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BANKRUPTCY COSTS: SOME EVIDENCE

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INTRODUCTION AND SUMMARY

ASSUMPTIONS ABOUT THE magnitude of bankruptcy costs will have a considerable bearing on the issue of how much debt it is optimal for the firm to have in its capital structure. For example, in the original Modigliani-Miller model (1958), which abstracted from both corporate taxes and the possibility of bankruptcy, no debt/equity ratio could be regarded as optimal. Given perfect markets and rational investor behavior, they showed that the value of the firm would be invariant to its capital structure. Stiglitz (1969) has shown that the invariance result holds even when there is a positive probability of bankruptcy, but only as long as there are no transactions costs associated with bankruptcy.¹

Relaxing the assumption that bankruptcy is costless and introducing a corporate tax in which interest payments can be deducted from net income reopens the possibility of optimal debt/equity ratios. Kraus and Litzenberger (1973) have developed a formal model dealing with this case, and on a more general level a central theme in textbook discussion of capital structure policy has become the presumed trade-off between tax savings and bankruptcy costs.²

This paper considers some issues surrounding the role of bankruptcy costs in models of capital structure. Evidence on the direct costs of corporate bankruptcy is presented for a number of railroad firms which were in bankruptcy proceedings under Section 77 of the Bankruptcy Act between 1933 and 1955. Elsewhere,³ I have examined the risk and return characteristics of defaulted debt claims of firms in the railroad industry; the railroad firms whose bankruptcy costs are discussed here are a subsample of the firms whose bond returns were the subject of those studies.

The ratio of direct bankruptcy costs to the market value of the firm appears to fall as the value of the firm increases. As measured here, the cost of bankruptcy is on average about one percent of the market value of the firm prior to bankruptcy. That result seems in striking contrast to the figure of 20 percent reported in a study

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1. The work of Arrow (1964), Debreu (1959), and especially Hirshleifer (1965) makes it possible to establish the 'irrelevance' proposition within the context of a 'states of the world' model. For a recent treatment, see Fama and Miller (1972) and Milne (1975).

2. See, for example, Van Horne, (1974), p. 267.

3. Warner (1976, 1977).

by Baxter (1967), although it should be kept in mind that Baxter's data referred to personal bankruptcies and to dollar amounts of individuals' assets which are much smaller than those of the railroad sample. While studies by Stanley and Girth (1971) and Van Horne (1976) also report figures similar to Baxter's, they too deal with entities of much smaller dollar size than the railroad firms. Given the evidence on a "scale" effect, it is important to realize that the findings presented here are by no means inconsistent with previous studies.

In interpreting the results, it must be emphasized that not all bankruptcy costs are measurable, direct costs. Some of the omitted indirect costs may be substantial. Furthermore, it is by no means clear that these findings can be generalized to other industries. The most that can safely be concluded at this point is that the direct costs of bankruptcy, such as legal fees, appear to be lower for large firms than the conventional wisdom suggests.

THE COSTS OF BANKRUPTCY

The costs of bankruptcy discussed in the literature are of two kinds, direct and indirect. Direct costs include lawyers' and accountants' fees, other professional fees, and the value of the managerial time spent in administering the bankruptcy. Indirect costs include lost sales, lost profits, and possibly the inability of the firm to obtain credit or to issue securities except under especially onerous terms.

It is important to distinguish between these two classes of costs. For direct costs of bankruptcy to arise, it is sufficient that there be transactions costs associated with negotiating disputes between claimholders.⁴ But whether indirect costs arise depends upon the market setting. Suppose, for example, that the real operating characteristics of Ford and General Motors are identical, and that the cars they produce are perfect substitutes. If Ford is bankrupt but General Motors is not, the two firms will still face the same production/investment possibilities. If it is optimal (i.e. value maximizing) for General Motors to manufacture a particular product, it will also be optimal for Ford to do so, even if the latter is bankrupt. If it is optimal for General Motors to stay in the industry, it will also be optimal for Ford to do so. Bankruptcy would seem to be irrelevant under these conditions, and the bankrupt and nonbankrupt firm might each operate in the same way, engaging in identical activities to maximize the wealth of their claimholders.

Circumstances can easily be imagined, however, under which the bankrupt firm cannot be treated as if it were "equivalent" but not bankrupt. Baxter (1967) and Jensen and Meckling (1976) point out, for example, that a firm's sales and profits

4. If there are costs associated with drawing up all-inclusive contracts, an optimal financing decision may involve issuing debt contracts which are actually ambiguous with respect to the rights of claimholders. Although additional costs are incurred conditional upon bankruptcy, it may be less costly to hire economic agents to negotiate claims in the bankruptcy than to hire them to design contracts to avoid bankruptcy in the first place.

Gould (1973) discusses the conditions under which it will be optimal for the parties to a dispute to settle out of court. If there is agreement on the probable outcome of the bankruptcy proceeding and if side payments are permitted, then there would be no incentive for individual claimholders or the firm to take a dispute to court. When we do observe such cases in the courts, they are likely to be the result of disagreements as to the likely outcome. The cost of such disagreements is presumably taken into account when the firm makes its financing decision.

may decline, and its market value fall, when potential buyers of the product perceive default to be likely. This might be the case because potential users of the product possess imperfect information and use their perception of the firm's financial condition to evaluate its operating characteristics. If so, the fact of bankruptcy is relevant in the sense that it conveys information about the longevity of the firm, and its ability to provide replacement parts or render other types of ongoing support services for the product it sells.

Of perhaps more direct relevance are the indirect bankruptcy costs arising from the bankruptcy process itself. The bankruptcy trustee, as an agent of the court, has the authority to operate the firm. It is not clear that this agency relationship gives the trustee any incentive to run the firm efficiently and make decisions which are in fact value-maximizing. Unlike management, the trustee is responsible to the court and not directly to the firm's claimholders. He might not necessarily act in the claimholder's interests. To the extent that a trustee makes non-optimal decisions which would not have been made in his absence, the firm incurs an opportunity loss which can properly be regarded as a cost of bankruptcy.

EVIDENCE ON DIRECT BANKRUPTCY COSTS FOR RAILROADS

Because the indirect costs of bankruptcy are mainly "lost opportunities," they are inevitably difficult, if not impossible to measure.⁵ For the direct costs, however, some quantitative information is available, and the major concern in the remainder of this paper is an examination and evaluation of this evidence.

One salient feature of the bankruptcy process is the extensive use of economic agents by each group of claimholders. Claimholders hire such agents in an effort to maximize the value of their respective claims when the court makes its decision on the terms of the reorganization. The agents include lawyers, accountants, various professional consultants, and "expert" witnesses. The bankruptcy trustee and his counsel are compensated by the firm, hence by the claimholders.

The direct costs of a bankruptcy proceeding includes compensation which must be paid to the various parties just mentioned. By law, each party who performs services related to the bankruptcy must apply to and receive approval of the court before he can be paid. In a typical case, application will be made by the trustee, his counsel, and the counsel for each class of claimholder. Cases with as many as 100 or 200 separate parties applying for fees are not unknown. Fees applied for and awarded are a matter of public record.

It would be exceedingly difficult to document these fees on a case-by-case basis by examining District Court records which are scattered throughout the country. Nor are the data on these costs generally collected in a manner which permits examination of the fees for a large number of companies. However, the Interstate

5. Another possible indirect cost of bankruptcy is the higher compensation that the managers of a highly-levered firm will receive because of the higher probability of unemployment they may face. Evidence from the railroad industry does not support the "higher turnover" argument. The study by Warner (1976) reports that in the five-year period following initiation of bankruptcy proceedings, the chief executive officers of the bankrupt firms he examined were replaced with a frequency of 8 percent per year. This compared to a figure of 9 percent per year for the non-bankrupt railroads of his control sample for a similar time period.

Commerce Commission has in the past collected bankruptcy cost data for a limited number of railroad firms.

The data analyzed in this paper are the bankruptcy costs which the ICC reported for 11 bankrupt railroads. The cost data include payments to all parties for legal fees, professional services, trustees' fees, and filing fees. They do not include payments to the managers or employees to reflect the value of the time which they spent in administering the bankruptcy.⁶

Table 1 indicates the firms in the 11 railroad sample, the number of years each was in bankruptcy, and the bankruptcy costs for each firm as reported by the ICC. On average, the bankruptcies took about 13 years to settle. The most lengthy case, that of the Missouri Pacific Railroad, was in the courts from 1933 to 1955. The average direct cost of the bankruptcies was \$1.88 million.

TABLE 1

FIRMS IN THE SAMPLE

Name	Number of Years in bankruptcy	Bankruptcy cost, millions of dollars
Chicago and Northwestern	11	2.14
Chicago, Indianapolis, and Louisville	14	0.82
Chicago, Milwaukee, St. Paul and Pacific	11	2.89
Chicago, Rock Island and Pacific	16	2.00
Denver and Rio Grande Western	13	1.37
Erie Railroad	4	2.22
Minneapolis, St. Paul & St. Ste Marie	7	0.95
Missouri Pacific	23	2.54
New York, New Haven and Hartford	13	2.15
St. Louis San Francisco Railway	15	2.34
Western Pacific Railroad	10	1.24
High	23	2.89
Low	4	0.82
Mean	12.5	1.88
Median	13	2.00

One problem in measuring bankruptcy costs is to relate these costs to the size of the firm. It is not appropriate simply to look at the bankruptcy cost as a fraction of the market value of the firm at the time of bankruptcy. What should be measured is the fraction of the market value of the firm which potential bankruptcy costs represented at the time the firm originally made its financing decision.⁷ This provides the relevant measure of the costs which the firm perceived at the time it

6. Note that Baxter also examined data on the legal costs, but the data in his study were for personal bankruptcy cases. He found that the legal fees in large personal bankruptcy cases totalled about 20 percent of the individuals' assets. While he had no data on corporate bankruptcy costs, Baxter concluded that "for corporate cases the...costs may average a somewhat smaller percentage...but are far from insignificant."

7. Strictly speaking, the future costs should be discounted to reflect their present value. For purposes of this analysis, the discount rate is implicitly assumed to be zero. For a discussion of the problems in dealing with expected bankruptcy costs, see Warner (1974).

decided on the tradeoff to make between bankruptcy costs and the tax advantage to debt. Given that firms may not be able to costlessly or instantaneously adjust their capital structures (due to regulatory constraints, floatation costs, and the like), it is necessary to look at the market value of the firm prior to bankruptcy, and before bankruptcy has become highly likely. Since it is not clear when this happens, it is appropriate to look at the market value of the firm at a number of points before bankruptcy. As long as bankruptcy is likely to be associated with a fall in the total value of the firm, failure to use such a procedure would result in measures of bankruptcy costs which are consistently biased upward when related to firm size.

Define month "0" as the month in which the firm filed a bankruptcy petition. The total market value of each debt and equity issue of each firm has been calculated as of the last day of that month and for several other selected months in the 84 months preceding the bankruptcy filing. Table 2 shows the number of securities whose market values were calculated for each firm. All of the traded securities of each of the railroads were used.

TABLE 2

SECURITIES USED IN COMPUTING MARKET VALUES OF FIRMS IN THE SAMPLE

Name	Total number of issues	Debentures	Common & Preferred
Chicago and Northwestern	14	12	2
Chicago, Indianapolis & Louisville	9	7	2
Chicago, Milwaukee, St. Paul and Pacific	15	13	2
Chicago, Rock Island and Pacific	12	9	3
Denver and Rio Grande Western	5	4	1
Erie Railroad	10	7	3
Minneapolis, St. Paul and St. Ste Marie	8	6	2
Missouri Pacific	15	13	2
New York, New Haven and Hartford	12	10	2
St. Louis San Francisco Railway	11	9	2
Western Pacific	4	2	2

High	15	13	
Low	4	2	
Mean	10.5	8.4	
Median	11	9	

Data on the outstanding amounts of each security were compiled from Moody's *Transportation Manual*. The source for price quotations was the *Bank and Quotation Record*. Transaction or bid prices were used in the calculations. As shown in Table 2, the calculations were made for an average of 8 securities per railroad.

Table 3 uses the computed market values of the firms' debt and equity issues and shows the debt/equity ratio for each firm for various months prior to and including the month of bankruptcy. The debt/equity ratio for, say, month "-12" is the ratio of the total market value of the firms' traded debt to the total value of its traded equity on the last trading day of the 12th month before the month in which a bankruptcy petition was filed. The data indicated that the mean debt/equity ratio for firms in the sample rises sharply, starting at 3.8 in month "-84" and eventually increasing to 24.3 in the month of bankruptcy. This is consistent with

TABLE 3
DEBT/EQUITY RATIOS OF FIRMS IN THE SAMPLE

Name	Month				
	0	-12	-36	-60	-84
Chicago and Northwestern	33.9	8.7	21.2	1.9	1.3
Chicago, Indianapolis, and Louisville	16.9	20.8	2.4	2.0	1.9
Chicago, Milwaukee, St. Paul & Pacific	14.4	27.7	15.0	3.0	2.6
Chicago, Rock Island and Pacific	23.9	20.9	1.7	1.4	2.0
Denver and Rio Grande Western	50.3	29.9	43.8	14.9	9.6
Erie Railroad	4.4	3.9	5.2	5.1	1.9
Minneapolis, St. Paul and St. Ste Marie	51.0	31.5	50.8	47.8	15.3
Missouri Pacific	33.9	11.7	1.3	1.5	1.6
New York, New Haven and Hartford	3.7	3.5	2.4	0.7	0.9
St. Louis San Francisco Railway	31.7	38.8	3.3	4.7	3.9
Western Pacific	3.7	2.8	3.6	3.6	1.0
High	50.3	38.8	50.8	47.8	15.3
Low	3.7	2.8	1.3	0.7	0.9
Mean	24.3	18.2	13.7	7.8	3.8
Median	23.9	20.8	3.6	3.0	2.0

TABLE 4
MARKET VALUES OF FIRMS, MILLIONS OF DOLLARS

Name	Month					% change in value over observation period
	0	-12	-36	-60	-84	
Chicago and Northwestern	80.4	155.4	88.6	377.2	370.6	-78.3
Chicago, Indianapolis and Louisville	12.5	8.7	43.5	50.9	49.7	-74.8
Chicago, Milwaukee, St. Paul & Pacific	75.2	140.5	78.5	357.7	737.5	-89.8
Chicago, Rock Island and Pacific	114.7	103.0	450.0	464.0	350.7	-67.3
Denver and Rio Grande Western	15.4	24.7	26.9	86.0	93.7	-83.6
Erie Railroad	57.2	205.9	171.4	90.3	216.3	-73.5
Minneapolis, St. Paul & SSM.	10.4	32.5	25.9	29.3	91.2	-88.6
Missouri Pacific	76.9	148.1	392.3	293.4	197.6	-61.0
New York, New Haven and Hartford	54.3	97.1	140.8	202.0	309.6	-82.5
St. Louis San Francisco Railway	39.2	23.9	277.4	378.5	264.2	-85.2
Western Pacific	14.	19.1	21.0	54.4	83.2	-83.2
High	114.7	205.9	450.0	378.5	737.5	-89.8
Low	10.4	8.7	21.0	29.3	49.7	-61.0
Mean	50.0	87.1	156.0	216.7	251.3	-78.9

expectations for firms declaring bankruptcy, namely a greater percentage fall in the market value of the firms' equity than of their debt.

Table 4 shows the total market value of each firm, assumed to be represented by the total market value of its traded securities. 84 months prior to bankruptcy, the average firm in the sample has a market value of \$250 million. In the month of bankruptcy, the average firm has a market value of about \$50 million. The value of every firm declines over the observation period. The mean percentage change in the market value of the firm between month "-84" and "0" is -78.9.

Table 5 displays the ICC reported bankruptcy costs as a percentage of the total market value of the firm. Using the market value of the firm in the 84th month prior to bankruptcy, bankruptcy costs are on average 1 percent of the value of the firm. If instead the market value of the firm 36 months prior to bankruptcy is used, bankruptcy costs average 2.5 percent of the total market value of the firm. Of the total *change* in the market value of the firm between months “-84” and “0”, bankruptcy costs represent 1.3 percent.

It should be noted that the percentages given in Table 5 are subject to several possible biases. One problem which has been ignored is that of non-traded securities. Many short-term liabilities are privately placed, and their market value is unknown. Assuming that the value of such securities is positive, exclusion of these securities from the market value computations biases the percentage figures upward. On the other hand, as discussed earlier, certain bankruptcy costs have not been taken into account. The fact that some components of the costs are not included tends to bias the results downward.

TABLE 5

I.C.C. REPORTED BANKRUPTCY COST AS A PERCENTAGE OF MARKET VALUE

Name	Month					Cost as % of change in value
	0	-12	-36	-60	-84	
Chicago and Northwestern	2.7	1.4	2.4	0.6	0.6	0.7
Chicago, Indianapolis & Louisville	6.6	9.4	1.9	1.6	1.6	2.2
Chicago, Milwaukee, St. Paul & Pacific	3.8	2.1	3.7	0.8	0.4	0.4
Chicago, Rock Island and Pacific	1.7	1.9	0.4	0.4	0.6	0.8
Denver and Rio Grande Western	8.9	5.5	5.1	1.6	1.5	1.7
Erie Railroad	3.9	1.1	1.3	2.5	1.0	1.4
Minneapolis, St. Paul & SSM.	9.1	2.9	3.7	3.2	1.0	1.2
Missouri Pacific	3.3	1.7	0.6	0.8	1.3	2.1
New York, New Haven and Hartford	3.9	2.2	1.5	1.1	0.6	0.8
St. Louis San Francisco Railway	6.0	9.8	0.8	0.6	0.9	1.0
Western Pacific	8.8	6.5	5.9	2.3	1.5	1.8
High	9.1	9.8	5.9	3.2	1.6	2.1
Low	1.7	1.1	0.4	0.4	0.6	0.4
Mean	5.3	4.0	2.5	1.4	1.0	1.3

BANKRUPTCY COSTS IN RELATION TO THE MARKET VALUE OF THE FIRM

Figure 1 is a plot of the ICC reported cost of bankruptcy, and the corresponding month “0” value of each firm. Bankruptcy costs tended to be higher, in absolute terms, for the high market-value railroads than for the low market-value railroads. For example, the two railroads in the sample with the smallest market values, the Minneapolis, St. Paul and Sault Ste Marie and the Chicago, Indianapolis and Louisville, each had market values of about \$10 million and bankruptcy costs of under \$1 million. The two largest railroads, the Chicago and Northwestern and the Chicago, Rock Island and Pacific, each had market values of about \$100 million, and bankruptcy costs of about \$2 million.

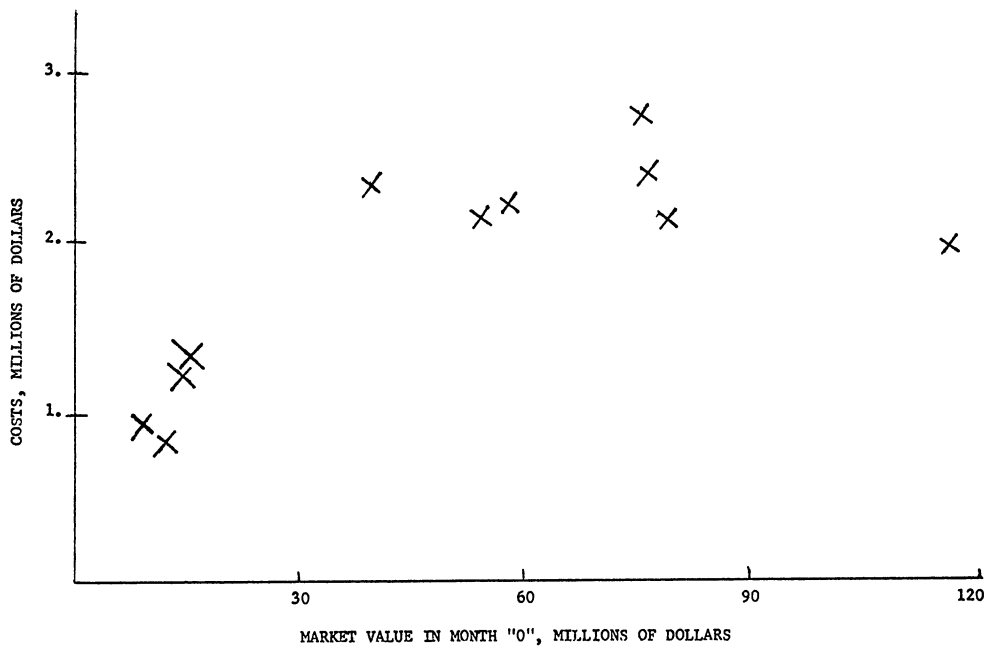


FIGURE 1. Bankruptcy costs and market value of firms

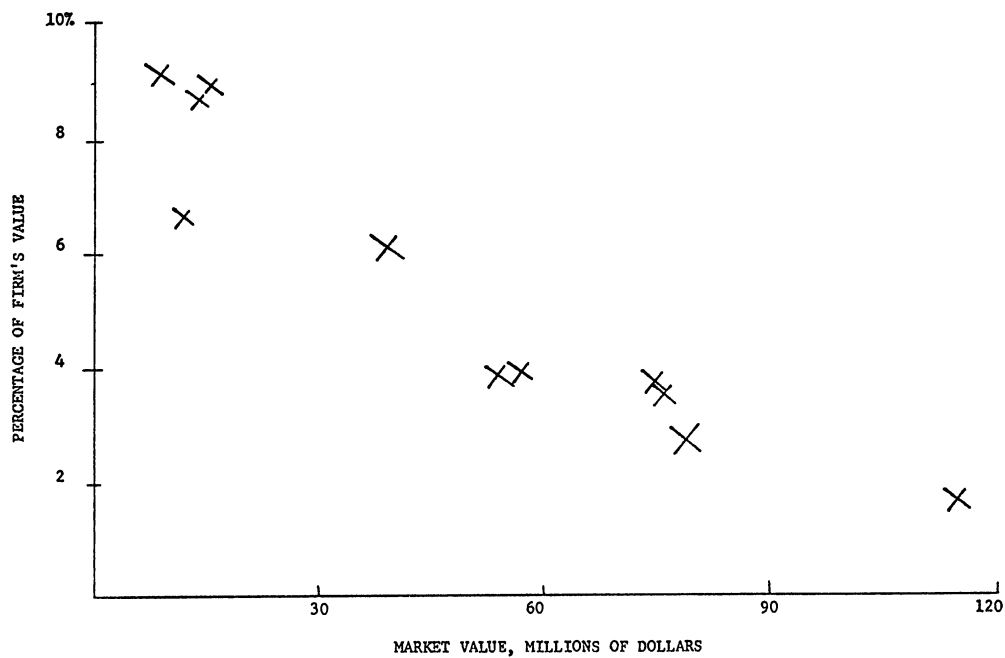


FIGURE 2. Percentage bankruptcy costs and market value of firms

While the higher market-value railroads generally did incur higher bankruptcy costs, the costs do not appear to be directly proportional to market value. Figure 2 shows the cost of bankruptcy, expressed as a percentage of the month "0" value, for each of the 11 firms. The percentage appears to decline for railroads with relatively high market values. The two smallest railroads, in terms of market values, had bankruptcy costs which were 9.1 and 6.6 percent of their values, while the two largest railroads had bankruptcy costs which represented 2.7 and 1.7 percent of their respective values.⁸

This evidence suggests that there are substantial fixed costs associated with the railroad bankruptcy process, and hence economies of scale with respect to bankruptcy costs. Moreover, when the relationship between the value of the firm and the length of time spent in bankruptcy proceedings was investigated, it was found that the two were uncorrelated. Thus it does not appear that high-market value firms incurred bankruptcy costs simply because they tended to be in bankruptcy proceedings for a longer period of time than low market value firms.

THE EXPECTED COSTS OF BANKRUPTCY

From the standpoint of a firm choosing its capital structure, it is the *expected* cost of bankruptcy that is the relevant measure of bankruptcy costs. These expected costs of bankruptcy cannot be inferred directly from the data presented, since the *ex ante* probability of going bankrupt is not known. However, what these results would imply about expected bankruptcy costs can be shown under different assumptions about the likelihood of bankruptcy.

Suppose, for example, that a given railroad picks a level of debt such that bankruptcy would occur on average once every 20 years (i.e. the probability of going bankrupt is 5 percent in any given year). Assume that when bankruptcy occurs, the firm would pay a lump sum penalty equal to 3 percent of its now current market value. If anything, these numbers tend to overstate the frequency and apparent direct cost of bankruptcy.

Given this background, the firm's expected cost of bankruptcy is equal to fifteen one-hundredths of one percent of its now current market value. If the cost of bankruptcy is doubled to 6 percent and the probability of bankruptcy increased to 10 percent, the expected costs would still be only six-tenths of one percent of the current value of the firm.

These numbers are small indeed. This is not to say that they are small enough to be neglected completely in discussions of capital structure policy. But it would not seem unreasonable to conclude that for firms of the size under consideration, the expected direct costs of bankruptcy are unambiguously lower than the tax savings on debt to be expected at present tax rates in standard valuation models.⁹

8. The squared value of the correlation coefficient between percentage bankruptcy costs and market value is .88. At the .01 level of significance, the hypothesis that the two are uncorrelated must be rejected.

9. See Miller and Modigliani (1963). The analysis here assumes that the relative price of going bankrupt has not changed since the sample bankruptcies took place. This assumption may not be realistic if the price of legal services has increased in relative terms, or if the complexity of the legal system and of the bankruptcy process has increased. The analysis here also ignores the question of

APPLICABILITY TO OTHER INDUSTRIES

The extent to which the results are applicable to firms other than those in the railroad industry is uncertain, since the magnitude of the costs and of the "scale effect" may be industry-specific. One reason that the figures could differ for nonrailroad firms is that the Interstate Commerce Commission plays an active role only in railroad bankruptcies. Some of the railroads' bankruptcy costs may in effect be subsidized. The subsidy exists to the extent that the ICC performs functions which in its absence would have been performed by the railroads or their claimholders. The resources expended by the ICC are not reflected in the cost figures.

From one standpoint, this is unimportant. As long as the bankruptcy costs which the firm itself must bear are known, the fact that the government absorbs certain other costs does not influence the firm's financing decision. The only bankruptcy cost which the firm perceives is the cost which is incident upon the firm and its claimholders. However, if these data are to be used to infer that bankruptcy costs in other industries are similar, and exhibit a similar scale effect, additional assumptions must be made. It must be assumed that the size of the subsidy relative to total bankruptcy costs does not differ across industries, and that total bankruptcy costs are the same for railroad and nonrailroad firms, assuming equivalent size.

There is no obvious factual basis for making such assumptions. While non-railroad firms receive no subsidy from the ICC, they do receive a similar type of subsidy from the Securities and Exchange Commission. It is not clear whether this subsidy differs from the one which the ICC offers, or whether railroad bankruptcies are any more (or less) expensive than bankruptcies for similar-sized non-railroad firms. Moreover, the differences between railroads and other firms may well be even more important in the case of indirect costs. Restrictions on entry by competitors, owing to ICC regulation, could serve to keep opportunity losses lower for bankrupt railroads than might otherwise be the case. For these reasons, the findings must be regarded as merely suggestive of bankruptcy costs in other industries.

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whether or not *at the margin* (and not just on average) the direct bankruptcy costs offset the tax advantage.

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