legislative attempt to promote competition amongst motor carriers and to remove barriers to efficient operations as a means of providing better quality and more flexible service to shippers at a lower cost.[13] While it is expected that this legislation will eventually benefit shippers, consumers, and the economy; unresolved are issues concerning the effects of deregulation on the motor carrier industry as a whole or certain segments within the industry.[14] Thus, in relaxing entry controls, the ICC has allowed a proliferation of less restrictive versions of operating rights. For example, prior to the MCA (in 1979) there were 17,000 regulated carriers in the nation while after deregulation (as of 1983) there are now 28,000 certificated carriers.[15] More importantly, for both new and existing operating authorities, the MCA mandates that certificate restrictions be eliminated or reduced as to backhaul restrictions, number of shippers to be served, intermediate points to be served, types of commodities to be handled, geographical scope, gateways to be observed, highways to be traveled, intermodal transfers, and interlining.[16] Finally, the Act gives carriers greater freedom in setting rates, yet the MCA also weakens rate bureaus and strengthens the rights of independent carrier rate actions. In total, the MCA appears to provide both advantages and disadvantages for carriers.

C. OPERATING RIGHTS LOSSES

As a result of motor carrier deregulation, the Financial Accounting Standards Board (FASB), which promulgates accounting standards for industry in general, has required that all motor carriers write off the intangible asset values of their interstate operating rights as extraordinary losses.[17] The FASB had taken the position that since operating authorities no longer protected carriers from competition, their resale and collateral values were open to question, and hence, they should no longer be reported as intangible assets. Consequently, the FASB saw the need for a new accounting standard (Statement of Financial Accounting Standards No. 44 (FAS 44)) which required that the entire unamortized cost of all

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13. Motor Carrier Act of 1980, *supra* note 8.

14. Harper, *supra* note 10, at 31; and Morash, *supra* note 1, at 555.

15. 1980, 1984 INTERSTATE COMMERCE COMMISSION ANN. REP.

16. Interstate Commerce Act, 49 U.S.C. § 10922(h) (1980); Interstate Commerce Commission, No. MC. 55 (Sub 43A), Acceptable Form of Requests for Operating Authority, 45 Fed. Reg. 45, 545 and 66, 798 (1980); and Interstate Commerce Commission, No. MC-142 (Sub 1), Removal of Restrictions from Authorities of Motor Carriers of Property, 49 C.F.R. 1138 and 1311 (Final Rule, December 24, 1980).

17. FINANCIAL ACCOUNTING STANDARDS BOARD, ACCOUNTING FOR INTANGIBLE ASSETS OF MOTOR CARRIERS, STATEMENT OF FINANCIAL ACCOUNTING STANDARDS NO. 44 par. 15 (Stamford, Conn.: December 1980).

carrier operating rights be written off against income and if material to be reported as extraordinary losses—effective for fiscal years ending after December 15, 1980.[18]

The reported accounting losses from these certificate write-offs were quite substantial. For the motor carrier industry as a whole, the intangible asset write-offs amounted to almost 800 million dollars.[19] For publicly traded carriers, the average loss per share amounted to $2.45, which represented 157 percent of the average 1979 earnings per share and resulted in a negative average reported earnings figure for these firms in 1980.[20]

D. THE QUESTION OF ECONOMIC LOSSES

Although these reported accounting losses were substantial, they may not represent substantive economic losses to motor carriers if the benefits of deregulation will outweigh any costs from increased competition. Because the MCA of 1980 is a package of economic trade-offs, it is possible that the advantages of the Act could offset the disadvantages, and hence, the reported accounting losses may not mirror true economic losses. Thus, while motor carriers have lost protection from competition on the one hand, they have also gained new opportunities such as fewer territorial and commodity restrictions, easier route expansion, and more control over freight rates.[21] Specifically, carriers are now free to ship a wider variety of goods along the most direct route from origin to destination, to solicit back-haul traffic, to serve intermediate points along a particular route, to provide through service without interlining, and to eliminate unprofitable traffic. In terms of pricing policy, carriers can now more quickly adjust freight rates to meet inflation, to utilize excess capacity, or to attract new customers without competitor protests or rate bureau interference. Finally, they can also reduce cost-inflating service competition and tailor price-service offerings to regain traffic currently moving by pri-

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18. *Id.* at par. 6. The FASB adopted the view that a major deregulation such as the MCA can only happen once and is unusual enough to justify treatment of any associated material losses as extraordinary items under Accounting Principles Board Opinion No. 30 (APB 30). According to APB 30, before a material gain or loss can be classified as an extraordinary item, the causal event must be of unusual nature and not reasonably be expected to recur in the foreseeable future, taking into account the environment in which the reporting entity operates.

19. INTERSTATE COMMERCE COMMISSION, *supra* note 6, at 93. For Class I intercity motor carriers alone, the accounting losses from certificate write-offs amount to approximately 520 million dollars. 1982 ICC Ann. Rep. 3. At the time of enactment of the MCA, tax relief was not provided for. Eventually, partial relief was granted by the *Economic Recovery Tax Act of 1981*, Pub. L. No. 97-34, 95 Stat. 172, 266.

20. Summary data regarding industry earnings, extraordinary losses, and share price levels is presented in Table 1 in the Results section of this article.

21. *See, e.g.,* INTERSTATE COMMERCE COMMISSION, *supra* note 6; and Harper, *supra* note 10.

vate, exempt, and rail carriers.[22] However, whether these potential bene-
fits will outweigh the loss in carrier market protection and industry stability
is not clear at the present time.

Although the MCA has removed a legal or artificial barrier to competi-
tion, it is also unclear whether all barriers, including those of economic
substance, have now been removed in order to institute truly unlimited
competition. Over many years, certain carriers have established nation-
wide networks of integrated break-bulk and satellite terminals (which also
impacts on service quality such as delivery time) (e.g., large LTL carri-
ers)[23] while others have achieved recognized reputations and experience
in specific transportation markets. Similarly, many operating authorities
were purchased just prior to the MCA at prices not reflective of a value-
shattering deregulation. Such authorities were acquired in order to estab-
lish market positions in anticipation of regulatory reform.[24] In essence,
established carriers and those carriers who purchased authorities prior to
the MCA received the opportunity to gain a "head start" in penetrating
lucrative markets. Thus, efficient carriers that are well managed and have
been entrenched in their markets prior to deregulation are unlikely to at-
tract a barrage of competition after deregulation. However, carriers that
provide inefficient service should feel considerable pressure from new
competition.

A second potential barrier relates to firm capital costs. For example,
while lending institutions do not make loans in anticipation of forcing carri-
ers to liquidate their operating authorities, the collateral value of these
assets did provide a safety net for loans granted to marginal carriers.[25]
Without this protection, banks must now shift emphasis from the resale
value of the rights to what the rights represent in terms of cash flows gen-
erated by well-managed market positions. Consequently, the new regula-
tory climate will increase the pressure on financial institutions to channel

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22. Nelson, *supra* note 9, at 382.

23. The largest of these carriers have over 500 terminals. For a discussion of similar issues
related to barriers to entry, *see* DeVany and Saving, *Product Quality, Uncertainty, and Regula-
tion: The Trucking Industry*, 67 AM. ECON. R. 583 (1977); J. RAKOWSKI, *The Nature of Competi-
tion in Common Carrier Trucking*, in BOUNDARIES BETWEEN COMPETITION AND ECONOMIC
REGULATION 180-183 (J. Rhoads Foster et al. eds. 1983); Frew, *supra* note 2, at 302; and J.
SNOW AND S. SOBOTKA, *Certificate Values*, in REGULATION OF ENTRY AND PRICING IN TRUCK
TRANSPORTATION 155 (P. MacAvoy and J. Snow eds. 1977).

24. INTERSTATE COMMERCE COMMISSION, *supra* note 3, at 120-21.

25. Morash, Bruning, and McQuin, *Motor Carrier Capital Costs and Deregulation: A Tenta-
tive Assessment*, 22 TRANSP. RESEARCH FORUM 229 (1981). The attitude of lending institutions
toward deregulation was well stated in letters from the First National Bank of Boston and Citibank
which were entered in Exhibit B before a March 31, 1981 Congressional hearing. *See, Tax
Aspects of the President's Economic Program* H.1427-29: *Hearings Before the House Commit-
tee on Ways and Means*, 96th Cong., 2nd Sess. 97-11 (1981). *See also* INTERSTATE COMMERCE
COMMISSION, *Motor Carrier Certificate Sales*, *supra* note 7, at 2.

capital to those carriers who have the capacity to employ the funds in the most efficient manner. These firms are likely to be those carriers who have the ability to take advantage of the new opportunities fostered by deregulation. New carriers are likely to feel the credit squeeze as these firms have depended heavily on operating rights as primary and secondary collateral for loans.[26] Thus, while a more liberal policy for granting operating certificates may ease an artificial barrier to entry, the loss in collateral value of these certificates may toughen an economic barrier—the need to obtain financing.[27] Essentially, new entrants are likely to experience some difficulty in obtaining credit at reasonable rates since banks will give priority to established carriers with a proven performance record.

Motor carriers have lost the resale and collateral value of their interstate operating rights. However, because the MCA is a package of economic trade-offs, it is possible that its advantages (e.g., less restrictions and new expansion opportunities) could offset its disadvantages (e.g., loss of protection from unlimited competition) so that the reported accounting losses may not mirror true economic losses. In the next two sections, the positive analysis of this issue is empirically examined within the framework of a market based study.

II. METHODOLOGY

The primary research question addressed in this study is whether the removal of regulatory protections means that motor carriers have suffered a net economic loss from deregulation. Although motor carriers have been required to write off the intangible asset values of their interstate operating rights,[28] such write-offs may not be losses in an economic sense if any decline in these values is offset by the economic benefits of regulatory reform. Although some respondents to deregulation believe that time will be required to fully evaluate the economic impact of the MCA, the stock market has been shown to be an efficient processor of information.[29] According to the "efficient-market/rational-expectations hypothesis," share prices instantaneously impound all publicly available

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26. INTERSTATE COMMERCE COMMISSION, *supra* note 3, at 150-1; *See also* Borts, *Motor Carrier Deregulation*, in BOUNDARIES BETWEEN COMPETITION AND ECONOMIC REGULATION 174 (J. Rhoads Foster et al. eds. 1983).

27. Morash, et al. *supra* note 25.

28. INTERSTATE COMMERCE COMMISSION, ACCOUNTING FOR INTANGIBLE ASSETS (Washington, D.C.: Bureau of Accounts, Accounting Series Circular No. 188, 1980); and *Financial Accounting Standards Board*, *supra* note 17.

29. Fama, *Efficient Capital Markets: A Review of Theory and Empirical Work*, 25 J. FIN. 383, 388-416 (1970).

relevant information.[30]

Share prices are theoretically the discounted future cash flows that investors anticipate will enhance the wealth of shareholders.[31] Consequently, if deregulation and the associated intangible asset devaluations as measured by the extraordinary losses reported for 1980 in compliance with FAS 44 have impaired the ability of motor carriers to generate future cash flows, then these firms have suffered substantive economic losses which should be impounded in their share prices. Such affected share prices should be more associated with the 1980 per share earnings after extraordinary items which have recognized such losses, than with the 1980 per share earnings before extraordinary items.[32] On the other hand, if the write-offs do not reflect substantive economic losses, then the share prices of motor carrier stocks should be more associated with the 1980 per share earnings before extraordinary items as these figures recognized no loss in the value of intangible assets. In short, market efficiency implies that investors will act upon any relevant information and ignore all irrelevant data.

Because earnings and share prices have been shown to exhibit similar structures within industries,[33] the first step was to construct a model descriptive of the manner in which the securities market capitalizes the earnings of motor carriers. The parameters for this cross-sectional model were empirically derived using ordinary least squares regression. The independent variable was 1979 Earnings Per Share (EPS) and the dependent variable was the average monthly share price computed over the twelve month period surrounding December 31, 1979.[34] The year 1979 was selected because it was the last full year prior to the MCA, and for

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30. Schwert, *Using Financial Data to Measure Effects of Regulation*, 24 J. L. & ECON. 121 (1981).

31. Schwert, *supra* note 30, at 122.

32. Eskew and Wright, *An Empirical Analysis of Differential Capital Market Reactions to Extraordinary Accounting Items*, 31 J. FIN. 651 (1976); Niederhoffer and Regan, *Earnings Changes, Analysts' Forecasts and Stock Prices* 28 FIN. ANALYSTS J. 65 (1972); Malkiel, *Equity Yields, Growth and the Structure of Share Prices*, 53 AM. ECON. R. 1,004-1,031 (1963); and Basu, *The Effect of Earnings Yield on Assessments of the Association Between Annual Accounting Income Numbers and Security Prices*, 53 ACCT. R. 599 (1978).

33. *See, e.g.*, King, *Market and Industry Factors in Stock Price Behavior*, 39 J BUS. 139 (1966); Ball and Brown, *Some Preliminary Findings on the Association Between the Earnings of a Firm, its Industry, and the Economy*, 5 J. ACCT. RESEARCH 55 (supp. 1967); Nicholson, *Price Ratios in Relation to Investment Results*, 24 FIN. ANALYSTS J. 105 (1968); and Holmes, *Anticipated Growth as the Prime Measure of Potential Risk, Hence Potential Reward*, 32 FIN. ANALYSTS J. 46 (1976).

34. Earnings and share price data were respectively obtained from SEC 10-K reports and the daily stock price record publications of *Standard and Poors*. The 38 publicly held motor carriers, which are the primary focus of this research, are exhaustive of all publicly traded SEC-registered motor carriers (SEC Industry Class #421) that are directly affected by certificate writeoffs. These firms range in size from annual revenues of 22 million dollars to over a billion

1979 motor carrier earnings before were virtually the same as after extraordinary items. Thus, there was only one year-end earnings number for the market to capitalize. Next, the validity of this earnings-capitalization model was tested by employing data from another year (1978). The use of 1978 data also controlled for the unlikely possibility that the capital markets had anticipated the economic effects of the MCA of 1980 as early as 1978.

To answer the primary research question, the third step in the analysis tested the residuals estimated from the industry earnings capitalization model, in order to ascertain the post-deregulation relationship between motor carrier share price levels and annual earnings numbers. The basic premise underlying the residual method, as used in this research, is that if motor carrier stock prices are cross-sectionally correlated, their variance can be segmented into two components: that explained by earnings and that explained by other factors. The objective of this analysis was therefore to determine which earnings number, 1980 earnings before (E_{1B}) or after (E_{1A}) extraordinary items, had the greater role in explaining carrier share price behavior (see Table 1 for subscript notation).

The final phase of the research provided two independent consistency checks for the findings of the present study. The first approach compared the performance of motor carrier share prices to the New York Stock Exchange Composite Indicator over the two year period surrounding deregulation. The second approach compared goodwill ratios for a new matched sample of 36 pre- and post-deregulation merged firms. The basic premise of this latter approach was that if motor carriers have received a benefit from deregulation, then the purchased goodwill of acquiring firms involved in mergers after deregulation will be greater than before deregulation. This latter test also has the added advantage of being able to compare non-publicly held firms, since the method does not depend on share price data.

III. RESULTS

A. EARNINGS-CAPITALIZATION MODEL

The first step in the analysis was to generate the earnings-capitalization model (hereafter the EC model) utilizing data from the first full year prior to motor carrier deregulation (1979). Table 1 presents the summary statistics for the earnings and price variables in the trucking industry from 1978 through 1980. The 1979 data were used to estimate the parameters for the EC model as expressed in equation (1).

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dollars and account for almost 40 percent of industry revenues. A sample of smaller non-publicly held firms was also used in a methodology subsequently described.

TABLE 1

Summary Statistics for Motor Carrier Share Price and Earnings Data (1978 - 1980)

	Median	Mean	Standard Deviation
Earnings Per Share (EPS) Levels[a]			
1978 (E_{-1})	$ 1.62	$ 1.75	1.42
1979 (E_0)	1.63	1.56	1.86
1980 (E_{1B})[b]	1.56	1.58	2.24
1980 (E_{1A})[c]	−1.05	−0.88	3.32
Extraordinary Loss Per Share (1980)	2.45	2.45	1.83
Aggregate Share Price Levels[a]			
1978 (P_{-1})	10.55	12.09	7.85
1979 (P_0)	8.96	11.15	7.58
1980 (P_1)	10.54	13.27	10.32

[a] Key to subscript notation:
0 = Year of Earnings-Capitalization (EC) Model.
1 = 1 year after EC Model (or first year of deregulation).
−1 = 1 year before EC Model
[b] Before extraordinary items
[c] After extraordinary items

$$\hat{P}_0 = 6.55 + 2.94E_0; \quad R^2 = .52, \text{ d.f.} = 36, \text{ F} = 39.4^* \tag{1}$$
where:
$\hat{P}_0$ = estimated mean share price level for 1979.
E_0 = 1979 EPS
$^*p \leq .001$
Equation (2) is the expression for the residual term associated with the 1979 EC model.
$$U_0 = P_0 - 6.55 - 2.94E_0 \tag{2}$$
where:
U_0 = a residual or a $N(o,\sigma)$ disturbance term associated with the 1979 model.

For each firm, the residual term measures the unexpected portion of the ex post share price level conditional upon the ex post earnings level. Alternately, the magnitude of the residual term measures that portion of a firm's share price that is not attributable to earnings, and thus may be viewed as an "unexpected" or an "abnormal segment" of that firm's price level. Since the expected value of a residual term is zero,[35] a

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35. *See,* R. PFAFFENBERGER AND J. PATTERSON, STATISTICAL METHODS: FOR BUSINESS AND ECONOMICS 413 (1977).

residual greater (less) than zero suggests that based upon the EC model the market has "overpriced" ("underpriced") a firm's earnings relative to other firms in the industry. Similarly, a residual (or residual vector) with a nonzero value(s) implies that there is irrelevant information contained in the earnings number(s) that is not being impounded in the security price(s); i.e., the information is perceived by the market to be of little economic impact.

B. VALIDITY OF EARNINGS-CAPITALIZATION MODEL

The second step in the research was to test the validity of the 1979 EC model as being representative of the cross-sectional relationship between earnings and share price levels in the motor carrier industry. In order for such a test to have credibility, the EC model should be tested using a data set other than that used to construct the model. Thus, the 1979 EC model was tested using 1978 data. Furthermore, the use of 1978 data controlled for the possibility that the securities market had anticipated and impounded the economic losses attributable to the MCA prior to the end of 1979.

The test was conducted by estimating a residual vector $\hat{U}_{-1}$ by applying the parameters of the 1979 EC model to the 1978 EPS (E_{-1} and share price (P_{-1}) numbers (for a key to the subscript notation, see footnote a of Table 1). According to Student's paried t-test, the $\hat{U}_{-1}$ and U_0 residuals did not differ significantly (t=0.67; Table 2). Clearly, the $\hat{U}_{-1}$ vector mean

TABLE 2

Residuals Estimated from the 1979 Earnings Capitalization Model

| | | | | | Paired t- values[a] | | |
| | | | Standard | | | | |
Residuals	Median	Mean	Deviation		$\hat{U}_{1A}$	$\hat{U}_{1B}$	U_0
$\hat{U}_{-1}$	− .95	.39	5.24	$\hat{U}_{-1}$	7.45*	2.46	0.67
U_0	− .54	.00	5.24	U_0	8.88*	2.81	
$\hat{U}_{1B}$	.29	2.08	6.63	$\hat{U}_{1B}$	8.27*		
$\hat{U}_{1A}$	7.88	9.30	7.90	$\hat{U}_{1A}$			

[a] Test of H_0 that the intersecting row and column residuals do not differ.
*p $\leq$ .001
$\hat{U}_{-1}$ = residual vector estimated using 1978 price and earnings data and the parameters of the 1979 EC model.
U_0 = residual vector for the 1979 EC model.
$\hat{U}_{1B}$ = residual vector estimated using 1980 price and earnings before extraordinary items and the parameters of the 1979 EC model.
$\hat{U}_{1A}$ = residual vector estimated using 1980 price and earnings after extraordinary items and the parameters of the 1979 EC model.

of .39 is very close to zero (see Table 2). The results of this analysis therefore suggest that the 1979 EC model is descriptive of the motor carrier industry's earnings-price structure, and that the securities market did not anticipate the effects of motor carrier deregulation as early as 1978.

C. DEREGULATION AND ABNORMAL PRICE LEVELS

To answer the primary research question, the third step in the analysis was to apply the parameters of the EC model to the 1980 earnings numbers before and after extraordinary items. The purpose of this analysis was to generate the residual vectors ($\hat{U}_{1B}$ and $\hat{U}_{1A}$) associated respectively with the 1980 earnings figure before extraordinary losses (E_{1B}) and the earnings figure after extraordinary losses (E_{1A}). Since these residual vectors represent the "abnormal" price levels associated with the respective EPS figures, the vector means are measures of the extent to which the stock market disregarded the two earnings numbers.

Table 2 shows that the mean value for vector $\hat{U}_{1B}$ is 2.08 while the mean for vector $\hat{U}_{1A}$ is 9.30. According to the paired t-test, the $\hat{U}_{1A}$ vector is significantly greater than the $\hat{U}_{1B}$ vector ($t=8.27$; $p \leq .001$; Table 2). In short, the securities market has on the average "overpriced E_{1B} by $2.08 per share and E_{1A} by $9.30 per share. Since market efficiency precludes the over or under-pricing of securities and since $\hat{U}_{1A}$ is significantly greater than $\hat{U}_{1B}$, one may conclude that the market capitalized E_{1B} to a significantly greater degree than it capitalized E_{1A}. Stated alternately, the E_{1A} number is characterized by more irrelevant information. Finally, it is important to note that both residual vector means are positive which indicates that rather than the presence of substantive economic losses, deregulation may be of net-positive economic benefit to publicly-held motor carriers in the long run.

In summary, the results of this analysis suggest that the reported extraordinary losses mandated by FAS 44 were not perceived by the market as substantive economic losses that would be expected to impair future cash flows for the motor carrier industry as a whole. The substantially "over-priced" E_{1A} numbers are evidence that the market did not adjust share prices downward to reflect such losses. Furthermore, the market did not adjust prices prior to the end of 1979 as the $\hat{U}_{-1}$ and U_0 vectors did not differ significantly from each other. Had such an adjustment occurred during 1979 (1978), the E_{-1} figures would have appeared as "overpriced" ("underpriced"). Essentially, these results indicate that the market ignored the reported accounting losses associated with deregulation and did not anticipate a long-run economic loss for publicly held motor carriers.

D. DEREGULATION AND SECURITY PRICE PERFORMANCE

As an additional test of the research question related to economic losses, the security price performance of the 38 motor carriers were compared over time with the performance of an overall stock market indicator. As the stock market is an efficient processor of information, one would expect motor carrier stocks to perform poorly relative to the market indicator if the FAS 44 certificate write-offs signaled substantive economic losses.[36]

The performance of motor carrier stocks was compared to the performance of the stock market as measured by the New York Stock Exchange Composite Indicator (NYSE) for the two-year period encompassing deregulation (see Table 3). According to Table 3 the gen-

TABLE 3

A Comparison of the Movements of Motor Carrier Stocks and the New York Stock Exchange Composite Index (NYSE)

	Directional Movement		Advances		Declines	
	Same	Opposite	NYSE	38 carriers[b]	NYSE	38 carriers
Before Deregulation	9[a]	2	4	6	7	5
After Deregulation	9	2	9	9	2	2
x^2 (sig.)	0.00 (NS)		0.26 (NS)		0.19 (NS)	

[a] During the period encompassing the MCA from the end of May 1979 to the end of June 1981 there were 22 four-month "moving" periods, 11 occuring before deregulation and 11 occuring after deregulation. The figures in each cell refer to the number of such periods that had exhibited the growth characteristics as indicated in the given column headings. Geometric means were used to compute the monthly growth rates for each moving four-month period.

[b] A composite portfolio consisting of the 38 motor carrier common stocks that were publicly traded during the deregulation period.

eral performance of the trucking stocks in aggregate did not differ significantly from that of the NYSE regarding (1) directional movements of the respective four-months moving indicators, (2) the number of advances in the four-month moving indicators, and (3) the number of declines in the four-month moving indicators both before and after deregulation.

In summary, the data in Table 3 also suggests that motor carrier certificate write-offs have had no substantive economic impact on the motor carrier industry as a whole. During the deregulation period, the movement of carrier stock prices in the aggregate did not differ substantially

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36. Schwert, *supra* note 30, at 121.

from the movement in the general stock market indicator. In fact, the motor carriers led the market in advances. Basically, these results also indicate that deregulation has not impaired the ability of motor carriers to generate future cash flows.

E. DEREGULATION AND MERGER GOODWILL RATIOS

As a final check on the findings of this study, a new matched sample of pre- and post-deregulation merged firms were statistically compared. The basic premise of this approach was that if motor carriers have received a benefit from deregulation, then these benefits would become capitalized into purchased goodwill on the books of merged firms after deregulation. Consequently, goodwill ratios (purchased goodwill ÷ total assets) would appear inflated for those acquiring firms involved in mergers after deregulation when compared to goodwill ratios for those acquiring firms involved in mergers prior to deregulation. This latter approach also has the added advantage of being able to study non-publicly held firms since the method does not require share price data.

The sample consisted of 18 acquiring firms involved in mergers after the date of the FAS 44 certificate write-offs (December 15, 1980), and 18 acquiring firms involved in mergers prior to deregulation. The two sub-samples were obtained from the ICC's listing of merged firms and were selected so as to match paired firms as closely as possible by total assets and other financial characteristics. To minimize other exogenous factors and to better reflect current market values, an attempt was also made to select merged firms as close to the preceding cut-off date as possible.

The pre-deregulation goodwill ratios were calculated using 1979 data from the 1980 edition of Trinc's *Bluebook of the Trucking Industry* while the post-deregulation ratios were calculated using 1981 data from the 1982 edition of the same source. For comparability, the pre-deregulation goodwill ratios required the substraction of the FAS 44 certificate write-offs from both the numerator (goodwill) and the denominator (total assets) of each firm, since pre-regulation intangible assets consisted of both operating rights and goodwill. The post-deregulation ratios, of course, already reflected the write-off of operating rights as intangible assets.[37]

According to the Wilcoxon Matched-Pairs Test, the goodwill ratio for the post-deregulation acquiring firms is significantly greater than that for the pre-deregulation acquiring firms ($Z = 1.78$, one-tailed $p \leq .05$). This relationship is also true for goodwill numbers ($Z = 2.44$ $p \leq .05$). In es-

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37. Prior to deregulation, motor carrier intangible assets consisted of operating rights and goodwill. After deregulation, the latter remained as the only intangible asset item.

sence, these results also indicate that the MCA is of benefit to motor carriers.

IV. CONCLUSIONS

A common argument against deregulation of an industry is that existing firms will suffer, that the industry will become unstable, and that "chaos" and destructive competition will prevail. Despite the loss in protection from open competition, the results of the present study indicate that interstate motor carriers have not suffered a substantive economic loss from deregulation. Thus, the earnings number which reported motor carrier operating rights as worthless was virtually ignored by the capital market, the performance of motor carrier share prices has paralleled that of the market indicator during the periods surrounding deregulation, and for merged firms after deregulation, the benefits of regulatory reform have been capitalized into "purchased goodwill." The explanation for these findings is that the long-run economic benefits of deregulation will outweigh any costs associated with the loss in protection from competition and the devaluation of motor carrier operating rights. In the case of motor carriers, these long-run benefits would include improved capacity utilization, relief from cost-inflating operating restrictions, an elimination of wasteful service competition, reduced common carrier responsibilities, future opportunities for market expansion, and pricing flexibility. In fact, since the securities market has on average "priced" 1980 earnings per share above 1979 and 1978 EPS figures (see Table 2), the MCA of 1980 may be of net-positive economic benefit to motor carriers in the long-run once the transitional shake-out period has ended and the industry has settled into equilibrium.

Although a major purpose of deregulation was to remove artificial barriers to entry, it is also unlikely that all barriers of economic substance have been removed to institute truly unlimited competition. First, transportation markets are characterized by differentiated and specialized services which means that transportation output is largely heterogeneous. Secondly, many carriers have received the benefit of a "headstart" afforded by past regulatory protection. Third, it has been previously noted that it will be very difficult for potential new entrants to duplicate the extensive terminal networks, communication systems, and national exposure of some already established firms (e.g., large LTL carriers where economies of scale in the production of quality may also exist.). Similarly, while in a deregulated environment, efficient firms will gain over inefficient firms, carriers with greater economic power, established reputations, knowledge of transportation markets, marketing synergies, and economies of utilization may be especially suited to take advantage of the new market and route expansion opportunities afforded by the MCA. Finally, as out-

lined in the introductory section of this paper, capital costs and capital cost levels will remain significant barriers for some potential new entrants. In total, the new competitive environment is likely to impose at least a "zero-sum" game on the industry rather than the "negative-sum" game as suggested by the devaluation of motor carrier operating rights. In turn, for shippers, consumers, and the national economy, the early evidence suggests that deregulation should prove a "positive-sum" game.[38]

The argument that an industry will suffer from deregulation is not supported by the results of this study. Rather, if the MCA is viewed as an experiment in partial deregulation, then the results of this study suggest that additional regulatory reform may be desirable. It would be expected that such a policy would benefit not only shippers, consumers, and the economy; but also incumbent firms in the industry as well.

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38. *See, e.g., U.S. Congress, Senate, Subcommittee on Surface Transportation of the Committee on Commerce, Science, and Transportation: Hearing on Oversight on the Motor Carrier Act of 1980*, 97th Cong., 2nd Sess. 9-16 (1982); *U.S. Congress, House, Subcommittee on Surface Transportation of the Committee on Public Works and Transportation; Hearings Oversight— Motor Carrier Act of 1980*, 97th Cong., 2nd Sess. 1053-1076 (1982); and Moore, *Rail and Truck Reform—The Record So Far*, 7 REG. 33 (1983).