Volume Title: Federal Tax Policy and Charitable Giving

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Volume Publisher: University of Chicago Press

Volume ISBN: 0-226-11048-6

Volume URL: http://www.nber.org/books/clot85-1

Publication Date: 1985

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Chapter URL: http://www.nber.org/chapters/c6776

Chapter pages in book: (p. 171 - 221)

5 Corporate Contributions

In 1980 corporations in the United States contributed an estimated $2.3 billion to charitable organizations, or about 0.8 percent of their pretax net income.[1] Although this amount appears small in relation to aggregate individual giving, considerable importance has been attached to corporate contributions. Because of corporations' visibility in political and economic activities, corporate gifts are viewed as a barometer of business sentiment and, to some extent, as a model for individual giving. President Reagan focused particular attention on corporate giving in 1981 when he called on corporations to lead private philanthropy in making up for reductions in federal expenditures for social programs.[2]

Despite the present importance of corporate giving, the propriety of such corporate behavior has been debated vigorously over the past several decades. As president, Franklin Roosevelt opposed the practice on the grounds that corporations should not be able to "purchase" goodwill and that charitable contributions were properly the domain of shareholders ("Corporation Gifts to Charities" 1935, p. 540). Similarly, current critics have argued that philanthropy and other manifestations of "social responsibility" that sacrifice profits constitute improper behavior by corporations.[3] In spite of these arguments, however, the view that corporations

1. U.S. Internal Revenue Service, *Statistics of Income, 1980—Corporation Income Tax Returns* 1983, p. 36, table 3. This figure is based on corporations with positive net income only. As noted in the text, the percentage limitation on the deductibility of corporate contributions makes this restriction necessary.

2. For a discussion of the pressure brought by this call, see Butler 1981, p. 12.

3. See, for example, Friedman 1962, chap. 8; Lindley Clark, "The Business of Business Isn't Charity," *Wall Street Journal,* 2 February 1982, p. 31; or Paul MacAvoy, "The Business Lobby's Wrong Business," *New York Times,* 20 December 1981, p. F3. MacAvoy states: "Unless social and charitable activities reduce long-run marginal costs or increase consumer demand then they divert resources from the social goals inherent in maximum production."

do have such responsibility appears to be widely held. In some communities, for example, corporations are active in supporting urban development and other community projects though membership in "5 percent clubs," signifying contributions equal to 5 percent of net income.[4] One prominent business organization explicitly recognizes such social responsibility in its official statement on corporate philanthropy:

> The Business Roundtable believes that corporate philanthropy, primarily through corporations, is an integral part of corporate social responsibility. All business entities should recognize philanthropy both as good business and as an obligation if they are to be considered responsible corporate citizens of the national and local communities in which they operate.[5]

A recent survey of corporate officers involved in philanthropy (Siegfried and McElroy 1981, p. 19) revealed that corporate responsibility was the most important reason for making contributions, followed by a desire to improve conditions in the community. Contributions may, of course, have more pragmatic motives as well. Siegfried and McElroy report that over a quarter of their sample of corporate officers thought that an improved public image was a "very important" reason for making corporate contributions. In fact it appears to be a common practice for corporations to make at least some contributions with an eye to improving its public image.[6]

This chapter examines corporate charitable contributions, with particular emphasis on the influence of the federal corporate income tax. The first section describes the size, composition, and growth in corporate giving. The next section briefly describes the major tax provisions related to contributions. The third section discusses several theories to explain corporate giving and note the implications of each for empirical analysis. The fourth section describes previous empirical studies of corporate contributions. A principal objective of such studies is to determine the effect of the corporate tax on the level of giving. As in the case of individuals, the tax affects a corporation's after-tax net income as well as its price of giving, so this section focuses particularly on the influence of income and price on

4. See, for example, Kathleen Teltsch, "Minnesota a Model of Corporate Aid to Cities," *New York Times,* 27 July 1981, pp. A1, A11. See also Andrews 1952, p. 17.

5. Business Roundtable, "Business Roundtable Position on Corporate Philanthropy," March 1981.

6. A representative of a southern power company reportedly told Franklin Roosevelt that his company's policy was to make the first contribution to each local charity drive in cities and towns in its area ("Corporation Gifts to Charities" 1935, p. 540). Similar reasoning based on marketing research underlies Horvitz's (1974) explanation of the legal aspects of gifts that bring benefits to the firm. The connection between self-interest and social responsibility is made by one business executive: "One of the important duties of each citizen, whether a corporation or an individual, is to work in a multitude of ways for the betterment of society. In the long run this is a self-interested proposition, in no way inconsistent with a corporation's duties to its shareholders" (Atwater 1982, p. 17).

giving. The final section of the chapter presents new evidence on the effect of taxation on corporate giving using data on tax returns from 1936 to 1980. The implications of these findings are also considered.

5.1 Growth and Distribution of Corporate Contributions

The $2.55 billion of corporate giving in 1980 is only about one-fifteenth the size of individual giving. Since virtually no corporate giving goes to religious organizations, however, it may be more meaningful to compare corporate giving to nonreligious individual giving. By this measure, corporate giving is about a sixth the size of individual giving. If contributions of individuals and corporations are expressed as a percent of income available to each, the ratios are comparable. Whereas corporations contributed about 0.8 percent of their aggregate net income in 1980, contributions by individuals as a percent of personal income amount to 1.8 percent for all contributions and 0.7 percent for nonreligious contributions only.

Table 5.1 traces the growth of corporate contributions since 1936. Expressing amounts in 1972 constant dollars, total corporate giving rose from $91 million in 1936 to $2.32 billion in 1980, an increase of fourteen times. During the same period, corporate net income increased to five times its 1936 level, and there were eight times as many corporations with assets and net income. Contributions as a percentage of net income increased from 0.28 percent in 1936 to 0.79 percent in 1980. By any measure, therefore, corporate contributions have grown in absolute and relative importance over this period. The table also shows the variation in corporate tax payments over the period, with the average tax rates rising to their highest levels during World War II and the Korean War. Although the correlation is not exact, it appears that the contributions-to-income ratio tends to be highest in those years of highest tax rates, suggesting that corporations are sensitive to the net-of-tax price of contributions in much the same way that individuals are.

5.1.1 Contributions by Industry and Income

At any one time, the level and distribution of contributions vary by industry and firm size. Table 5.2 presents contributions as a percentage of net income for eleven major industries and selected minor industries in 1980. In general, the contributions ratio tends to be relatively highest in industries with more direct contact with consumers—for example, banking, retail trade, and food products. The lowest ratios, for holding companies and mining, are for industries with little direct contact with consumers. These ratios may, of course, vary for a number of reasons, including differences in profitability, but one factor that appears to be important is the potential usefulness of contributions in creating a favorable public image.

Table 5.1 **Corporate Contributions: Returns with Net Income and Assets, 1936–80 (dollar amounts in thousands of dollars)**

Year	Contributions	Net Income	Contributions as Percentage of Net Income	Taxes as Percentage of Net Income	Number of Returns
1936	$ 25,657	$ 9,101,973	.28	11.0	188,533
1937	29,029	9,391,521	.31	11.4	178,935
1938	22,826	6,368,559	.36	13.3	159,056
1939	29,023	8,708,642	.33	14.0	187,920
1940	36,761	11,068,395	.33	22.8	207,270
1941	56,496	17,796,797	.32	39.7	246,195
1942	95,197	23,785,152	.40	51.0	249,668
1943	156,073	28,398,598	.55	55.5	260,341
1944	230,441	26,879,959	.86	54.9	266,615
1945	261,487	21,944,924	1.19	48.8	281,244
1946	208,161	26,680,636	.78	32.6	334,042
1947	235,213	32,789,713	.72	32.9	357,041
1948	233,594	35,790,976	.65	32.9	370,056
1949	217,066	30,157,558	.72	32.1	360,243
1950	247,569	43,704,379	.57	39.3	400,914
1951	338,809	44,902,623	.75	48.8	414,856
1952	393,474	40,085,418	.98	47.4	418,174
1953	487,881	41,440,712	1.18	47.5	418,150
1954	306,840	39,137,178	.78	42.6	419,679

1955	406,742	49,821,123	.82	43.2	489,592
1956	409,868	49,818,409	.82	42.6	537,275
1957	410,239	48,337,857	.85	42.3	550,665
1958	380,137	43,061,174	.88	43.3	586,746
1959	469,530	51,194,875	.92	43.6	650,035
1960	472,860	49,397,433	.96	44.0	658,227
1961	501,894	51,981,781	.97	42.4	703,160
1962	588,634	55,889,041	1.05	42.6	772,503
1963	649,350	60,958,152	1.07	42.9	795,436
1964	721,211	68,316,387	1.06	40.6	844,783
1965	771,731	80,161,530	.96	39.2	900,442
1966	796,498	86,838,441	.92	39.3	923,913
1967	814,666	85,939,311	.95	38.5	971,793
1968	984,577	94,045,273	1.05	41.7	983,345
1969	1,044,608	92,784,603	1.13	42.2	1,029,660
1970	786,951	83,036,167	.95	39.8	991,660
1971	854,488	95,967,034	.89	38.8	1,046,052
1972	996,310	112,018,071	.89	38.0	1,119,422
1973	1,163,718	137,421,249	.85	37.9	1,178,250
1974	1,186,374	170,185,222	.70	38.6	1,184,177
1975	1,184,321	168,526,861	.70	39.0	1,199,848
1976	1,464,686	209,086,024	.70	39.6	1,248,794
1977	1,756,504	243,212,774	.72	39.4	1,400,910
1978	2,063,129	272,789,622	.75	39.3	1,495,398
1979	2,664,449	319,488,771	.83	37.3	1,562,549
1980	2,320,850	294,222,899	.79	35.4	1,568,535

Table 5.2 Corporate Contributions by Industry: Returns with Net Income, 1980

Industry	Contributions as Percentage of Net Income	
Agriculture, forestry, and fishing	0.53	
Mining (total)	0.47	
Selected minor industry[a]		
Oil and gas extraction		0.38
Construction	0.95	
Manufacturing (total)	0.84	
Selected minor industries		
Food and kindred products		1.10
Chemicals and allied products		0.97
Petroleum and coal products		0.47
Primary metal industries		0.93
Fabricated metal products		0.92
Machinery, except electrical		0.82
Electrical and electronic equipment		1.02
Motor vehicles		0.91
Transportation	0.80	
Communication	0.78	
Electric, gas, and sanitary services	0.74	
Wholesale trade	0.59	
Retail trade	1.16	
Finance, insurance, and real estate (total)	0.66	
Selected minor industries		
Banking		1.77
Other credit agencies		0.93
Security, commodity brokers and services		0.72
Insurance		0.75
Real estate		0.68
Holding companies		0.10
Services	0.84	
All industries	0.79	

Source: U.S. Internal Revenue Service, *Statistics of Income—1980, Corporation Income Tax Returns 1983,* pp. 36–43, table 3.

[a]Minor industries with over $50 billion in assets each.

One relationship that has interested researchers is that between contributions and corporate income. Whether it is seen as a measure of company scale or capacity to make gifts, net income is often taken as a quantity by which firm contributions can be compared. Figure 5.1 displays contributions as a percentage of pretax net income by asset class in 1940,

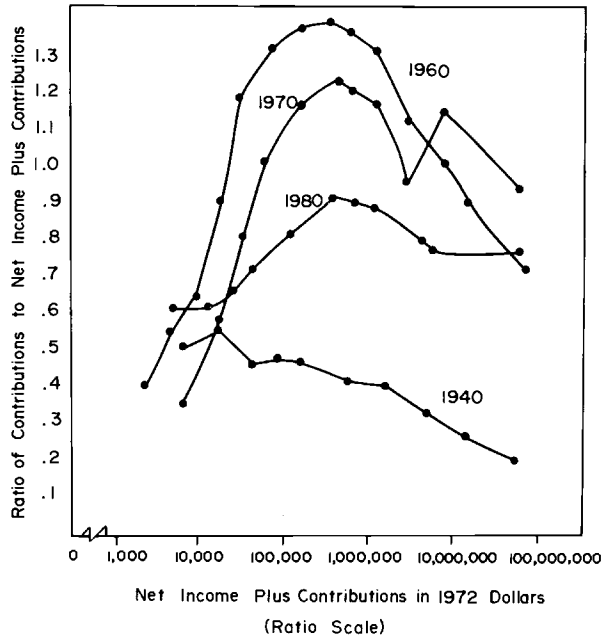

Fig. 5.1 Contributions ratio as function of net income, selected years. *Source:* U.S.Internal Revenue Service, *Statistics of Income, Corporation Income Tax Returns.*

1960, 1970, and 1980. Since the asset size of corporations tends to rise with net income, the resulting patterns show the combined effect of both measures of firm scale. Except in 1940, the ratio of contributions to net income rises with average income and then falls. Maximum contribution ratios were 1.4 percent at $278,000 (1972 dollars) in 1960, 1.2 percent at $369,000 in 1970, and 0.9 percent at $358,000 in 1980. In 1940 the contribution ratio fell throughout the range except for the peak of 0.6 percent at $175,000. Each distribution suggests that, among the largest firms, the contribution ratio falls with increased size. Besides this similarity, the striking characteristic of figure 5.1 is the overall dissimilarity among the distributions over time. This suggests the importance of careful econometric analysis of corporate giving in order to disentangle the effects of taxes, profits, and other economic conditions in explaining these differences.

5.1.2 Size Distribution of Corporate Gifts

When one looks beyond average values, one of the striking features of corporate giving is the dramatic unevenness of giving among corporations. It goes without saying that corporations vary greatly in size. Thus it

is to be expected that the scale of virtually all expenditure items will also vary between large and small corporations. But, as table 5.3 shows, corporations differ widely in their propensity to make contributions at all. Whereas over 90 percent of corporations with assets over $1 billion made some contribution in 1977, only 15 percent of those with positive assets less than $25,000 made contributions at all. (Six percent gave over $500 in 1977.) Overall, only 35.5 percent of active corporations in 1977 made contributions.[7] Since these figures are based on annual data, it is difficult to guess how many of these corporations refrain from making contributions over a longer period. Combining their greater incomes and higher rate of contributions, one can readily see that large corporations account for the lion's share of total corporate giving. As shown in table 5.3 the largest 0.2 percent of firms accounted for over three-quarters of all corporate contributions.

Table 5.3 **Proportion of Firms Making Contributions by Asset Size: Active Corporations, 1977**

Asset Size	Percentage of All Firms	Percentage of All Contributions	Firms Making a Contribution as Percentage of Firms in the Class
Zero assets	1.7	.0	18.9
$1 under 25,000	17.5	.1	14.6
$25,000 under 50,000	13.1	.1	27.0
$50,000 under 100,000	15.9	.3	29.8
$100,000 under 500,000	34.0	2.4	38.9
$500,000 under 1,000,000	7.9	1.7	54.1
$1,000,000 under 5,000,000	7.2	4.4	65.3
$5,000,000 under 10,000,000	1.0	2.1	73.7
$10,000,000 under 25,000,000	.8	3.8	78.5
$25,000,000 under 100,000,000	.6	9.0	83.2
$100,000,000 under 1,000,000,000	.2	20.6	83.8
$1,000,000,000 or more	.04	55.5	91.5
TOTAL	99.9	100.0	35.5

Source: Rosen 1981, table 11.

7. It is possible that the presence of corporate foundations, which may make grants while the company itelf makes no contributions, tends to understate the proportion of contributing firms. Yet foundations are used predominantly by the largest corporations, where the proportion of contributors is greater, so this factor is probably not of great importance. The use of foundations is discussed below.

As the preceding tables suggest, propensities to contribute out of net income vary significantly. Table 5.4 shows just how much this propensity does vary, by ordering corporations by the proportion of net income contributed. The contributions measured in this table are deductible contributions; thus very few contributions in excess of 5 percent of net income are included.[8] The table again suggests that the distribution of giving is very unequal even when differences in corporate income are taken into account. Firms in the bottom three classes account for 55 percent of all corporate net income but only 6 percent of contributions. At the other end, fully a quarter of all corporate gifts are given by corporations with only 3 percent of all net income.

The degree to which corporations differ in their propensities to contribute can be illustrated by a Lorenz curve of contributions by net income, as shown in figure 5.2. As in the cases of individual contributions and volunteering, considerable inequality exists in corporate gifts. In fact, the Gini coefficient is 0.31 for corporate contributions, almost the same as the 0.30 index calculated for all individual contributions. Among individuals and corporations alike, contributing units representing only 10 percent of total income made over 50 percent of all contributions of each type.

Table 5.4 **Corporate Contributions by Percentage of Net Income Contributed: Active Corporations, 1977**

Contributions as Percentage of Net Income	Percentage of Net Income	Percentage of Contributions
0.0	16.2	0.0
0.0–0.2	27.4	1.7
0.2–0.4	11.4	4.6
0.4–0.6	9.3	6.2
0.6–0.8	10.4	10.2
0.8–1.0	6.7	8.5
1.0–1.2	3.4	5.2
1.2–1.4	1.8	3.3
1.4–1.6	1.7	3.5
1.6–1.8	1.2	2.8
1.8–2.0	1.2	3.3
2.0–2.5	2.1	6.4
2.5–3.0	1.6	6.0
3.0–4.0	1.3	6.3
4.0–5.0	1.2	7.3
5.0+	3.1	24.7
	100.0	100.0

Source: Rosen 1981, table 7.

8. For a discussion of the 5 percent rule, see section 5.2.

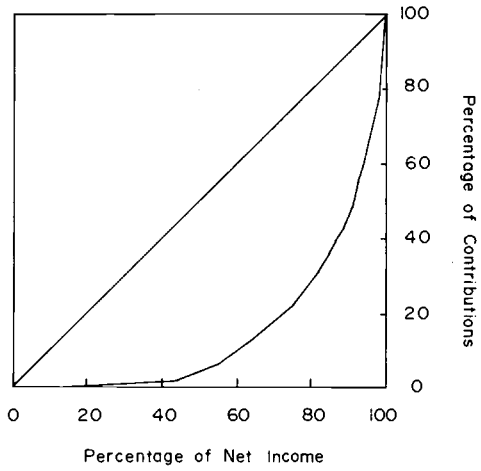

Fig. 5.2 Distribution of corporate contributions by net income, 1977. *Source:* Table 5.4.

5.1.3 Recipients of Corporate Contributions

As with the case of individual contributions, it is impossible to analyze fully the economic effect of corporate contributions—or of tax laws affecting such contributions—without knowing the uses to which the gifts are put. The most obvious difference between the giving patterns of individuals and corporations concerns religious giving. While virtually no corporate gifts go to religious organizations, almost 60 percent of individual gifts are religious in nature.[9] Among the secular beneficiaries of corporate giving, the most important categories are health and welfare and education. Table 5.5 gives comparable distributions of corporate giving between 1955 and 1982 based on surveys of large corporations by the Conference Board. During this period corporate gifts to civic and cultural organizations grew (from 3.2 to 23.1 percent of the total) while gifts in the health and welfare group declined in relative importance (from 50.7 to 31.0 percent). By 1982 the most important category of corporate giving was education, which accounted for over 40 percent of the total; health and welfare organizations received about a third, and civic and cultural organizations claimed about a tenth each.

9. See chapter 2.

Table 5.5 Percentage Distribution of Corporate Giving

	1955	1965	1970	1975	1980	1982
Health and welfare	50.7	41.5	38.6	41.2	34.0	31.0
Education	31.3	38.4	37.6	35.1	37.8	40.7
Culture and art	3.2	2.8	5.3	7.5	10.9	11.4
Civic activities		5.8	8.1	10.3	11.7	11.7
Other	14.8	9.2	8.1	5.8	5.6	5.2
TOTAL	100.0	100.0	99.9	99.9	100.0	100.0
Number of firms	180	540	401	796	732	534

Sources: Nelson 1970, p. 41; Troy 1977, pp. 28–29; 1983, p. 10; 1984, p.11. Also see *Corporate Support of Higher Education 1980*, 1981, p. 5.

In table 5.6 distributions of contributions by donee groups are given for various industries, suggesting in several cases that gifts are made to donees with mutual interests to the industries. For example, the highest concentrations on civic activities tend to be among firms in service industries, many of which are likely to contain firms closely identified with particular cities. Education receives the largest shares in manufacturing industries, which appear most likely to benefit from advances in knowledge and technical training. These patterns are by no means clear, however, and the distributions themselves also vary somewhat from one year to the next.

Siegfried and McElroy (1981, p. 27) present complementary evidence on the effect of firm size on the distribution of gifts by donee. In their sample of corporations in medium-sized cities, they found, not unexpectedly, that the larger the firm (measured by number of employees), the larger the average share of gifts made to national causes. In addition, larger firms gave more to the educational and arts and cultural groups of organizations. The donee group that suffers a relative decline as firm size increases is health and welfare—a group likely to contain many organizations with a local focus. For their sample as a whole, Siegfried and McElroy found that local causes dominated national causes by a ten-to-one ratio (p. 16) and that the share of contributions made to a corporation's headquarters city varied directly with the share of the firm's employees there (p. 28). Thus, there is some reason to suppose that corporations seek to support charitable activities that benefit the geographical areas where their employees or customers live. Whether this is a manifestation of corporate social responsibility or plain good business sense is not obvious, but it does at least lay the groundwork for constructing models of corporate giving.

Table 5.6 **Distribution of Corporate Contributions by Donee Group; 786 Large Corporations Classified by Industry, 1980**

Industrial Classification	Number of Companies	Total Giving ($ thousands)	Health and Welfare		Education	Culture & Art	Civic	Other
			Federated Campaigns	Other				
Chemicals	45	$ 99,205	13.8%	13.4%	44.3%	8.7%	11.9%	8.0%
Electrical machinery	48	104,191	22.5	14.1	47.5	7.4	6.2	2.4
Fabricated metals	22	20,287	16.1	14.2	24.3	6.4	16.9	22.1
Food, beverage & tobacco	40	70,583	12.3	26.1	33.5	13.1	9.2	5.9
Machinery, nonelectrical	48	52,672	18.4	10.8	48.7	7.8	8.1	6.2
Mining	8	5,832	5.7	19.9	46.1	10.2	14.6	3.4
Paper	25	34,768	14.0	15.0	34.9	10.4	20.3	5.5
Petroleum & gas	33	228,867	7.9	11.2	42.6	18.4	14.5	5.3
Pharmaceuticals	18	41,880	9.1	28.5	33.7	6.4	7.4	14.9
Primary metals	27	38,795	19.8	20.0	39.2	9.9	8.2	3.1
Printing & publishing	17	15,415	10.2	17.2	37.1	20.4	10.7	4.4
Rubber	12	6,512	30.7	20.0	35.7	5.4	7.2	1.1
Stone, clay, & glass	15	18,693	12.7	19.0	32.8	18.2	9.3	7.9
Textiles	23	13,226	11.5	28.2	30.5	5.0	13.9	11.0
Transportation equipment	22	71,889	22.0	13.6	38.4	9.6	8.5	8.0
TOTAL MANUFACTURING	403	822,815	14.2	15.5	40.7	12.0	11.1	6.5

Banking	88	75,848	25.9	16.0	25.1	13.6	14.9	4.5
Business services	24	10,424	15.2	20.6	34.0	17.5	9.0	3.8
Engineering & construction	9	10,960	20.2	25.5	30.8	10.5	5.0	8.0
Finance	15	12,026	13.1	18.0	27.3	19.3	11.8	10.6
Insurance	99	63,751	22.8	15.8	29.5	11.1	16.0	4.7
Merchandising	26	48,017	33.2	20.5	18.4	13.1	10.3	4.6
Telecommunications	25	66,591	29.4	15.3	32.1	9.7	8.8	4.8
Transportation	11	16,688	15.7	14.8	33.3	7.5	23.1	5.7
Utilities	88	43,568	29.6	14.8	25.2	10.6	13.9	6.0
TOTAL NONMANUFACTURING	385	347,873	26.1	16.7	27.2	11.9	13.0	5.2
TOTAL ALL COMPANIES	788	1,170,688	17.7	15.9	36.7	11.9	11.7	6.1

Source: Troy 1983, p. 30.

5.2 Tax Treatment of Corporate Contributions

Charitable gifts and contributions have been deductible since 1936.[10] Until 1981 the major limitation was that deductible contributions could not exceed 5 percent of net income, calculated without regard to contributions and several other items.[11] Contributions actually made in a year that exceeded this 5 percent limit could be carried forward for up to five years, with the carry-overs being subject to the 5 percent limit in later years as well. The Economic Recovery Tax Act of 1981 increased this percentage limit from 5 to 10 percent. Because the increased depreciation allowances in that bill will have the effect of reducing reported net income, however, it is possible that for some companies the new 10 percent rule could place a lower absolute ceiling on contributions than the 5 percent limit did under previous law.[12]

As in the case of the personal income tax, the tax savings available to companies that make contributions are proportional to the marginal tax rate on net income. Where t is the marginal tax rate on corporate income, a company that contributed G dollars effectively reduces its tax liability by tG dollars if the ceiling on contributions has not been reached.[13] In any one year this marginal tax rate varies by size of corporate income because of the progressive rate structure of the tax, although in recent years the rates have leveled off at fairly low incomes. Over time this marginal tax rate has varied widely, due largely to wartime excess-profits taxes. Figure 5.3 indicates the variation in tax rates from 1936 to 1980 by showing the average tax rate for corporations with assets and net income and the top marginal tax rate for each year.

Corporate gifts may be made in cash or property, though most are in cash form. Siegfried and McElroy (1981, p. 7) found in their survey, for example, that about 12 percent of the value of corporate giving was made in kind rather than in cash. Before 1969 the fair market value of goods could be deducted for contributions out of inventory. As Johnson (1966, p. 496) notes, this rule made it advantageous for certain companies to

10. See Freemont-Smith (1972, pp. 9–13) for a history of judicial rulings concerning the legality of corporate contributions.

11. The rule applied to taxable income computed without regard to the charitable deduction, net operating loss carry-backs, capital loss carry-backs, and certain special deductions. (*Internal Revenue Code* 1982, sec. 170(b)(2), pp. 201–2).

12. As Horvitz (1974) explains, it is possible for a corporation to extend the percentage limitation in practice by showing a business motive for some gifts and classifying them as regular business expenses.

13. A small number of corporations (less than 1 percent in 1980) were subject to a corporation minimum tax that had the effect of changing the price of making contributions. The tax was 15 percent of the excess of preferences (which did not include contributions) over the greater of the normal tax paid and $10,000. For corporations subject to this tax and with normal tax over $10,000, the price was reduced from t to $(1 - 0.15)t$. See *Internal Revenue Code* 1982, sec. 56 and 57, and U.S. Congress, Staff of the Joint Committee on Taxation 1982.

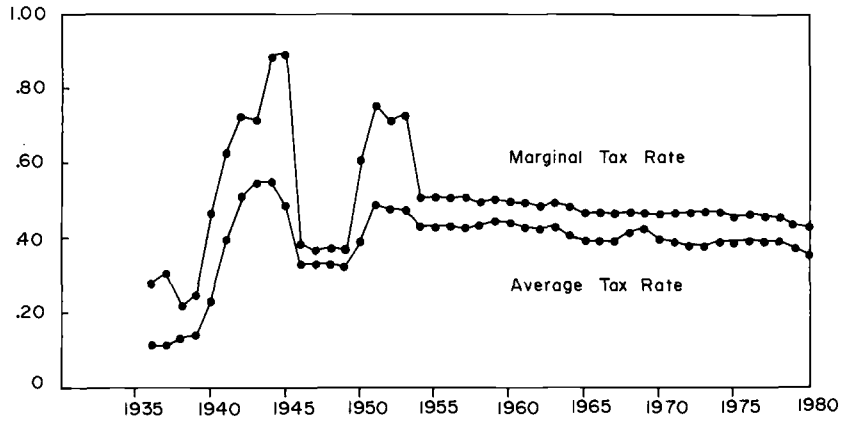

Fig. 5.3 Average and marginal tax rates for corporations, 1936–80.

contribute goods out of their own inventories. Since the deductible basis for goods was defined as their usual selling price, companies with relatively low production costs and high distribution costs may bear little or no cost when donating their own products.[14] The current law now limits contributions of inventory to the cost basis of the goods for most kinds of gifts, thus eliminating this incentive.[15] Finally, corporations may also contribute the volunteer services of their employees. As in the individual income tax such volunteer work receives no special deduction, but the wages of such employees remain fully deductible.

5.2.1 Corporate Foundations

The tax law allows corporations to set up foundations for the purpose of receiving and distributing contributions. Contributions from a corporation to its foundation are deductible like other contributions and are subject to the percentage ceiling, but grants made by foundations are not subject to the ceiling. In part because of the flexibility this allows, many larger corporations have established such foundations. According to Nelson (1970, p. 11) most corporate foundations were established during the Korean War, when high tax rates encouraged giving. Nelson estimates that between 1955 and 1965 foundations accounted for a quarter of all

14. Where t is the firm's marginal tax rate and v is the portion of marginal cost due to distribution, it was advantageous under previous treatment to contribute such goods when $t > 1 - v$.

15. The general rule is given in *Internal Revenue Code* 1982, sec. 170(e)(1)(A). For contributions of scientific research property or inventory used by charitable organizations to benefit the ill, the needy, or infants, the deduction is reduced by one-half of the difference between market value and cost, and the deduction can be no more than twice the cost. See sec. 170(e)(3) and 170(e)(4).

corporate contributions. In interpreting data on corporate contributions, it is useful to consider the role played by these corporate foundations. Foundations could play one of two possible roles in the distribution of donations. First, they could act to "smooth out" contributions over the business cycle. Corporations desiring to maintain a given level of support to a donee, for example, may choose to have the foundation make rather constant contributions while the firm itself makes contributions to the foundation that vary with tax and profit considerations. Siegfried and McElroy (1981, p. 25; McElroy and Siegfried 1982a, p. 24) found that a majority of their corporations with foundations use them to stabilize the flow of support to donees. In this case, contributions from the firm would be expected to fall relative to foundation grants during low-profit years and exceed foundation giving during periods of high profits. While this balance might be expected to vary from year to year, one would expect a net outflow from corporate foundations during recessions and the reverse during periods of economic growth. A second role that corporate foundations might play is that of permanent endowment to support the corporation's giving. Rather than making regular contributions to it, the parent firm in this model would make only one or several initial contributions to set up the foundation's endowment. In any given year thereafter, grants made by a corporate foundation would normally exceed contributions received from the corporation.

Table 5.7 presents information on payments to and by the foundations in a sample of large corporations. The numbers of corporations with positive entries for each item are shown in parentheses. In 1980, for example, there were 353 corporate foundations that made contributions out of a sample of 732 corporations with company or foundation gifts. In 1978 and 1979 corporate foundations received more than they paid out in contributions, but this relationship was reversed in 1980. In fact, 1980 was the first year since 1975 that corporate foundations in the Conference Board's sample paid out more than they received (*Corporate Support of Higher Education* 1981, p. 5). In that 1975 and 1980 were both recession years and corporate profits were correspondingly low, this finding is consistent with the hypothesis that foundations are used to smooth out corporate giving over time. One implication of this smoothing-out model is that contributions made by companies (counting grants to their own foundations) will tend to be more highly correlated to annual net income than the total flow of corporate (company and foundation) gifts to charities would be. While total corporate gifts may be related to a firm's normal level of profits, deductible company contributions will tend to be more highly correlated to current profits. Thus the income effects estimated from data on annual net income and total contributions would reflect a permanent rather than a current net-income effect. The figures in table 5.7 also to some extent support the endowment model in that the number of grants from foundations exceed the number of contributions received from par-

Table 5.7 **Structure of Corporate Contributions (millions of dollars)**

	1980		1979		1978	
Total company contributions	$994.7	(709)	$855.7	(763)	$834.4	(759)
Less grants to company foundations	381.4	(249)	372.1	(291)	418.7	(249)
Other company contributions	563.3	(661)	483.6	(722)	415.7	(696)
Plus contributions by company foundations	431.3	(353)	351.9	(352)	277.5	(329)
Total corporate contributions	994.6	(732)	835.5	(786)	693.2	(759)

Source: Corporate Support of Higher Eductation 1980 1981, p. 5.
Note: Numbers in parentheses are counts of nonzero answers.

ent firms. For example, in 1980 foundations for 353 corporations made contributions while only 249 foundations in the sample received contributions from their related corporation. Table 5.8 presents survey data only for corporations with foundations, giving the relative frequency of positive and negative balance between payments to and by foundations. That payouts exceed payins for a majority of firms in both years suggests that the role of foundations goes somewhat beyond simple smoothing, although the smoothing model is probably appropriate for most corporations.

5.3 Models of Corporate Giving and the Role of Taxes

The prospect of companies giving money away seems at first glance to fly in the face of the profit-maximization model. Indeed, such behavior appears to demand a theory of firm behavior that stresses factors other

Table 5.8 **Flow of Funds into and out of Company Foundations, 1978 and 1981**

	1978		1981	
	Number of Companies	Percentage of Total	Number of Companies	Percentage of Total
Payins equal to payout	26	7	14	4
Payins less than payouts	178	52	232	64
Payins greater than payouts	141	41	115	32
TOTAL	345	100	361	100

Sources: Troy 1981, p. 17; 1983, p. 17.

than profits. The purpose of this section is to consider two basic models of firm giving behavior and to trace out their implications for the effect of taxes on giving. The first model is simple profit maximization, and the second focuses on utility maximization by managers.

5.3.1 Profit Maximization

If a company is managed so as to maximize profits, the only possible reasons for making contributions would be if such expenditures increased revenues or reduced costs. Revenues may be increased if contributions perform a public relations function, and this possibility has not escaped the attention of students of corporate giving. One commentator cites as a benefit of contributions "better public acceptance of the company's products and a higher regard for it and its managers as citizens of the community."[16] By the same token, profits are increased if contributions serve to reduce the cost of operations by more than the amount contributed. One way costs may be reduced is if contributions have the effect of making a community a more desirable place in which to live and work and if this reduces the level of wages the company must pay.[17] Or a company's good public image may reduce other costs, for example, by making zoning changes easier or reducing the costs of vandalism.

Because of the nature of these benefits to firms, it is difficult to assess their importance empirically. One may, however, consider implications of this model. One implication is that, if such effects are important for any firm, they will tend to be most important for firms whose sales or market share may be sensitive to public perceptions. Another implication is that firms would tend to make contributions in the communities where they are located. Regarding the first, Johnson (1966) argues that firms in competitive or monopolistic industries stand to gain little from influencing public opinion, whereas firms in oligopolistic industries do. His analysis (Johnson 1966, pp. 496–504) suggests indeed that firms in rival industries contribute more than do firms in competitive and monopolistic industries. Patterns of giving by industry as shown above in table 5.2 indicate that the industries with the highest rates of giving tend to contain firms that depend on a favorable public image. Along the same lines, the empirical work reported in the next section shows that high rates of contributions are correlated with high rates of advertising. As for the location of contributions, survey data suggest that corporations make most of their gifts within their home states (Andrews 1952, p. 63), although this fact could also suggest utility maximization on the part of managers. In sum-

16. G. Clark Thompson quoted in Andrews 1952, p. 17. Martin Segal states: "Increasingly, corporations believe that good public relations resulting from support for the arts are an appropriate advertising and marketing expense ("Business Can Benefit by Giving to the Arts," *Wall Street Journal*, 1 January 1982, p. 26).

17. See Schwartz 1968, p. 480.

mary, there is good reason to believe that at least some portion of a corporation's contributions have a profit-related motive attached to it, much of it serving to improve the company's public image. As Andrews states (pp. 95–96), "Corporations seldom hide their philanthropic light under a bushel, and it is no accident that their contributions committees usually include the director of public relations."

What is the effect of an income tax on contributions if the management's objective is to maximize after-tax profits? Consider a firm with production function $Q(X,G)$, where G is contributions and X is other inputs. Where t is the tax rate, r is the output price, and s is the price of the composite input X, net profit is

$$N = [rQ(X,G) - sX - G](1-t),$$

assuming that contributions are fully deductible. The first-order condition determining the demand for contributions is the usual condition for derived demand in competitive markets, $rQ'(G) = 1$, the value of the marginal product being equal to the before-tax price of giving a dollar. The income tax in this case has no effect on the company's optimal contributions.[18] The result is qualitatively the same if the price of inputs is also made a function of contributions, $s(G)$. In this case the optimality condition is

$$rQ'(G) - s'(G)X = 1, \tag{1}$$

or that the marginal increase in profit (due to increased revenues and reduced costs) is equal to marginal cost, again with taxes not coming into play.

One can modify this profit-maximization model by relaxing the assumption that contributions have a contemporaneous effect on output. Suppose, instead, that contributions build a kind of goodwill that lasts over a period of years. For simplicity, consider a two-period model in which revenue is a function of total contributions in the two years. Where h is a discount factor that expresses year-two amounts in terms of year-one dollars and where total contributions for the two years are a fixed amount $G^0 = G_1 + G_2$, the present value of net profits for both years is:

$$V_n = (rQ(X_1,G^0) - sX_1 - G_1)(1-t_1) + h[rQ(X_2,G^0) - sX_2 - (G^0 - G_1)](1-t_2). \tag{2}$$

The profit-maximizing solution is simply to take the deduction in the year in which the present value of the deduction is greater. The net cost of the contribution will be $(1\text{-}t_1)G^0$ in the first year and $h(1\text{-}t_2)G^0$ in the second. Where the net price of giving is $P = 1 - t$, this implies taking the deduction

18. See also Schwartz 1968, p. 481.

in year two if $hP_2 < P_1$. Thus profit maximization is consistent with the timing of contributions according to variations over time in marginal tax rates if contributions have more than a contemporaneous effect on revenues.[19] Not only is it reasonable to believe that contributions do in fact have a more sustained effect, corporate foundations act to reinforce this sustained effect by smoothing out gifts over time.

5.3.2 Utility Maximization

A second general explanation for corporate giving rests on utility-maximizing behavior by managers or owners of the corporation. If either managers or owners derive utility from making contributions, the corporate tax may affect the amount of corporate giving.

Adopting Williamson's (1964) model of discretionary behavior suggests that a company's charitable contributions may enter the utility functions of managers. Accordingly, the management may choose to sacrifice profits in order to make such contributions. Suppose, for example, that management values two "goods": after-tax profits and corporate contributions. Whether they view corporate giving as a substitute for personal gifts, personal consumption, or certain forms of corporate conspicuous consumption, managers may place special value on or receive special credit for contributions made by their companies.[20] Contributions may be profitable over some range, but beyond some point their marginal profit is negative. Figure 5.4 shows excess profits as a function of contributions and indifference curves for management. Contributions in this case will exceed the profit-maximizing point G_1 and will be at a point such as G_2.

In order to determine the effect of taxes on contributions, consider a manager who maximizes utility as a function of contributions and net profit. Where G and N are contributions and net profit, respectively, utility is $U(G,N)$. Defining net profit as before, with s exogenous, utility is

$$U[G,(1-t)(rQ(X,G)-sX-G)]. \tag{3}$$

Where U_g and U_n are marginal utilities, the first order condition is:

$$U_g + U_n(1-t)[rQ'(G)-1] = 0, \text{ or} \tag{4}$$

$$U_g/U_n(1-t)[1-rQ'(G)]. \tag{4'}$$

19. Although Schwartz (1968, p. 481n) refers to the possible response to transitory tax changes, his analysis takes the observation of a significant price effect to imply "that corporate giving is philanthropic rather than profit-oriented" (p. 492).

20. Managers in closely held corporations especially may take this kind of personal role in contributions, as is discussed below. See Nelson 1970, pp. 32–33. For further discussion and a test of whether corporate contributions are a source of utilitiy for managers, see Goldberg 1979.

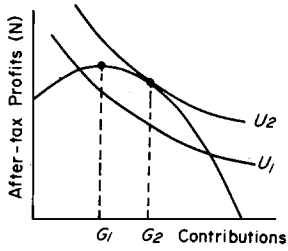

Fig. 5.4 Managerial preferences for contributions.

Taxes clearly are important. Only in the special case in which the manager has no interest in the level of contributions per se ($U_g = 0$) does the tax rate drop out; this case is simply that of profit maximization, which implies the condition analyzed above, $rQ'(G) = 1$. If the production function is quadratic in G, $Q(G) = a + bG - cG^2$, and if units are defined so that $r = 1$, the first-order condition becomes

$$U_g/U_n = (1-t)[1-b+2cG], \text{ or} \tag{5}$$

$$G = (U_g/U_n)/[(1-t)2c] + (b-1)/2c. \tag{5'}$$

The effect of a change in the tax rate on contributions can be seen by differentiation:

$$\frac{\partial G}{\partial t} = (U_g/U_n)/[(1-t)^2 2c], \tag{6}$$

which is positive. Thus an increase in the corporate rax rate is expected to increase the company's contributions when the management values contributions directly. Whereas the profit-maximization model implies that taxes will affect only the timing of contributions, this utility-based model implies that taxes can affect the permanent level of contributions made by a company.

A special case of managerial utility maximization arises in closely held corporations in which the owner or owners can choose between making contributions through the corporation or making personal contributions out of profits. When the alternative to corporate contributions is declaring dividends and making personal contributions from them (as opposed to, say, paying bigger salaries to the owners), the corporation income tax will generally make it attractive to contribute through the corporation. In terms of foregone after-tax dividends, the price of giving a dollar through the corporation is $(1-t)(1-m)$, where t is the marginal corporate rate and m is the relevant marginal rate in the personal income tax. When the corporation is subject to tax, this price is less than the price of $(1-m)$ apply-

ing to personal contributions. Where the corporation has appreciated assets available to give, the advantage of contributing through the corporation may be even greater. The advantages of owners making contributions through corporations are not limited to closely held corporations, but the mechanism for owner control of gifts is problematic where the number of owners is very large.[21]

5.3.3 Rules of Thumb

A third model by which corporations may decide the level of contributions is by using rules of thumb based on industry norms, past behavior, or percentage of income. Because such behavior in the short run might be consistent with the long-run maximization of profits or utility, this notion does not necessarily constitute a separate theory of corporate giving. To the extent that rules of thumb are part of a "satisficing" approach whereby managers seek only a satisfactory level of profit, however, rules of thumb can be part of a distinctly different model of corporate behavior. Most of the corporate officers interviewed by Siegfried and McElroy (1981, p. 70) said their companies used a rule of thumb in determining contributions. Most respondents said their companies calculated contributions as a percentage of net income, while over a quarter based it on the previous year's giving. Fewer than 10 percent said they aimed for an absolute level of contributions.

Depending on its importance, such rule-of-thumb behavior may have one or two effects on observed patterns of corporate gifts. First, the prevalence of contribution rules based on a percentage of net income obviously would make the income elasticity near one, to the extent that the percentages used by corporations were similar. Second, if a firm's gifts are based, even in part, on the previous year's giving, an autoregressive model will result, making it necessary to correct for serial correlations in estimation.

5.3.4 The Price of Corporate Contributions

The models discussed in this section examine the effect of the corporate income tax rate on contributions under a rule of full deductibility. Schwartz (1968, p. 481) observes that, under this rule, the appropriate price to use for corporate gifts is $(1 - t)$ because the relevant alternative to corporate gifts is consumption of retained earnings. Implicitly, this assumes that contributions are strictly a form of corporate consumption,

21. One corporation, Berkshire Hathaway, allows shareholders to designate gifts in proportion to their holdings of shares. See Bill Richards, "Berkshire Hathaway Pleases Shareholders by Letting Them Earmark Corporate Gifts," *Wall Street Journal*, 26 April 1983. The advantage of giving through a corporation also underlies a proposal by Robert Sproull (1982) to allow shareholders to have the before-tax profit corresponding to some portion of their dividends to be contributed to a charity of their choice.

that is, that contributions do not increase revenues. This approach ignores the possibility, however, that an important alternative to contributions might be other expenditures, such as advertising. This possibility would become more important if the full deductibility rule were modified. Partial deductibility rules, such as the separate taxation of contributions as a "preference item," would change the *relative* cost of inputs, however. Neither these simple models nor empirical observation under the full deductibility regime would be directly appropriate for inferring the effects of such a rule.[22] If the deductibility of contributions were modified in this way, the relative attractiveness of contributions and advertising would be affected along with the relative attractiveness of contributions and consumption. Thus neither the simple models discussed in this section nor empirical observation of behavior under the full deductibility regime are directly appropriate for inferring the likely effects of a partial deductibility rule.[23]

5.4 Empirical Studies of Corporate Giving

Given the important role of firms in the study of economics as well as the interesting theoretical questions surrounding corporate philanthropy, it is not surprising that economists have devoted attention to empirical investigations of such behavior. Corporate contributions have, however, received less attention than giving by individuals. This difference may be due to the relatively small size of corporate giving. In addition, there appear to be fewer sources of data on contributions by corporations than by individuals. Table 5.9 summarizes the data and models used in the published studies of corporate contributions. The studies include time-series as well as cross-section analyses, using for the most part data collected from corporate tax returns. This section reviews the econometric analyses of corporate giving, discussing the sources of data, the definition of variables, and the specification of models.

5.4.1 Sources of Data

Virtually all the data used in econometric studies of corporate philanthropy are based on information from federal corporate income tax returns. These data are tabulated by the Internal Revenue Service in the published *Statistics of Income* series and in the unpublished "Source Book of Statistics of Income." The former provides annual data on income, assets, contributions, and other tax-related items as reported on corporation tax returns based on a large sample of returns selected each

22. See Clotfelter 1983b.

23. For an analysis of partial deductibility for the case of travel and entertainment, see Clotfelter 1983b.

Table 5.9 **Summary of Empirical Studies of Corporate Contributions**

Study	Data Source	Corporations Excluded from Sample	Contributions Measure	Income Measure	Price Measure	Other Variables	Functional Form
Johnson 1966	*SBSOI,* [a] 1936–61	Zero assets; nonpositive net income	Ratio of contributions to net income	Net income	—	Concentration, asset size	—
Schwartz 1968	*SOI* [b] time series, 1936–61; cross section by minor industry, 1948, 1959, 1960	None	Average contributions	Net income after taxes Cash flow after taxes	Weighted average based on tax rates (price = 1 for corporations with no net income)	Time series: trend; cross section: advertising expenditures	Linear; linear with lags; logarithms; first differences
Nelson 1970	*SOI,* time series, 1936–63; SBSOI, 1954–1957 (4-year averages for 121 industry classes)	Nonpositive net income	Total contributions	Net income after taxes, before contributions (time series); net income before taxes (cross section)	Weighted average based on average tax rates	Time series: trend, expectations, net worth Cross section: Net worth, employment, number of corporations	Log-linear
Levy and Shatto 1978	*SOI* 1971, 56 aggregate industries; *SOI,* 1946–76	—[c]	Total contributions	Net income	Average tax rate	Cross section: investment, advertising; time series; dividends	Log-linear Linear

Bennett and Johnson 1980	*SOI*, 20 aggregate manufacturing industries, 1967 and 1971	—[c]	Total contributions	Net income	—	Investment, advertising, unionization, concentration	Linear
Maddox and Siegfried 1981	*SBSOI*, asset and minor industry classes, 1963	Zero assets	Average contributions	Net income	—	Relative size, concentration ratio (4-firm), advertising, R&D	Linear
McElroy and Siegfried 1982a[d]	Authors' survey of 229 corporations	Zero contributions; no financial data	Direct contributions of firm and foundation	Net income	State tax credit dummy	Contributions by other firms; government expenditures; population	Lienar, logarithms
McElroy and Siegfried 1982b	*SBSOI*, asset and minor industry classes, 1972, 1976.	Zero assets; assets less than $10 million	Total contributions, weighted; average contributions (log-linear)	Net income	—	—	Linear; quadratic, log-linear

[a]U.S. Internal Revenue Service, "Source Book of Statistics of Income."

[b]U.S. Internal Revenue Service, *Statistics of Income, Corporation Income Tax Returns*.

[c]Information not given.

[d]Also presents illustrative regressions using data in McElroy and Siegfried 1982b.

year. With some variation from year to year, this information is tabulated by the size of corporate assets and by major industrial groups. Tabulations typically are presented separately for corporations with positive profits as well as for all corporations. The "Source Book" provides a more detailed tabulation, consisting of a two-way classification of firms by industry and asset size, making it attractive for cross-section analysis. Besides this tax return information, the only other data that have been used in an econometric analysis of corporate giving is a survey of companies conducted by McElroy and Siegfried (1982a; 1982b). Not only do survey data of this kind allow the examination of behavior by individual firms, but they also allow considerably more detail in the examination of nontax influences on contributions. While these other influences are of great interest, they are likely not to be of central importance in assessing the effect of the corporate tax in philanthropy.

The most important limitations of the Internal Revenue Service data, which are used in all but one of the analyses discussed in this section, have to do with the possible mismeasurement of contributions and economic profits.[24] The reported amounts for "contributions or gifts" counts only those contributions that are deductible. Deductibility is limited by the nature of the expenditure itself and its amount. Only contributions to approved nonprofit or philanthropic organizations are deductible, and qualifying contributions by law cannot be placed in some other expenditure category. Several studies have alluded to this problem, noting the possibility that tax return data may understate true contributions.[25] Some information on the likely extent of this understatement is given by Andrews (1952, p. 252), who cites a 1950 survey suggesting that incorrectly reported contributions were 7.6 percent the size of underreported contributions.[26] According to Johnson (1966, p. 494), however, a court case in 1951 established the principle that contributions must be reported as such. Combined with what Johnson sees as a growing acceptance of corporate contributions, this would suggest that misreporting may have declined since the introduction of the charitable deduction. Based on the findings for 1950, however, the extent of misreporting was probably never great.

24. A third limitation, not relevant to the analysis presented here, is the classification of firms by industry according to the major activity rather than a recognition of different industries represented by a single firm.

25. Tax rulings relevant to the distinction between charitable contributions and regular business expenses are discussed in Horvitz 1974. Despite the distinction between these classes of expenses, it appears in practice that contributions are often not fully separated from public relations and similar expenses on corporate returns due to the accounting cost of doing so and because there are no tax consequences for firms below the contributions limit. Johnson (1966, p. 494) suggests that gradual acceptance of corporate contribution may be reducing this classification problem over time. McElroy and Siegfried (1982b, p. 10) state, however, "Since contributions are a tax-deductible expense like any other business expense, there is no incentive to classify them in a separate budget." This ignores the legal incentive cited by Johnson 1966, p. 494n.

26. Also see Nelson 1970, p. 32.

The limitation on the amount of the charitable deduction is also an important consideration in studying giving behavior. Before 1981 contributions made during a given year amounting to more than 5 percent of income were not deductible in that year. Firms exceeding the limit could carry such deductions forward for five years. Deductible contributions in any one year therefore include currently deductible gifts and any past gifts that exceed the limit.[27] The available data provide little definitive information either on the amount of contributions that exceed the limit or the amount of the deductions accounted for by carry-overs. For firms with no positive net income, however, few if any contributions are deductible, so tax returns are a very incomplete measure of actual contributions for these firms.[28] As shown in table 5.10, corporations with no net income in 1980 accounted for over 40 percent of corporate returns but only 1.2 percent of contributions. Because of their profit situation and because most of their contributions are not deductible, it is not surprising that giving by these firms is very low. Clearly, the problem is that deductible giving may be only a fraction of total giving. The inclusion of firms without positive net income is therefore a source of downward bias in the measure of contributions. If, furthermore, the net price for such firms is taken to be one—thus ignoring the possibility of taking the deduction in future

Table 5.10 **Returns and Contributions by Corporations by Net Income and Assets, 1980**

	Returns		Deductible Contributions	
	Number	%	Amount	%
Firms with net income				
Without assets	28,402	1.0	7,728	0.3
With assets	1,568,590	57.9	2,323,204	98.5
Firms with no net income				
Without assets	50,206	1.9	2,638	0.1
With assets	1,063,700	39.2	24,984	1.1
TOTAL	2,710,538	100.0	2,358,554	100.0

Source: U.S. Internal Revenue Service, *Statistics of Income—1980, Corporation Income Tax Returns* 1983, pp. 44–46, tables 4, 5.

27. Carryovers were also subject to the 5 percent limitation. See, for example, *1980 U.S. Master Tax Guide* 1979, section 1147, p. 418.

28. Firms with no net income may nevertheless have some deductible contributions because the 5 percent rule is based on a slightly different definition of income. As noted above, the rule applies to taxable income computed without regard to the charitable deduction and other items. Thus firms with zero or negative taxable income might be able to deduct some contributions in the same year. See, for example, U.S. Internal Revenue Service, *Statistics of Income—1977, Corporation Income Tax Returns* 1981, p. 141.

years—a negative bias is imparted to the correlation of price and giving since giving is understated and price is overstated. Among the studies reviewed here, only Schwartz (1968) and Maddox and Siegfried (1981) include firms with no net income. How serious the bias is, of course, depends on the number of such firms and the extent of the two measurement errors.

The second problem with the IRS tax data is general mismeasurement of economic variables. This problem is particularly apparent regarding the definition of corporate income. The divergence between depreciation allowances permitted by the tax code and "true" economic depreciation is well known.[29] Depletion allowances present a similar problem in the measurement of income. Reported net income may also diverge from the economic definition of profit in closely held corporations where part of what conceptually should be "return to capital" may be paid in the form of compensation to corporate officers. Nelson (1970, pp. 63–66) has suggested that this last problem probably causes profits to be more seriously understated for small corporations than for large ones, thus inflating the measured ratios of contributions to net income in lower income and asset classes. To illustrate, contributions as a percentage of net income falls from 4.38 to 0.55 from the second to the highest asset classes in 1957. When income is defined to exclude taxes and include officers' compensation, however, this proportion *rises*, from 0.20 to 0.90 (Nelson 1970, p. 62).

5.4.2 Explanatory Variables

As in the case of contributions by individuals, tax policy influences corporate giving in two important ways: by affecting the net price of giving a dollar of contributions and by affecting the after-tax income available to managers. Other characteristics such as industry structure and advertising have also been examined, and although they are not directly related to tax policy, these other factors are noted as well in this section.

Price

There is little disagreement in the empirical literature that the net cost to a firm of making another dollar of corporate contributions generally is $\$1(1-t)$, where t is the marginal tax rate on net income. (Where the 5 percent ceiling has been exceeded, of course, the price will be more, depending on the likelihood of carrying over the excess deduction to future years.) The methods of approximating the marginal tax rate have varied, however. Schwartz (1968) based his price measure on the average tax rate, letting average price be a weighted average of the complement of the average rate and one, where the weights are donations by taxable and nontaxa-

29. See, for example, Samuelson 1964.

ble firms.[30] Since firms with no net income have very few deductible contributions, this measure is quite close to the simple complement of the average tax rate.[31] Nelson (1970), in contrast, calculated an aggregate net price based on marginal tax rates. In years with wartime excess-profits taxes, he computed a weighted average of income tax and excess-profits tax rates. In other years his estimate of the marginal tax rate is simply the maximum marginal rate.[32] There is no account taken for the declared-value excess-profits tax which was in force between 1936 and 1945, nor for the surtax on undistributed net income in 1936 and 1937. The marginal tax rate implicit in Nelson's estimates are given in Appendix G. For comparison, Appendix F summarizes the marginal tax rates embodied in the various components of the corporate tax since 1936. Appendix G compares the average tax rate and Nelson's estimate of the marginal tax rate. Clearly, Nelson's marginal tax rate does show more variation over time, as one would expect given the progression in corporate taxes. Nelson's measure has three weaknesses, however. First, it ignores the declared-value excess-profits tax that was imposed from 1936 to 1945 on net income amounting to more than 10 percent of capital stock. Since many firms of all sizes earned more than a 10 percent rate of return over this period, this tax added to the marginal tax rate on net income. The Nelson calculations also omit the undistributed profits surtax of 1936 to 1938, which featured marginal tax rates up to 22 percent. Finally, the Nelson calculations do not account for the deductibility of some portions of the tax in calculating other portions. Because of these interactions, it is inappropriate to calculate the total marginal rate by simply summing the components.

Two other aspects of the price of contributions are the relative cost of making gifts in various years and the relative cost of contributing goods versus money. Because of changes in tax laws and a firm's net income over time, marginal tax rates may change. This opens up possibilities for the timing of gifts so as to minimize tax liability. Particularly striking changes in tax rates occurred at the beginning and end of the wartime excess-profits taxes, in 1940, 1945, 1950, and 1953. Nelson (1970, pp. 47–48) has focused on the effect of anticipated tax changes, noting that each of these years witnessed unusually high contributions, presumably caused by firms' bunching gifts into the higher-tax year. Such timing effects are important to distinguish from the effects of "permanent" changes in net prices. For the sake of predicting the effects of permanent changes in the

30. Where t_a is the average tax rate, D_t and D_{nt} are donations by taxable and nontaxable corporations, the price variable is $P = [(1 - t_a)D_t + D_{nt}]/(D_t + D_{nt})$ (Schwartz 1968, p. 482).

31. In 1977, for example, returns with no net income had only 1.4 percent of total deductible contributions. The complement of the average tax rate for firms with net income was 0.608, and the Schwartz weighted average was 0.613 (U.S. Internal Revenue Service, *Statistics of Income—1977, Corporation Income Tax Returns* 1981 pp. 43, 45).

32. For a description and illustration of this calculation, see Nelson 1970, Appendix B. Appendix E compares the Schwartz and Nelson analyses.

tax structure on corporate contributions, it is necessary to know this permanent price effect, and not the transitory price effect. In order to reflect the anticipation of changes in tax rates, Nelson (1970, p. 48) included in some estimated equations a qualitative variable that takes on the value of zero in years before adoption or following the end of wartime excess-profits taxes—two in the first and last years of such taxes, and one otherwise.

Corporations may contribute goods as well as cash. Formerly, such contributions were deductible at "fair market value." Johnson (1966, p. 496) notes that corporations with low production costs and high distribution costs could benefit from contributing manufactured goods since both would be deductible but only the former would be borne. Johnson found that industries which produce usable products (for example, manufacturing and construction) contributed at higher rates than industries with few usable products (for example, finance and mining) (p. 497). The benefit from contributing inventory is now limited in most cases, however, as noted in section 5.2 of this chapter.

Income and Scale

The variable most often used in these empirical studies to measure the income or scale of a corporation is net income before tax. Not only is it readily available for all years, net income also seems to correspond to the economic definition of profit, at least gross profit. As noted in the previous discussion of data, however, the net income quantity defined by the tax law may not necessarily be the same as the economic one. In particular, depreciation allowances may diverge from true economic depreciation, and the degree of this divergence may be expected to change over time with the enactment of various accelerated depreciation allowances. Thus net income as defined in the tax law may be a misleading measure of economic profit. One alternative to the use of net income is cash flow income, which is net income plus depreciation and other amortization. Its use may be justified on the basis that depreciation allowances ought to be included in a variable intended to measure a corporation's ability to contribute. Or it may be viewed, given the wide fluctuations in allowable depreciation treatment, as simply a more consistent proxy for economic profit than net income would be. Among previous econometric studies of corporate giving, only Schwartz (1968) used cash flow income. It is worth considering what the likely effect will be of using net income as the measure of capacity when a variable such as cash flow is more appropriate. In this case, net income could be viewed as an imprecise measure of cash flow, presenting a simple case of errors in variables. The result would be a downward bias in the estimate of the scale effect, implying that the elasticity for the cash flow variable would tend to be larger than that for the income variable.

A second important drawback to the use of net income is that it does not reflect the impact of corporate tax liability on a corporation's capacity to contribute. The only study to examine after-tax income is Nelson's (1970) time-series analysis in which after-tax net income is the capacity variable. Although the choice between net income and cash flow income is not clear, since neither are perfect measures of economic profit, it does seem clear that after-tax quantities are preferable to before-tax ones.

Industry Structure

Several of the cross-section studies include some measure of industry structure to explain corporate contributions. Johnson (1966) examines two related hypotheses. The first is that corporations with more monopoly power demonstrate more social responsibility by making larger contributions. Using concentration as one measure of economic power, Johnson shows that contributions in fact *fall* as industry concentration increases. Johnson's second hypothesis regarding industry structure is more compelling. Johnson distinguishes "rival," or oligopolistic firms from purely competitive and monopolistic ones. Rival firms may use contributions "to seek a comparative advantage over each other" (p. 497). In contrast, by this hypothesis, competitive firms cannot afford to do this and monopolistic firms have no need to. Johnson then shows that the contributions-to-income ratios tend to be highest in industries characterized by "rivalry" (p. 499). Johnson also uses this argument to explain the hump shape of the contributions-to-income ratio as a function of asset size, arguing that the middle-asset classes display the highest degree of rivalness (p. 501). In contrast, Maddox and Siegfried (1981), using aggregated data by minor industry for 1963, found that contributions tended to rise with concentration ratios.

Trend

As in other analyses of changes over time, it is possible that models will not measure all of the effects occurring over time. In the case of corporate contributions, time trends usually indicate a secular increase in contributions over time. Johnson (1966, p. 494) argues that there has been a "gradual acceptance" of corporate contributions over time by management and stockholders. Another reason might include changes in the industrial composition of U.S. corporations.

Other Variables

Among the other variables used to explain contributions, advertising is intriguing as well as ambiguous in its probable effect. Because contributions may serve a purpose similar to that of advertising, advertising expenditures presumably reflect the extent to which corporations may use

contributions for public relations purposes. As Schwartz (1968, p. 482) implies, however, no sign can be predicted unambiguously. Firms that advertise may also find it useful to give contributions, but for a given firm the two items may well be substitutes. Levy and Shatto (1978) use investment as an explanatory variable, but it is unclear why. McElroy and Siegfried included relative firm size, research development expenditures, population, and contributions by other firms in the city in analyses of two different data sets (Maddox and Siegfried 1981; and McElroy and Siegfried 1982a).

5.4.3 Findings

The findings of previous econometric studies of corporate contributions are summarized in tables 5.11 and 5.12. The more aggregative time-series analyses provide the only evidence on the effect of the tax-defined net price on corporate giving. The estimated elasticities are generally greater than one in absolute value, implying, as in the case of personal contributions, that charities receive more in contributions as a result of the deduction than the Treasury loses in revenue. The magnitude of the estimated elasticity appears to be sensitive to functional form and variable definitions. Schwartz, using logarithms of pretax net income and price based on average tax rates to explain the logarithm of average contributions, obtained a price elasticity of -2.00. Nelson, using after-tax net income and lagged price based on marginal tax rates, obtained an elasticity of -1.03 in his logarithmic equation explaining total contributions. The estimates for the income elasticity vary similarly, from 0.53 to 1.43 among the equations summarized in table 5.11. Schwartz's equations suggest that the use of cash flow yields higher income elasticities than net income while the use of the logarithmic form yields larger price elasticities. The use of lagged price variables yields results similar to those obtained with current price. The inclusion of a trend variable appears to make little difference. The trend is negative but insignificant in Schwartz's regressions. Nelson obtains a positive and significant trend effect, but this may reflect growth in the number of firms over time.

Among the cross-section studies, the only common point of comparison is the income elasticities. These estimates vary less widely than in the time-series studies. Leaving aside an estimate of 0.03 obtained in an equation also containing investment, by Levy and Shatto (1978), these estimates range from 0.44 for Schwartz's (1968) equation with net income and advertising to 1.17 for McElroy and Siegfried's (1982) quadratic equation. Because income can vary greatly in a cross-section sample while other variables are constant, these cross-section estimates are probably more dependable than those for the time-series studies. Taken as a whole, the cross-section equations imply that contributions probably rise less than proportionally with corporate income. Regarding the estimated ef-

Table 5.11 **Summary of Time-Series Results**

Study	Form and Sample	Price Elasticity	Income Elasticity	Other Variables (sign if significant)	Sample Size
Schwartz 1968	Actual values	−1.36	.63	—	26
	Logarithms	−2.00	.63	—	26
	Actual values: net income, lagged price, and income[a]	−1.52	.53	trend	25
	Actual values: cash flow	−1.06	1.33	—	26
	Logarithms: cash flow	−1.68	1.34	—	26
Nelson 1970	Logarithms: net income, lagged price	−1.03	1.05	trend (+), expectations[b]	27
	Logarithms: current and lagged net income and price[a]	−1.18	1.43	trend (+), expectations[b]	27

[a]Elasticities shown are sums of current and lagged variable elasticities.

[b]See text for definition of expectations variable.

Table 5.12 **Summary of Cross-Section Results**

Study	Form and Sample	Income Elasticity	Other Variables (sign if significant)	Sample Size
Schwartz 1968	Logarithms: net income	.44	Advertising (+)	60
	Logarithms: cash flow	.60	Advertising (+)	
Nelson 1970	Logarithms	.68	Number of corporations (+)	121
		.52	Number of corporations (+), net worth	121
		.47	Number of corporations, net worth, employment (+)	121
Levy and Shatto 1978	Logarithms	.03	Investment (+), advertising (+)	56
Bennett and Johnson 1980	Logarithms: 1967	.58	Net investment, advertising (+) percent union (−), concentration ratio (−)	20
	Logarithms: 1971	.53	Net investment (+), advertising, percent union, concentration ratio (−)	20

Maddox and Siegfried 1981	Linear: positive assets, 1963			
	All industries	.47	Relative size (+), R&D/sales (+)	2262
	Manufacturing	.48	Concentration (+), relative size (+), advertising/sales (+), R&D/sales (+)	1163
McElroy and Siegfried 1982a	Linear	.72		162
	Logarithms	.72	Other firm contributions (+), population (−)	
McElroy and Siegfried 1982	Weighted, assets $10 million or more, 1976			
	Linear, all industries	.90	—	371
	Linear, all manufacturing	.87	—	480
	Quadratic, all industries	1.17	—	371
	Logarithms	.88	—	371
	Linear: weighted, assets $10 million or more, 1972	.96	—	204
	Linear: weighted, positive assets, 1976	.97	—	255

fects of other variables, corporations that advertise heavily also appear to make more contributions. Because decisions on both categories of expenditures are made simultaneously, however, it is not clear what the behavioral implication of that correlation is. Bennett and Johnson (1980) confirm Johnson's (1966) initial finding that contributions are inversely related to industry concentration.

A final effect on corporate giving examined in both time-series and cross-section equations by Nelson (1970) is the possible influence of profitability. If, independent of income, more profitable corporations contribute more than less profitable ones, then the inclusion of net income may reflect both scale and profitability components. Where G, P, I, and K are contributions, price, income, and capital stock, respectively, a profitability effect would be measured by b_3 in the equation:

$$\ln G = a + b_1 \ln P + b_2 \ln I + b_3 \ln (I/K). \tag{7}$$

If capital stock is included along with income as an independent variable, the coefficient on I will be a combination of income and profitability effects:

$$G = a + b_1 \ln P + (b_2 + b_3) \ln I - b_3 \ln K. \tag{8}$$

Nelson included net worth in time-series regressions (not shown in table 5.11) as well as in the cross-section analysis. In the time-series equation (Nelson 1970, p. 55), the coefficient of net worth is indeed negative, as suggested in equation (8). In the cross- section equation, however, the coefficient of net worth is positive but insignificant. While by no means definitive, these results suggest that income may measure both capacity and profitability effects and that, when net worth is omitted, the income coefficient will not be a pure measure of the scale effect. In order to measure accurately any profitability effect, it would be important to correct for taxes as well as for the effect of inflation in the presence of cost-based accounting rules.

5.5 Analysis of Corporate Contributions, 1936–80

In order to refine the models discussed in the previous section as well as to take advantage of data for recent years, a new analysis of corporate giving was undertaken in the current study. As in most previous studies the Internal Revenue Service's tabulations of tax return information in the *Statistics of Income* provided the basic data.[33] Two samples of observations were used for the analysis. First, annual tabulations of corporations by asset size were pooled over the period 1936–80 to yield a sample of 506

33. Data for the years 1963–68 were obtained from the unpublished "Source Book of Statistics of Income." All other data were taken from the U.S. Internal Revenue Service, *Statistics of Income, Corporation Tax Returns* (various years).

observations. This pooling makes it possible to observe corporations of different sizes over time. Pooled data therefore provide considerably more variation in income and asset size than is possible with aggregate time-series data. In addition, pooling allows for changes over time in the structure of tax rates, which obviously is impossible in cross-section analysis. Unlike the cross-section analyses discussed above, observations in the present analysis are not broken down by industry. If industrial composition changes over time, differences in contribution rates will tend to be reflected in the trend variable. The second sample used in the present study is a time-series of aggregate observations over the same period, 1936–80. Although this sample provides less information than the pooled sample, it is necessary for testing hypotheses regarding the dynamic nature of corporate giving. Because the number of asset classes as well as their real dollar limits change over time, correction for serial correlation and the examination of the response to changes in tax rates was confined to a subset of recent observations.

5.5.1 Data and Variables

The data and basic variable definitions from the *Statistics of Income* are described in section 5.4. For the current analysis, corporations with zero assets were excluded from the sample because they are likely to be in unusual or transitional situations.[34] In addition, firms without positive net income were excluded. As discussed in the previous section, such firms have virtually no deductible contributions, due to the limitations on the deductibility of contributions to 5 percent of net income, and only deductible contributions are given in the *Statistics of Income*. While the published data on contributions may understate actual contributions for any firm—due to the 5 percent limitation—the understatement is especially serious in the case of firms with no net income.

Income

The basic measure used to reflect firms' scale or capacity to contribute is after-tax cash flow, defined by:

$$(9) \quad CF = NI + (\text{Depreciation} + \text{Depletion} + \text{Amortization}) - T,$$

where NI is net income calculated without deducting contributions and T is total federal corporate tax liability calculated without the deduction for contributions. The net-income and tax variables are calculated so as to be independent of the size of actual contributions and thus exogenous to the contribution decision. After-tax cash flow measures income available to management in a given year. Although depreciation, depletion, and amor-

34. Firms reporting no assets included final returns of liquidating, dissolving, or merging corporations and foreign corporations. Internal Revenue Service, *Statistics of Income—1977, Corporation Income Tax Returns 1981*, pp. 124–25.

tization refer to costs the corporation has borne or eventually will bear, the amounts allowed for each—particularly depreciation—may bear little relationship to the true pattern of costs.

Given the importance of favorable depreciation features of the tax law, particularly in the last two decades, it is important to examine the effect of such provisions on corporate contributions. If net income as defined by the tax code were the correct measure of firm capacity, then accelerated depreciation schemes would be expected to discourage contributions to the extent that net income falls. If, however, cash flow is the correct measure, then such provisions may have no effect or may stimulate contributions. In order to compare the cash-flow and net-income concepts of income, equations using after-tax net income ($NI - T$) are also examined. The use of pretax net income seems to have little to recommend it since the income available to management clearly must be net of taxes.

Price

As in previous studies, the relative price of contributions is defined as one minus the tax rate on corporation incomes. For decisions at the margin, the correct tax rate is the marginal tax rate. Only Nelson (1970) has attempted to estimate marginal rates as such. As discussed in the previous section, however, his method relies in most years on taking the maximum statutory rate and in all cases produces only one overall rate per year. More detail is required for the present study because it examines corporations of different sizes in each year. To obtain the marginal tax rates applicable to various asset classes in each year involved two steps. First, averages of income and other relevant variables were calculated for each class in each year. Second, the various corporate tax schedules were applied to the tax bases in each class. In this way it was possible to account in some detail for variations in tax schedules over time, progression in rates within a given year, and interactions among the components of each year's corporate tax liability. Over the period studied, these components included the normal corporate income tax, the surtax (1941–78), the undistributed net-income surtax (1936–37), the declared-value excess-profits tax (1936–45), and the wartime excess-profits tax (1940–45, 1950–53).

The first step in calculating the component marginal rates within each asset-class observation was to apply the tax schedules in each year to the means for net income, capital stock, and other relevant variables. since the tax schedules are not linear, rates for the average income may differ from the average of all marginal rates, but comparisons of normal tax liabilities (i.e., before surtaxes) for selected classes show that calculated tax liabilites are generally close to actual figures, suggesting that calculated marginal rates are quite close to the actual. It is likely, however, that the calculated marginal rates will tend to mask some variation in the actual marginal tax rates faced by individual corporations. This problem is prob-

ably alleviated to a large extent because the sample used is restricted to corporations with positive net income. In addition, it is necessary to note that the tax calculation method used here omits all but the most important provisions of the tax code for any year. In most calculations, no account is taken, for example, of provisions related to long-term capital gains, carry-overs of unused excess-profits taxes, carry-overs of prior year net operating losses, or for special provisions related to utilities or insurance companies. The similarity of calculated and actual tax liabilities for the basic corporate tax suggest that these provisions are not greatly important for aggregate calculations.

The second step in the calculation of corporate marginal tax rates was to account for the interaction of component taxes. Because some of these taxes were deductible in calculating other taxes, the marginal tax rate on net income is not simply the sum of the marginal rates applicable to each tax base. To take a simple example, the corporate tax in 1939 was the sum of the declared-value excess-profits tax (*DEPT*) and the normal tax (*NT*), where the former is a deduction in calculating the latter. Where *NI* is net income and *CS* is the firm's capital stock, the total tax could be written as

$$T = DEPT(NI, CS) + NT(NI - DEPT). \tag{10}$$

The marginal tax rate for the total tax is

$$\frac{dT}{dNI} = \frac{\partial DEPT}{\partial NI} + \frac{\partial NT}{\partial NI}\left(1 - \frac{\partial DEPT}{\partial NI}\right). \tag{11}$$

Where *RNT* and *RDEPT* are marginal rate brackets applicable to a given return, the marginal rate for the total tax is

$$R = RDEPT + RNT(1 - RDEPT). \tag{11'}$$

Besides the basic measure of price based on the marginal tax rate on corporate net income, two variants were tested as well. The first was defined as one minus the average tax rate, where the average rate is the ratio of the total corporate tax liability (normal tax, surtax, and excess-profits taxes) to net income plus contributions. Because no calculation of marginal tax rate for aggregated corporate data can give exact results, it is useful to compare the performance of the price based on the approximate marginal tax rate with that based on the average tax rate. The latter is more straightforward to calculate, although as Fiekowsky (1977) has noted, average tax rates are not without ambiguities of their own.

The final measure of price used separates the marginal price into its permanent and transitory components. Where P is the price based on the marginal tax rate in a given year and P^N is the normal or permanent price faced by corporations, the observed price can be divided into permanent and transitory components:

$$P = P^N k, \tag{12}$$

where k is the transitory deviation of price from its normal level. In the current study normal price is defined as the average price faced over the most recent three-year period. As it has been used in other applications, this general formulation[35] makes it possible to distinguish responses to permanent price changes from those to temporarily high or low prices, such as those resulting from wartime excess-profits taxes. The motivation for this specification is much the same as that behind Nelson's (1970, pp. 47–48) use of a qualitative variable for anticipated major changes in tax rates.

Time Trend

As in the two time-series analyses described in the previous section, the estimated equations in the present study include a linear time trend designed to reflect changes in the level of real giving over time not explained by other explanatory variables. Such a trend may be the result of a number of different effects, including changes in attitudes regarding the legality or propriety of corporate giving and changes in the perceived need for private giving in general.

5.5.2 Estimation

Equations explaining corporate contributions were estimated using two samples based on *Statistics of Income* data. First, an aggregate time-series analysis similar to that of Schwartz and Nelson was performed. Second, a pooled time series of cross sections was analyzed in order to combine the advantages of both kinds of data. These analyses are discussed in turn.

Time-Series Analysis

Annual data on corporate contributions from 1936 to 1980 for corporations with net income and assets were analyzed. Analysis of residuals from preliminary regressions revealed the presence of serially correlated errors. The time-series analysis therefore employs a correction for autocorrelation. For all published data the observations in the time-series analysis are based on the mean aggregate value. For the price of giving, the basic measure is one minus the weighted average of calculated marginal tax rates for each asset class, where net income is used as the weight. This series is given in Appendix G. Alternative measures of price are the top marginal tax rate, given in Appendix F, and the average tax rate. One aspect of price response that cannot be captured in a single measure is the possibility that corporations seek to time their gifts so as to give more in years when tax rates are relatively high. To capture this timing effect, the price was split into permanent and transitory components.

35. Friedman's (1957) analysis of permanent income is well known. For an application to tax analysis, see Auten and Clotfelter 1982.

Table 5.13 presents the basic time-series estimates. Equation (A) gives estimated elasticities for the basic measures of price and capacity, based on marginal tax rates and cash flow, respectively. The price elasticity is −0.41, with a standard error of 0.07, and the elasticity for cash flow is 0.54 (standard error = 0.22). The trend is positive, suggesting an average annual growth rate of 3.3 percent in corporate contributions that is not explained by trends in tax rates or after-tax cash flow. A slightly smaller price elasticity is obtained when the basic price measure is replaced by the price corresponding to the top tax rate, in equation (B). Replacing cash flow income by after-tax net income, in equation (D), results in a lower income elasticity (0.40) but almost no change in the estimated price elasticity (−0.43). Using pretax net income results in a drop in the estimated price elasticity to −0.33 and little change in the income elasticity, in comparison to equation (A). The price-elasticity estimates in these equations vary from −0.30 to −0.43, and the income elasticities vary from 0.40 to 0.57. Variants using the lagged price produced similar estimates.[36]

The result most at variance with the basic estimates in equation (A) is the very high price elasticity, −1.70, estimated in equation (C) using price defined in terms of average rather than marginal tax rates. The price- and income-elasticity estimates of −1.70 and 0.50 are much closer to those obtained by Schwartz of −2.00 and 0.63 in his log-linear specification. Because of the divergence in the estimated price elasticities, the choice of price measure is clearly a matter of some significance. While the correct measure of a company's price is based on its marginal tax rate, the issue is whether the average rate or a marginal rate based on average income better reflects marginal rates for all companies. On the one hand, the marginal rate calculated as a function of the average income for a class overstates the actual rates for firms with no net income, implying that the average tax rate may be a better measure of the average of marginal rates than the calculated marginal rate. A weakness of average tax rates as a proxy for marginal rates—besides not being calculated from the tax schedule—is that they may be much more strongly procyclical than marginal rates. In order to correct for this possible bias, the national unemployment rate was added in equations (F) and (G). Both estimated elasticities fall in absolute value, with the price based on the average rate becoming insignificant. At the same time the corporate-income coefficients become insignificant, reflecting the high negative correlation with the unemployment rate. While the procyclical nature of corporate gifts is made clear, the high degree of collinearity in the time-series data makes it impossible to distinguish any income effect.

A final specification used with the time-series data allows for a split in the price variable between permanent and transitory components. Equa-

36. Substituting the lagged price yielded price and income elasticities of −0.40 and 0.52.

Table 5.13 **Estimated Time-Series Equations: Dependent Variable—Logarithm of Aggregate Contributions**

Equation	(A)	(B)	(C)	(D)	(E)	(F)	(G)
Price							
$\ln(1-R_m)$	−0.41			−0.43	−0.33	−0.16	
	(0.07)			(0.07)	(0.06)	(0.05)	
$\ln(1-R_t)$		−0.30					
		(0.05)					
$\ln(1-R_a)$			−1.70				−0.32
			(0.26)				(0.27)
Income							
ln *CFN*	0.54	0.53	0.50			−0.08	−0.11
	(0.22)	(0.21)	(0.20)			(0.15)	(0.17)
ln *NIN*				0.40			
				(0.17)			
ln *NI*					0.57		
					(0.14)		

Unemployment rate						−0.082	−0.084
						(0.007)	(0.011)
Trend	0.033	0.036	0.026	0.041	0.035	0.046	0.045
	(0.011)	(0.011)	(0.010)	(0.008)	(0.008)	(0.006)	(0.007)
Intercept	5.41	5.71	6.14	9.03	4.63	21.6	22.2
	(5.37)	(5.01)	(4.84)	(4.09)	(3.32)	(3.6)	(4.1)
R^2	0.76	0.71	0.78	0.76	0.76	0.96	0.96
Autocorrelation coefficient	0.75	0.83	0.78	0.75	0.83	0.51	0.47

Note: There are 44 observations, except in equation (B) (42 observations) and equation (G) (41). The method of estimation is generalized least squares, with a correction for first-order serial correlation.
Variables are defined as: R_m = annual weighted average of class marginal tax rates (see Appendix G, col. 1); R_a = average tax rate (Appendix G, col. 2);
R_t = marginal tax rate at highest incomes (see Appendix F);
R_p = normal or "permanent" marginal tax rate = $(R_m(t-1) + R_m + R_m(t+1))/3$;
CFN = cash flow after taxes, before contributions, (net income + depreciation + depletion + amortization + contributions − (taxes + R_m (contributions))), in 1972 dollars (deflation using the GNP price deflator);
NIN = net income after taxes, before contributions, in 1972 dollars;
NI = net income, in 1972 dollars; Trend = year − 1935. Numbers in parentheses are standard errors.

tion (13) shows the estimated equation using prices based on marginal tax rate:

$$(13)\quad \ln G = \underset{(0.16)}{-0.27 \ln (1-R_p)} - \underset{(0.12)}{0.37 [\ln (1-R_m) - \ln (1-R_p)]}$$

$$+ \underset{(0.24)}{0.22 \ln NCF} - \underset{(0.013)}{0.059\, U} + \underset{(0.011)}{0.039 \text{ Trend}}$$

$$+ \underset{(5.9)}{14.0}\,, R^2 = 0.89, \rho = 0.46.$$

The elasticity with respect to the permanent price is -0.27 while the transitory tax effect is -0.37; these coefficients are not significantly different. The transitory tax effect suggests that corporations as a whole time their gifts to some extent in order to increase the tax savings from contributions. Nelson's results using a qualitative variable to represent anticipated price changes suggests the same sort of timing effect. It is interesting to note that the exclusion of that anticipation variable causes Nelson's estimated price elasticity to change from -1.0 to -0.6.[37] As in equations (F) and (G) the estimated-income effect is statistically insignificant.

Pooled Time-Series/Cross-Section Analysis

The second data set analyzed includes annual observations by asset class for firms with net income and assets. This pooling yielded a total of 506 observations with sizable variations in both the size of firms and the price of giving. Two econometric problems often arise in estimation using pooled data such as this: autocorrelation and heteroskedasticity. The

37. Nelson (1970, p. 51, table 11) estimated the equation:

$$\log GC = \underset{(0.26)}{-0.75 + 1.05 \log Y} - \underset{(0.11)}{1.03 \log P_{-1}}$$

$$+ \underset{(0.028)}{0.055\, E} + \underset{(0.003)}{0.016 \text{ Trend}}, R^{-2} = 0.93,$$

where GC is total giving in (thousands of) 1936 dollars, Y is total net income after taxes and before contributions, P_{-1} is the lagged value of Nelson's price variable, and E is his measure of expectations. I assumed $E = 0$ in 1939, 1946, 1949, and 1954 (years immediately before or after an excess-profits tax) and $E = 2$ in 1940, 1945, 1950, and 1953 (the beginning and ending years of such taxes). Where contributions were measured in 1972 dollars, I obtained the equation:

$$\ln GC = \underset{(5.67)}{-7.06} + \underset{(0.24)}{1.05 \ln Y} - \underset{(0.11)}{0.99 \ln P_{-1}}$$

$$+ \underset{(0.062)}{0.124\, E} + \underset{(0.007)}{0.040 \text{ Trend}}, R^2 = 0.94.$$

Obviously, the estimates are quite close except for the coefficient of E, which may oe attributable to an incorrect assignment of that variable in my analysis.

presence of serially correlated errors in the aggregated time-series equations suggests that this may be a problem in the pooled equations as well. Heteroskedasticity may arise because the error associated with class means tends to vary with the number of observations, and the number of firms by asset class in the present data varies greatly. Analysis of residuals showed that residuals did, in fact, tend to increase as the number of firms in each class fell. Accordingly, a generalized least squares procedure was used to account for both autocorrelation and heteroskedasticity. This involved, first, correcting for first-order serial correlation and, second, weighting the resulting observations by the square root of the number of firms in the class.[38] For the present sample, the former was complicated because the dollar values of class limits in the *Statistics of Income* were changed several times over the 1936–80 period, preventing comparison of class averages between certain years.[39] In estimation, transitional years were omitted in order to form comparable lagged values.[40]

Table 5.14 presents the estimates based on the pooled time-series/cross-section sample. The basic model using the price based on marginal tax rate is compared with after-tax cash flow and net-income variables in equations (A) and (B). Although the price elasticities are quite close, the estimated income elasticities differ significantly: 1.1 in (G) and 0.6 in (B). As noted above, if the legal net-income variable is a poorer measure of economic profit than cash flow income, one would expect, as in other cases of errors in variables, that the income coefficient in (B) would tend to be biased toward zero. For this reason, equations using the cash flow definition are presented in the remainder of the table. Equation (C) presents equation (A) corrected for autocorrelation. The estimated value of the autocorrelation coefficient in the equation is 0.85, indicating substantial positive correlation over time in a given class's residuals. While the point estimate of the income elasticity is 1.1 in (A) and (C), the price elasticity falls in absolute value from -0.47 to -0.23 between the two equations. The most apparent difference between these estimates and those based on the time-series data is that the income elasticities based on the pooled data are considerably larger, with point estimates ranging from 1.05 to 1.14, aside from equation (B). This difference is attributable to the greater vari-

38. A similar procedure is suggested by Kmenta 1971, pp. 508–12. For a discussion of weighted least squares, see Theil 1971, pp. 244–49. For a similar application to cross-section data on corporate contributions, see McElroy and Siegfried 1982b.

39. The number of asset classes by year was: 10 from 1936 to 1953; 14 from 1954 to 1961; 7 in 1962; 14 in 1963; 12 from 1964 to 1967; and 11 from 1970 to 1980.

40. Observations for 1954, 1962 through 1964, and 1970 were omitted. Each variable was transformed, e.g., $g^* = g_t - rg_{t-1}$, where g is the logarithm of giving and r is the estimated autocorrelation coefficient. The equations on these transformed variables were then weighted. It is also worth noting the implicaton of inflation for this estimation procedure. Inflation has the effect of changing the real bracket limits of asset classes over time, although inspection of the data over time shows that the distribution of firms among classes changes slowly, so that correcting for first-order serial correlation is not unreasonable.

Table 5.14 **Estimated Pooled Equations: Dependent Variable—Logarithm of Average Contributions**

Explanatory Variables	(A)	(B)	(C)	(D)	(E)	(F)	(G)
$\ln(1-R_m)$	−0.47	−0.46	−0.23		−0.20		−0.57
	(0.06)	(0.06)	(0.03)		(0.03)		(0.25)
$\ln(1-R_a)$				−1.75		−1.81	
				(0.15)		(0.17)	
$\ln ACFN$	1.12		1.11	1.04	1.14	1.05	1.12
	(0.01)		(0.03)	(0.03)	(0.02)	(0.02)	(0.04)
$\ln NIN$		0.59					
		(0.76)					
U					−0.024	−0.001**	0.011**
					(0.006)	(0.007)	(0.014)
Trend	−0.0065	−0.0077	−0.020	−0.0082	−0.015	−0.007	0.015**
	(0.0017)	(0.0018)	(0.005)	(0.0040)	(0.003)	(0.003)	(0.013)
Intercept	−6.44	−5.56	−0.84	−0.96	−1.30	−1.28	−1.79
	(0.12)	(0.15)	(0.05)	(0.50)	(0.06)	(0.05)	(0.14)
R^2	0.96	0.96	0.77	0.84	0.87	0.89	0.92
Autocorrelation coefficient	—	—	0.85	0.83	0.78	0.78	0.89
Sample[a]	1936–80	1936–80	1936–80	1936–80	1936–80	1936–80	1965–80

Note: Standard errors are given in parentheses. Coefficients denoted by double asterisks have t-statistics less than 2 in absolute value. Variables are defined for asset classes as follows: R_m = marginal tax rate; R_a = average tax rate (normal tax plus excess-profits taxes as percent of net income); $ACFN$ = average cash flow after taxes, before contributions; NIN = average net income after taxes, before contributions; U = unemployment rate.

[a]The number of observations per year was: 1936–53: 10; 1954–61: 14; 1962: 7; 1963: 14; 1964–69: 12; and 1970–80: 11. Equations (A) and (B) are based on the entire 506 observations. The remaining equations include only years for which the preceding year had the same number of observations. For equations (C) to (F) this was 438 observations. For equation (G) it was 158.

ation in average company size in the cross-section data than in the time-series, and it is similar to the results obtained in previous econometric analyses. The equations suggest that contributions increase at a rate slightly faster than proportional to income or capacity. As in the time-series regressions, the use of alternative income measures made little difference in the estimated income elasticity.[41] As discussed below, the choice between cash flow and net income must rest on the reasonableness of each. In contrast to the positive trend in aggregate giving in the time-series analysis, the trend terms for average giving in the pooled analysis using the full sample are negative.

Regarding the effect of price in the pooled equation, the contrast between the magnitude of the estimated price elasticities based on marginal and average tax rates remains striking. In the basic equation covering the entire sample and employing the correction for autocorrelation (C), the elasticity associated with the marginal price is -0.23, compared to -1.75 for the average price (the latter being roughly the same magnitude as that in the corresponding time-series equation (C) in table 5.13). In equations (E) and (F) the unemployment rate is included to account for any cyclical effects not measured by net income. In contrast to the time-series sample, where unemployment and corporate income are highly correlated, the addition of unemployment in these pooled equations has little effect on the estimated-income coefficients.

Equation (G) is limited to observations after 1964. The use of this more recent period makes the autocorrelation correction more straightforward since there is only one change in asset-class definitions. In addition, using the recent period allows one to avoid the most difficult problems in measuring marginal tax rates, particularly those associated with excess-profits tax. For this sample the estimated income elasticity is quite close to that obtained in the entire sample, but other coefficients are different. Most apparent, the point estimates of the price elasticity are larger in absolute value for each specification, although the standard errors are considerably bigger, presumably due to the higher correlation between income and price during the post-1964 period. The unemployment rate is insignificant in both equations, and the trend is positive and significant in the last equation.

41. Substituting net income for cash flow in equation (A) yielded an almost identical income elasticity of 1.10 (standard error = 0.01), but a smaller absolute price elasticity of -0.21 (0.05). The R^2 was 0.97. An alternative measure of firm scale, assets, was included along with cash flow in another formulation; estimated elasticities were: price: -0.42; cash flow: 0.03; and assets: 0.91. $R^2 = 0.97$. This suggests that assets may be as good a measure of scale as income.

An equation splitting up the price effect into permanent and transitory components was estimated as in the time-series analysis. The equation including the unemployment rate was

$$\ln G = \underset{(0.07)}{-0.27} \ln (1-R_p) - \underset{(0.11)}{0.14} [\ln (1-R_m) - \ln (1-R_p)]$$

$$+ \underset{(0.01)}{1.12} \ln NCF - \underset{(0.006)}{0.064} U - \underset{(0.002)}{0.012} \text{Trend} - 5.81,$$

$$R^2 = 0.97, N = 391.$$

Only the permanent price effect is significantly different from zero at the 95 percent level, with an implied elasticity of -0.27. The point estimate of the transitory price effect, -0.14, is insignificant.[42]

Evaluation

In assessing the findings of the present study, it is important to focus in particular on the income effect and the price effect. The present results regarding the elasticity of corporate giving with respect to measures of income or capacity are generally comparable to those obtained in earlier studies. The equations using cross-section data, in which income shows the most variation, imply an income elasticity slightly above 1.0 when net cash flow is used; the use of net income results in a smaller estimate. The present analysis, however, does not resolve the question of what is the proper measure of income or capacity. Neither pretax net income, after-tax net income, nor after-tax cash flow stands out in terms of explanatory power. Consequently, it appears to come down to which measure is the most reasonable. Pretax net income is commonly used as a measure of firm income, but the exclusion of tax liability causes actual capacity to be measured incorrectly. This is so particularly in the context of "managerial discretion" models of firm behavior in which management maximizes utility subject to a net-profit constraint. Even more dubious is the notion—implicit in any use of the legal definition of net income—that corporate contributions respond to changes in accounting definitions used for tax purposes. There is little reason to believe, for example, that an increase in allowable depreciation charges would itself lower contributions through an income effect unless managers were subject to some sort of accounting illusion. The major attraction of the cash flow definition is that it is unaffected by artificial changes in the accounting definitions of depreciation, depletion, and amortization. These quantities are added back into net income on the assumption that they do not represent current ex-

42. Because of the number of lags already involved in the definitions of permanent price, no correction for serial correlation was made for this equation.

penditures that reduce available capacity to make contributions. To the extent that allowable depreciation and depletion allowances exceed the true corresponding magnitudes, the cash flow measure is all the more attractive.

Net income and cash flow income imply quite different results for tax policies providing for liberalized depreciation allowances, such as the Economic Recovery Tax Act of 1981. The most apparent effect of the new depreciation rules will be to reduce net income as defined for tax purposes in the short run. Over the lifetime of any class of capital goods, the major effect of any shortening of accounting lives is to increase depreciation deductions. This increase will last until capital being depreciated under the previous accounting rules is fully depreciated. How this change in depreciation will affect contributions depends crucially on which specification is adopted. In order to illustrate the effect of a liberalization in depreciation such as that embodied in the 1981 tax act, table 5.15 presents a simple example of a firm whose capital stock has a life of five years and is replaced over time. The effect of shortening the accounting life of assets in year 3 is to increase depreciation expenses in the short run, thereby reducing net income (both before and after tax), but *increasing* cash flow. Because the estimated equations presented above suggest that these measures of capacity have similar effects on contributions, these opposite changes also imply opposite effects on contributions. The implications of the act for corporate giving in the 1980s therefore depend on which econometric specification is selected. Since the statistical fits of both models are quite close, one must fall back on the reasonableness of the models. Using this criterion, the cash flow specification seems preferable, implying that the income effect of the act will tend to encourage giving.

Conclusions about the price effect of tax rates on corporate giving are equally unsettled as a result of the present analysis. Although most of the estimates of the price elasticity based on marginal tax rates cluster between -0.2 and -0.4, estimates using the average tax rate are considerably higher. Because of its theoretical soundness, the marginal-price concept is preferable, but difficulties in measuring marginal tax rates make one cautious about rejecting the average price results entirely. Splitting the price into permanent and transitory components suggests that corporations time their contributions in order to take advantage of temporarily high tax rates. As Nelson (1970) notes, corporate foundations may be used in this connection to smooth out the pattern of gifts over time.

With these reservations in mind, it is nevertheless illuminating to apply the estimated coefficients to project corporate giving under various changes in tax policy. One of the most extreme changes in the present tax structure would be the elimination of the corporate tax. Like previous studies, the present estimates are strictly applicable to changes in price and income variables that are within the range of observed values. Simu-

Table 5.15 **Effect of Shortened Asset Life for Accounting Purposes: An Example of a Change in Year 3**

Year	Cash Flow Income[a]	Depre-ciation[b]	Net Income	50% Income Tax	After-Tax Contributions[c]			
					Cash Flow	Net Income	Based on Net Income	Based on Cash Flow
1	200	100	100	50	150	50	10.0	10.0
2	200	100	100	50	150	50	10.0	10.0
3	200	130	70	35	165	35	8.1	11.1
4	200	160	40	20	180	20	5.8	12.2
5	200	140	60	30	170	30	7.4	11.5
6	200	130	70	35	165	35	8.1	11.1
7	200	120	80	40	160	40	8.7	10.7
8	200	110	90	45	155	45	9.4	10.4
9	200	100	100	50	150	50	10.0	10.0
10	200	100	100	50	150	50	10.0	10.0

[a]Revenue minus costs other than depreciation and other amortization.

[b]In years 1 and 2, a five-year asset life with straight-line depreciation is used. A constant capital stock of 500 is assumed. In year 3, the allowed asset life is reduced to two years,increasing the allowable depreciation on one year's worth of capital to 50 rather than 20; total depreciation is 80 + 50 + 50 = 130. In year 4, it is 60 + 50 + 50 = 160; in year 5, 40 + 50 + 50 = 140; and so on.

[c]Beginning contributions (years 1 and 2) are assumed to be 10. Calculated contributions are calculated assuming variables other than income or cash flow remain constant: $G_t = 10\,(N_t/N_1)^b$, where N_1 and N_t measure net income or net cash flow in years 1 an t and where the coefficient b is assumed to be 0.6 for net income and 1.1 for net cash flow.

lating the elimination of the corporate tax, of course, involves a much larger change in price and income than what has been observed; thus a simulation based on such estimates must be taken as merely suggestive of the possible impact. Taking the values of after-tax cash flow, taxes, and price for all corporations with net income in 1980 to be $370.7 billion, $62.8 billion, and 0.54, respectively (U.S. Internal Revenue Service, *Statistics of Income—1980, Corporation Income Tax Returns* 1983, p. 36, table 3), and assuming price and income elasticities of -0.4 and 1.1, respectively, corporate giving in the absence of the corporate income tax is estimated to fall by only 7.2 percent. Although the elimination of the tax would cause the price of gifts to rise by about 85 percent, after-tax cash flow would increase by 17 percent, nearly offsetting the price increase.[43] Obviously, larger price elasticities would imply larger reductions in contributions, so a 7 percent decline should probably be taken as a minimum reduction in corporate giving if the tax were eliminated. Assuming the basic validity of the estimates presented here, it seems quite unlikely that the elimination of the corporate income tax would result in an increase in corporate gifts.

A second change in the corporate tax that is less far-reaching would be a limitation on the deductibility of charitable gifts. If, for example, contributions were included as a preference item in the corporate minimum tax, the price of making contributions would be increased for corporations subject to that tax. For a firm facing a 46 percent marginal rate and subject to the minimum tax, including contributions as a preference item at a 15 percent rate would increase the price of giving from 0.61 to 0.76.[44] If there were no cross-price effects between this price and other business expenditures, simulation of the effect using the present model would be straightforward. Based again on figures for 1980, contributions would be projected to fall by about 8.5 percent.[45] Again, larger price elasticities would imply larger declines associated with this change. As noted previously in this chapter, current estimates of the price elasticity of corporate giving may shed little light on the effect of changing the *relative* price of firm's expenditures. If changing the deductibility of contributions caused firms to substitute other expenditures—like advertising—for contributions, simulations based on current estimates will probably understate the reduction in contributions.

43. $G_1/G_0 = (1/.54)^{-0.4}(433.5/370.7)^{1.1} = 0.928$.

44. Before the inclusion the price is $(1-(0.46)(1-0.15)) = 0.609$. Afterwards, it is $(1-(0.46)(1-0.15) + 0.15) = 0.759$.

45. $G_1/G_0 = (.759/.609)^{-0.4}(370.4/370.7)^{1.1} = 0.915$, where $370.4 = 370.7 - .15(2.33)$.