

**SOME ISSUES ASSOCIATED WITH  
BUSINESS DEBT**

**by**

**L.R. Klein  
N.B. Gultekin  
M.N. Gultekin  
Q. Mohiuddin**

**25-90**

**RODNEY L. WHITE CENTER FOR FINANCIAL RESEARCH  
The Wharton School  
University of Pennsylvania  
Philadelphia, PA 19104-6367**

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## SOME ISSUES ASSOCIATED WITH BUSINESS DEBT

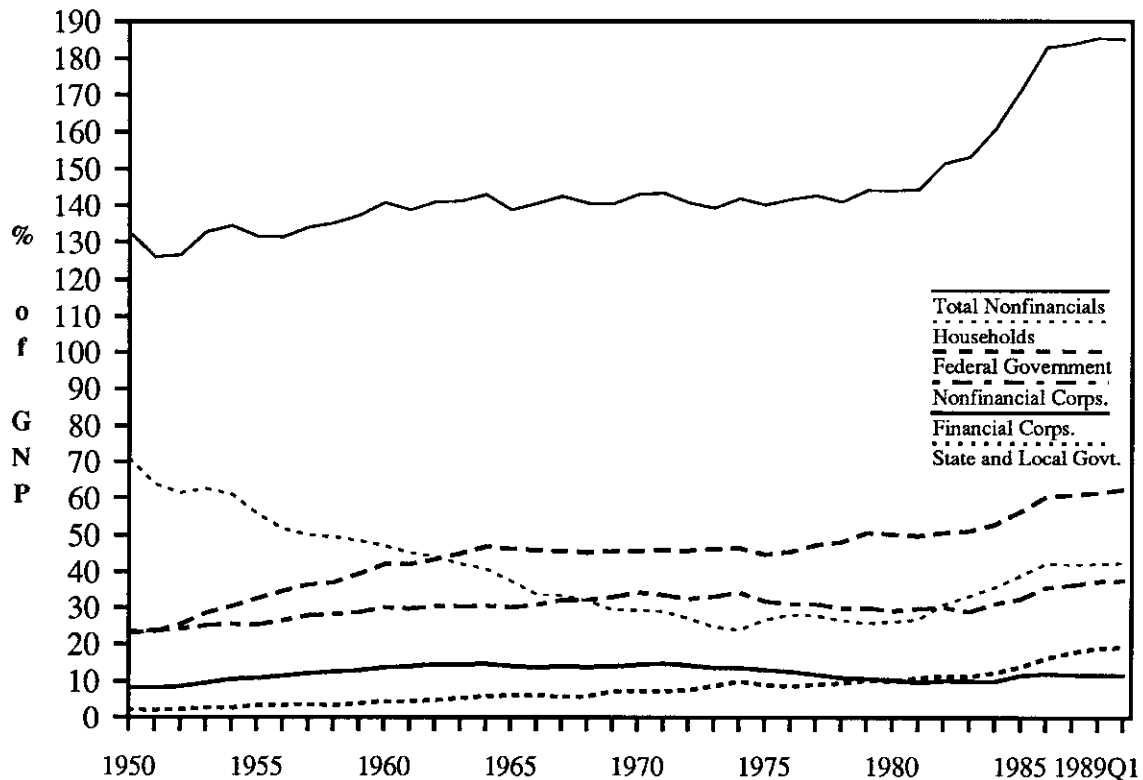
### Abstract

In this report we investigate the impact of the recent increase in indebtedness in the United States on tax receipts, economic stability, and economic efficiency. Evidence reported in this study shows that increased indebtedness in the corporate sector has a significant cost to the Treasury in term of reduced tax receipts. This reduction in corporate tax receipts is not fully offset by an increase in personal taxes. It appears that corporate restructuring, together with the build-up of debt, is worrisome and bears careful monitoring, but it does not seem to lead to a financial crisis. The issue of economic stability, without access to more data, is not settled and it is difficult to make a clear case.

## I. Statement of the Issues

There can be no doubt that an increase in indebtedness has taken place in the United States. This has occurred in several sectors -- household, business, and government. In this report, we shall be primarily concerned with debt issued by nonfinancial corporations, but there are some aspects of the total debt picture in which the inter-relatedness of debt held in the various sectors is of relevance and will be commented upon.

**Figure 1**  
**Credit Market Liabilities Outstanding as Percent of GNP**



Source: Federal Reserve Board, Flow/Funds Discount

An overall picture of the time pattern of liabilities among the various debtor groups is shown in Figure 1, based on data taken from the flow-of-funds accounts of the Federal Reserve Board. Of course, a growing nation and its growing sectors need to carry, and are capable of carrying, an increasing debt burden in the ordinary course of events; so the debt figures are scaled by a conventional size indicator, namely, the total GNP. Both debt and GNP are measured in current dollars and expressed as a ratio.

For the economy as a whole, the debt ratio has risen markedly, with a very sharp increase since 1982. Benjamin Friedman (1986), in commenting on this picture, has emphasized that no one particular sector has always been responsible for the large rise. The debt ratio has trended upwards for the nonfinancial corporate sector, but its rise since 1982 appears to be only a small factor in the increase of the national ratio. The public sector debt ratio, especially of the federal government, and the household sector debt ratio have also made significant contributions to the total. From time to time, different sectors have been of unusual significance in the rise of the total ratio, and every sector's ratio has not risen monotonically, but the overall national ratio has risen steadily, and very sharply so, in recent years.

The corporate sector's ratio (both nonfinancial and financial) and the household sector's ratio have exhibited long term trends (upwards) since 1950, but they show spurts in recent years. The federal government debt ratio was on a declining trend until 1974 and then started to rise, with an acceleration after 1982.

There are other ways of looking at the indebtedness of the business sector, not only in relation to GNP, but in relation to its own sectorial contribution to GNP or its cash flow position. Let us note that business debt, in particular the debt of the nonfinancial corporate sector, has unmistakably risen in recent years in relation to some key scaling factors, to be discussed below, and it is the purpose of this report to look at this rise from three points of view.

- (i) Has the rise in corporate indebtedness contributed to a decline in corporate tax receipts of the federal government, below what they would have been without the extensive use of this form of corporate finance?
- (ii) Has the rise in corporate indebtedness increased the degree of economic instability? The sharpest rise in indebtedness has occurred during a period of sustained economic expansion, and there is concern that the business sector will find it harder to continue servicing a large debt during a significant recession. It is particularly feared that a normal recession could be amplified if it were to take place with companies in an unfavorable debt position.

- (iii) Has the large amount of debt financing made for more or less economic efficiency? Much of the debt was issued in connection with highly leveraged management buyouts (LBOs) or also with mergers and acquisitions. An argument can be made that management buyouts lead to efficiency because they fuse *ownership* and *management* together, thus giving the managers a greater stake in the successful operation of the firm. It can also be argued that concern for heavy debt servicing can distract management from the tasks of running the firm efficiently by focusing undue attention on the generation of immediate cash flow. Also, mergers and acquisitions are expensive and time consuming, diverting management attention from the daily tasks of running the business on the shop floor or in the back rooms of firms.

There are many more issues associated with present trends in corporate finance, but this report is going to focus on the three listed above, except where related issues must be taken up in order to throw light on those of central concern.

These are not new issues, but they are actively under investigation at the present time. Research scholars in the field of corporate finance have delved into analysis of the three issues cited here and into many more also. A large literature has blossomed, and the research is of very high quality. The issues are elusive, especially because quantitative data are not readily available in a form that throws light on the matters of concern. Researchers have had to create finely tailored data sets and design simulated scenarios where data on actual outcomes are not available. For example, Statistics of Income, published by the Internal Revenue Service that show innumerable details about federal revenue would be an ideal source for issue (i), but these invaluable reports are available only after considerable time delay, up to 4 years. So many of the most interesting and significant events concerning corporate indebtedness have occurred since 1985 that a clear picture of the situation cannot be taken from Statistics of Income at the present time.

In spite of the ingenuity and diligence of this army of researchers, there is no clear consensus on any of the three main issues. There are reasons for and against a decrease in tax revenues although most of the evidence supports the idea that the debt build-up takes revenue away from the Treasury, on balance. As for the issue of stability of the economy, leading

researchers come to different conclusions; some see the debt build-up as a potential or actual source of instability, while others believe that it is fundamentally benign. There is practically no argument that it is a stabilizing factor, except for those who implicitly believe that any market clearing activity makes for stability.

Consider the question of economic efficiency. There are important papers by respected scholars that come to opposite conclusions; some arguing that buyouts, mergers, or acquisitions make for more economic efficiency, while others claim that these activities make for less economic efficiency. Efficiency is measured by lower costs, higher profits, superior stock market performance, or increased factor productivity.

There are essentially two research strategies in quantitative economics that will be used to bring the existing literature up to date or to try to settle honest disputes. By one technique, we shall look carefully and systematically at macroeconomic data taken from the national income and product accounts, the flow-of-funds accounts, and related national tabulations. At the national level, through time, many events ("third" factors) are continuously changing, thus blurring the relationships we are looking for. But in many cases, the changes being investigated are so large and so sharp that the macroeconomic results are quite convincing. "Third" factors will be able to account for only a small part of overall variation.

By contrast, the specially designed samples of individual businesses can either avoid the presence of "third" factors or even control them, so they may produce more satisfying results. But, in general, the microeconomic data sets are capable of giving only *direct* effects, on the first round, and in situations where indirect effects are important they can be misleading. Also, the simulated results are not always realistic, therefore it is difficult to rely on them alone.

## **II. Discussion of Taxes**

In examining the issue (i) of declining corporate tax receipts, we deal only with the total value of Treasury collections as a result of those actions that give rise to the debt build up. Taxation is an extremely important consideration for the LBO, merger, or acquisition process.

The literature fully recognizes that tax saving or tax minimization is an important contributing factor behind an LBO or merger or acquisition.

The argument runs as follows: Debt financing is tax-motivated because interest payments are deductible as business costs in figuring corporate tax liability; whereas dividend payments that would be generated by equity financing are not deductible as business costs.

There is another powerful tax motivation in buyout and merger or acquisition activity, namely, that business assets are generally revalued upwards to produce a buyout premium, and this provides greater depreciation charges, which are deductible as business costs. During the period when accelerated depreciation changes were more liberal, 1982-86, this was an especially stimulative factor and the tax reform legislation introduced after 1986 weakened this incentive but did not eliminate it.

Insofar as the wave of buyouts, mergers, and acquisitions since 1982 were heavily financed by issuance of high yield debt ("junk bonds"), the effects of these activities were closely associated with the build-up of corporate debt.

There is a related development that is relevant for judging trends in corporate tax liabilities, namely, the growth of employee-stock-ownership-plans (ESOP). These have an independent existence, apart from buyouts, mergers, and acquisitions, but they may be tied to these activities in a few cases. Management buyouts may be more feasible if ESOP schemes are introduced for the workforce at large, beyond the strict management group. Also, trade union takeover of a company may be financed through an ESOP.

Under the terms of an ESOP, debt is created to pay for the shares distributed to employers, and the servicing of this debt carries interest deductibility for tax purposes. Also, the *principal*, as well as the *interest* is deductible because it is treated as an employer payment to employees.

Interest deductibility, the changing basis for calculating depreciation, and ESOP financing all contribute in a direct sense towards lowering Treasury revenues from corporate income taxes. There are, however, two sources of tax increase for the Treasury. The interest paid to individuals, and businesses who purchase the bonds used for corporate finance must pay income



tax on their earnings. Some of the bonds are purchased and held by tax exempt institutions, and their interest receipts are not taxable. In the case of pension funds, they ultimately become taxable when paid out for retirement income but not right away.

A second source of revenue comes from the capital gains distribution to shareholders of a merged or acquired corporation. The corporate change customarily involves a premium over prevailing prices, and this is often treated as a realized capital gain. Even unsuccessful takeovers may result in special payments to shareholders, who then pay income tax on the distribution. Again, a distinction must be made between taxable and tax-exempt shareholders.

These sources of higher or lower tax collections for the Internal Revenue Services have been discussed so far in terms of *direct effects*. At the total economy level, there are significant indirect effects, too. Money market rates, dividend rates, levels of total economic performance are all changed by virtue of the buyout, merger, and acquisition activity taking place, and these indirect macroeconomic changes *feedback* on tax liabilities. In the end, it is a very complicated piece of analysis to determine whether the Internal Revenue Service gains or loses.

Suppose, for example, that the unusual expansion of the American economy that began in November 1982 were being kept alive in good part by the buyout, merger, and acquisition activity in the corporate sector. This expansion is surely a revenue earner for the Treasury by providing businesses and households with a strong tax base.

It is difficult, and it may even seem to be impossible, to assess the revenue implications of corporate debt financing, which is, in turn, associated with corporate re-structuring. Three interesting studies look at the direct effects on corporate income tax collections. Alan Auerbach and James Poterba (1987) conclude that the *relative* decline in corporate tax revenues in recent years is partly accounted for by changes in revenue legislation but mainly by the *relative* decline in corporate profits. The changes in capital recovery provisions are the principal legislative reasons for the changes in reported profits.

Katherine Schipper and Abbie Smith (1989) look at a sample of 93 management buyout firms and find that estimated (not actual) interest tax savings tend to exceed depreciation tax

savings. The latter gains, which were significant for only 30 firms in their sample are largely eliminated by the Tax Reform Act of 1986.

Both studies are insightful as to the logical source of *direct* revenue gains or losses for the Treasury, but they do not settle our first issue. To make an estimate of the effect of debt financing on Treasury receipts, we estimate a macroeconomic relationship between tax liabilities, corporate asset structure, and capital consumption allowances.

John Shoven (1986) has looked at the general issue of corporations' making of non-dividend tax payments to shareholders. This came about through the repurchase of their own shares by corporations or by the acquisition of shares in another company. Such payments used to be quite small, but by 1984 they exceeded total dividend payments. They continue to grow. John Shoven estimates that the Treasury loss as a result of treating share purchase payments differently from dividends amounted to more than \$25 billion in 1985. Total corporate equity has been reduced by this practice and debt has been increased; this generates lower corporate tax payments in the future. Of course, individual shareholders are liable for personal taxes if they receive the non-dividend cash payments. This is not the case for tax-exempt pension or other funds that hold shares.

A number of considerations have been taken up in this section to see, in principle, what could be contributing to the downward drift, through time, of corporate income tax liabilities when scaled by the size of GNP. There are direct effects of changes in tax legislation and also of corporate financing practice, such as debt-equity shifts. Tax revenues, tax legislation, and techniques of finance all have important effects on the economy. These effects show themselves in financial markets and overall economy performance. In other words, there are indirect (or feedback) effects as well as direct effects.

How does it all work out? To try to answer this question, we have looked in some detail at macroeconomic relationships to get the total economy effects. We begin by assuming that corporate tax liabilities follow corporate profits. This is actually a tight fitting relationship that yields regression coefficients that appear to be compatible with the official tax rates.

In line with macroeconomic reasoning, we say that apart from the relationship between corporate tax liabilities and corporate profits we would expect (accelerated) depreciation to have an effect especially because it is known to be intended to reduce taxable corporate earnings. It is a cost item and is allowed by law to be at a rapid rate in an asset's early years. We therefore enter capital consumption allowances and expect it to show a negative effect on tax collections. All variables, so far, are scaled by GDP originating in the nonfinancial corporate sector (tax liabilities, profits, and capital consumption allowances). It should be remarked that, implicitly, capital consumption allowances are a negative component of the identity that defines profit.

Given our hypotheses with respect to the present investigation, we look for a measure of debt that would also help to explain the downward slide of corporate tax liabilities. Liabilities, profits, and capital consumption allowances are all scaled by GDP, to keep their coefficient in a tax equation small and readily interpretable. Debt is, however, scaled by equity. We use debt-equity ratio as a separate variable.

Finally we try to account for major changes in the tax laws. Accordingly, we define the following constructed (dummy) variable:

- |                 |  |
|-----------------|--|
| D = +1, 1950-53 | to take account of excess profits taxes and higher statutory rates.  |
| D = 0, 1954-61  | to take account of the lowering of revenues from allowing corporations a privilege for faster write-offs.  |
| D = -1, 1962-85 | to allow for the introduction of the investment tax credit and a later step up in the investment tax credit, through 1985. Also, statutory rates were lowered. |
| D = 0, 1986-88  | to allow for the tax reform act of 1986 on capital consumption allowances.   |

An estimated equation from annual data, 1950-1989, yields the following results:

$$\frac{CTAX}{GDP} = \frac{0.055}{(3.98)} + \frac{0.32}{(7.90)} \frac{PROFIT}{GDP} - \frac{0.23}{(2.72)} \frac{CAPCON}{GDP} - \frac{0.020}{(5.48)} \frac{DEBT}{EQUITY} + \frac{0.0082}{(8.04)} D$$
$$\bar{R}^2 = 0.97 \quad DW = 1.78$$

CTAX/GDP = ratio of non-financial corporate tax liabilities to GDP

PROFIT/GDP = ratio of profit before tax to GDP

CAPCON/GDP = ratio of capital consumption allowances to GDP

DEBT/EQUITY = ratio of non-financial corporate debt to equity

*D* = dummy variable described above

GDP is measured as production originating in the non-financial corporate sector.

(Data Sources: WEFA Database; and Federal Reserve System, Flow of Funds Balance Sheets).

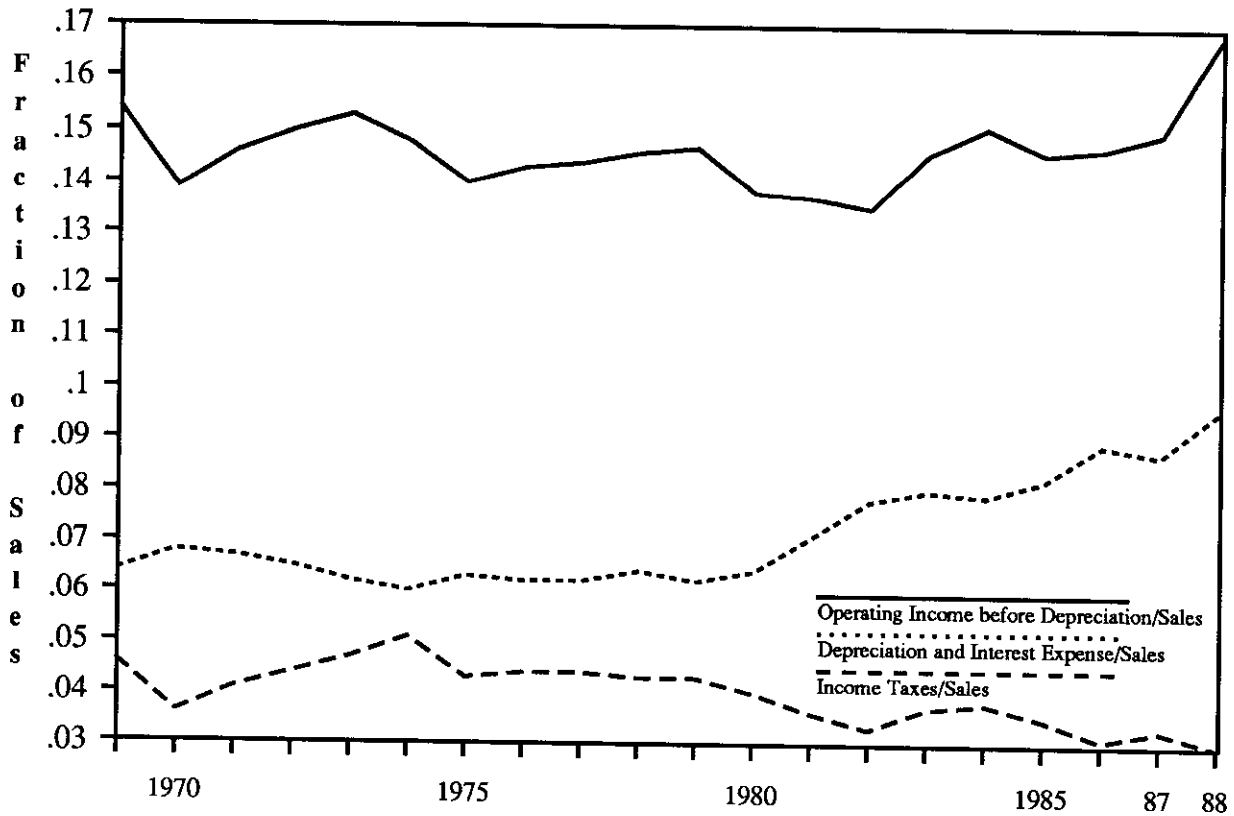
This equation estimated by the method of ordinary least squares produces sharp (statistically significant) coefficients, all showing the expected direction of effect.

In spite of the fact that PROFIT is computed after allowing for depreciation, there is still a significant effect of the amount of depreciation (capital consumption allowances), and the changes in tax laws, exemplified by the values assigned to the dummy variable *D* in various periods since 1950, show not only rate changes but the extent to which depreciation allowances or investment credits can be used. The Tax Reform Act of 1986 was not phased into place all at once. If we were to treat 1986 differently from 1987 and 1988 (0 for the transition year and +1 for each of the latter two), the results would hardly be affected.

We cannot *prove* that tax treatment of depreciation and interest as opposed to dividend payments on capital are largely responsible for the negative trends in corporate tax revenues; our results are certainly consistent with that viewpoint. The negative coefficients of (CAPCON/GDP) and (DEBT/EQUITY) are so significant and strong, in line with movements of (CTAX/GDP), that it is difficult to argue otherwise, especially given the general logical arguments why

they lead to tax minimization. These results, however, refer only to corporate tax liabilities and not to the possible shifting of some of the tax burden from the corporate to the personal sector.

**Figure 2**  
**Operating Income, Interest and Taxes**



Source: Standard & Poor's Compustat Services, Inc.

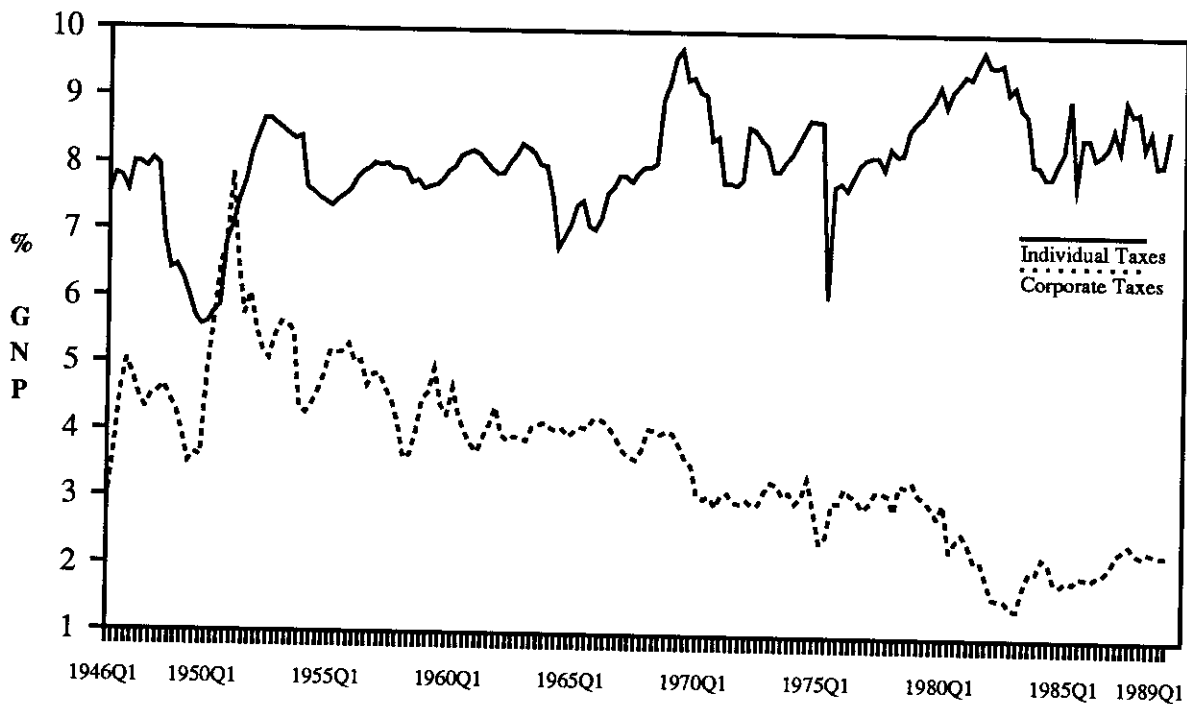
Another piece of evidence about the declining shares of corporate taxes in corporate economic activity and about some of the related factors responsible for this trend is shown in figure above, where we have plotted the time paths of corporate operating income, depreciation and interest expense, and income taxes all expressed as ratios to corporate sales. These data are based on their total corporate sample reported in the Compustat tape, which is described in the next section.

The ratio of operating income to sales exhibits little or no trend since 1969, while the time path of the depreciation and interest expense ratio moves sharply upward after 1980. At the same

time, the path of the corresponding corporate income tax ratio moves slightly downward. These are fairly strong pieces of evidence to give additional support to the argument being made in this section about the reasons for the declining trend in the corporate tax ratio.

While the ratio of corporate tax liabilities to GNP shows a declining trend (over many years), the ratio of individual tax payments to GNP shows a slightly rising trend, perhaps not fully compensating for the decline in the corporate sector. These opposite trends can be seen in the graph below.

**Figure 3**  
**Federal Tax Collections As Percent Of GNP**



Source: Citicorp Citibase Data Files

To see how tax minimization by corporations spills over to higher taxes for individuals (recipients of dividends, non-dividend distributions, and capital gains), we estimate an inverse relation between the two revenue streams, each scaled by total GNP, from annual data 1950-1988:

$$\frac{\text{PTAX}}{\text{GNP}} = \frac{0.090}{(33.52)} - \frac{0.63}{(2.97)} \frac{\text{CTAX}}{\text{GNP}} + \frac{0.38}{(1.89)} \left( \frac{\text{CTAX}}{\text{GNP}} \right)_{t-1}$$

$$\bar{R}^2 = 0.26 \quad DW = 1.31$$

$\frac{\text{PTAX}}{\text{GNP}}$  = ratio of personal tax receipts to GNP.

$\frac{\text{CTAX}}{\text{GNP}}$  = ratio of corporate tax liabilities to GNP.

(Data Sources: WEFA Database; and Citicorp CITIBASE Data Files)

In this case we use a common scaling factor for both personal and corporate income taxes, namely GNP. In the previous calculation for corporate tax liabilities, the scaling factor was GDP originating in the nonfinancial corporate sector. The correlation is only moderately strong but statistically significant, and the errors are not as random as we would like to see; there is some serial correlation of error. Yet the estimated equation is suggestive. Personal taxes rise as corporate taxes fall, but the effect is not dollar-for-dollar. On balance, a dollar of taxes avoided in the corporate sector eventually ends up as 25 cents collected in the personal sector. For this calculation the coefficients of current and previous corporate taxes are added together.

### III. Capital Structure and Financial Stability

In this section we provide descriptive statistics on the capital structure and the debt service ratios of non-financial corporations in the U.S. using individual corporate data, with a view towards throwing light on issue (ii) which deals with the stability of the financial system and the economy as a whole.

Findings in the previous section using the aggregate flow of funds data show that there has been an increase in the indebtedness of both public and private sectors of the economy as well as the household sector. While the aggregate data provide the magnitudes and trends in the economy, unless the results are uniformly distributed, one needs to examine the disaggregated data in order to unravel the impact of increased use of debt financing on the liquidity and solvency of corporations.

**Data**

Data in this section are from the financial statements of non-financial U.S. corporations reported in the following files of the 1988 and 1989 Compustat Data Base: the Primary Industrial File, the Supplementary Industrial File, the Tertiary file, the Full Coverage File, and the Industrial Research File.

**TABLE 1: SUMMARY STATISTICS FOR THE COMPANIES  
IN THE COMPUSTAT DATABASE**

Year	Number of Firms	Average Assets (\$ Millions)	Average Sales (\$ Millions)
1969	3,539	323.3	212.9
1970	3,610	351.6	231.3
1971	3,801	378.6	243.1
1972	3,974	419.3	263.3
1973	4,362	451.6	297.2
1974	5,986	394.1	282.0
1975	6,054	415.8	293.5
1976	6,103	462.5	334.4
1977	6,131	521.7	378.3
1978	6,038	605.4	433.7
1979	5,951	701.4	520.4
1980	6,048	773.4	590.3
1981	6,089	872.8	643.1
1982	6,385	932.2	633.8
1983	6,619	994.8	629.8
1984	6,663	1,048.4	676.0
1985	7,030	1,097.9	663.5
1986	7,303	1,193.6	652.2
1987	7,183	1,330.1	734.1
1988	5,000	845.7	738.2

Source: Standard & Poor's Compustat Services, Inc. Data include all nonfinancial firms in the Primary Industrial File, the Supplementary Industrial File, the Tertiary File, the Full Coverage File, the Over-the-Counter File and the Industrial Research File. Firms with assets less than \$0.4 million are excluded. 1988 figures are from the 1989 Compustat Data Base which reports only those companies that filed their 1988 statements with the Securities and Exchange Commission as of July 30, 1989.



Table 1 provides brief summary statistics about the sales and assets of the corporations in our analysis. When all Compustat Files are merged, we are able to cover a sample of firms ranging from 3,500 to over 7,000 during the period 1969 to 1988, making our data base the most comprehensive in this type of study.<sup>1</sup>

### Balance Sheet Ratios

Capital structure of U.S. corporations has been perhaps one of the most, if not the most, researched topics in financial economics since the seminal work of Modigliani and Miller (1958). A comprehensive summary of theoretical and empirical work describing the historical changes in the debt to equity ratios of the U.S. corporations can be found in Taggart (1985). A more recent treatment of the similar issues can be found in Campbell and Bernanke (1988) for U.S. corporations and in Davis (1987) for Canada, Germany, Japan, the U.K., and the U.S.

Figure 4 provides the time series pattern of the most commonly used leverage measures for non-financial U.S. corporations from the Compustat Data Files since 1969. Four leverage ratios, total debt to total assets, total liabilities to total assets, total debt to total capitalization, and total debt to equity are computed for each firm individually and their weighted averages reported.<sup>2</sup> The number of firms in the sample varies from 3,137 in 1969 to 6,343 in 1987.

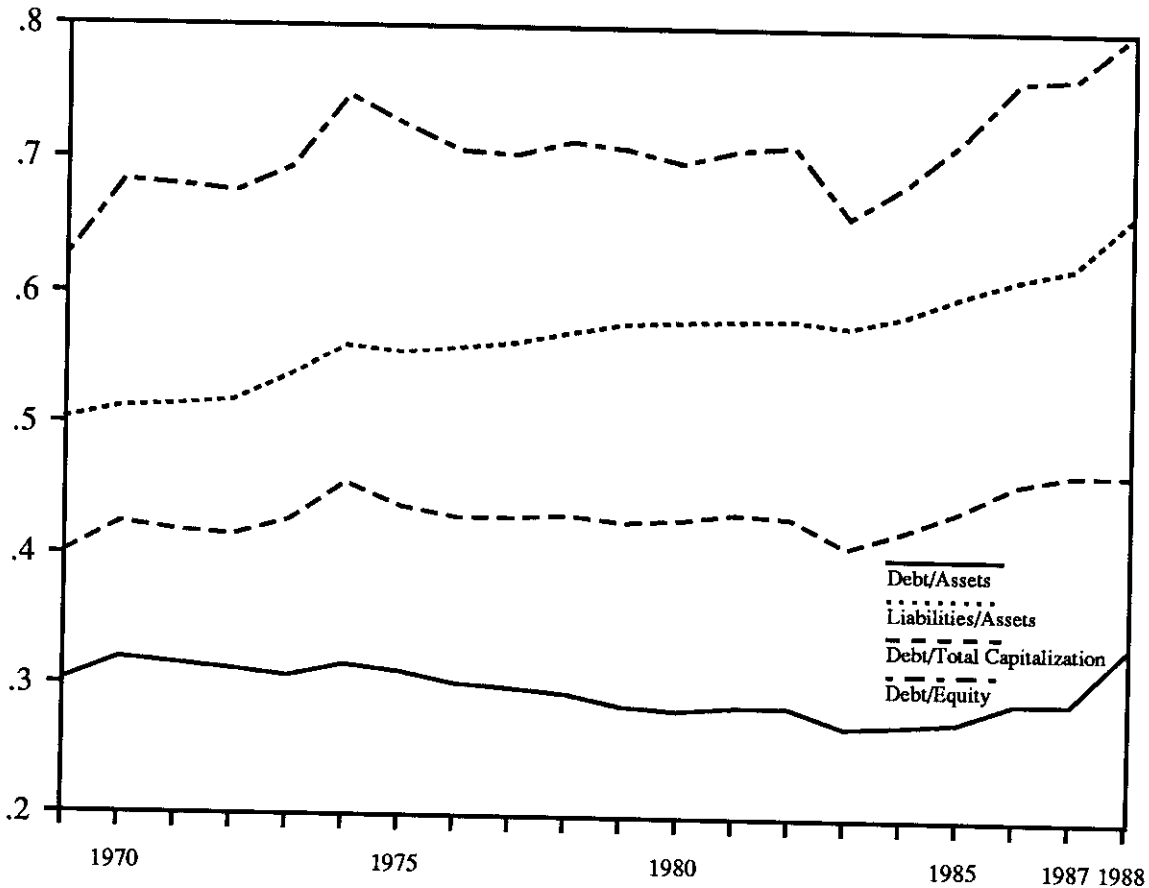
All measures of leverage, with the exception of total debt to total assets, have a slight upward drift since 1969. Total debt to total capitalization varies within a range of 40% to 47%. It went up from 40% in 1969 to 46% in 1974 and drifted back to 40% in 1983. Since 1983, it has crept up to 47%.

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<sup>1</sup>Most previous studies use only the Industrial Files from the Compustat Data Base. Industrial Files include primarily large corporations. Also, those corporations that merged or filed bankruptcies are excluded, which creates a survival bias.

<sup>2</sup>For the remainder of this section, we provide weighted means for all ratios and variables. All ratios are computed for the individual firm first and they are weighted by the variable in the denominator of the ratio for averaging. When computing ratios, one encounters a number of variables that take a value of zero or close to zero. This is particularly an acute problem with income and cash flow variables. If one does not adjust for such irregularities, unweighted means are usually driven by these outliers. Using weighted means not only deals with this problem, but it also adjusts for the size of corporations in the sample.

**Figure 4**  
**Leverage Measures**



Source: Standard and Poor's Compustat Services, Inc.

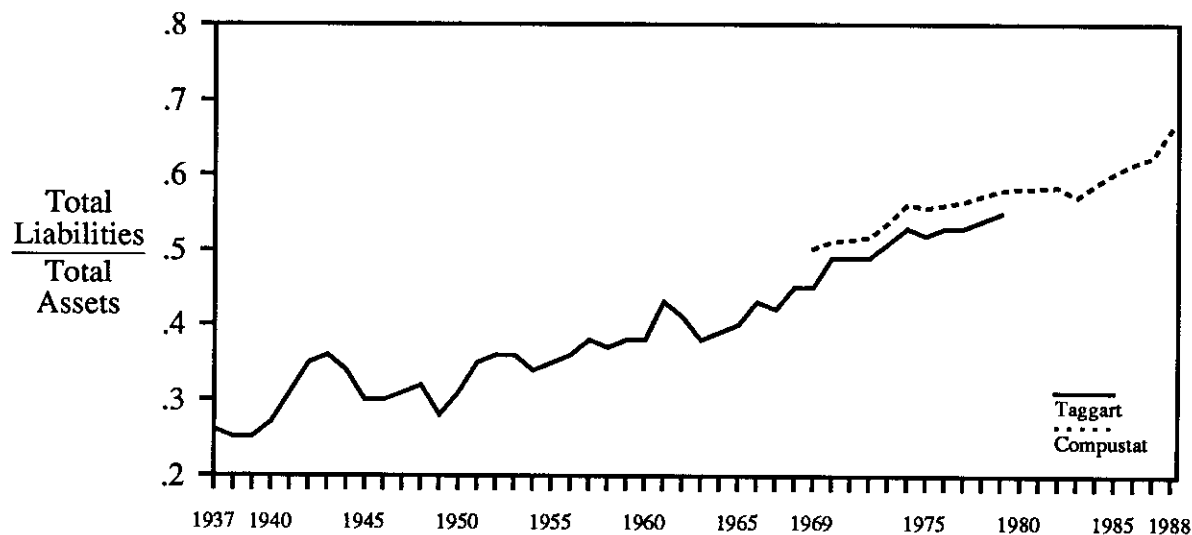
The other two leverage ratios, debt to equity and total liabilities to total assets, also follow a similar pattern. The debt to equity ratio exhibits more variability over time. It gradually moved from 63% in 1969 to 75% in 1987, and the ratio of total liabilities to total assets rose from 50% to 63% in the same period.<sup>3</sup> Total debt to total assets, however, has been more or less stable. A final observation is that all measures of leverage have been rising since 1983.

Leverage ratios in Figure 4 are consistent with aggregate findings in the previous section and also with similar studies in this area that the U.S. corporations have made increased use of debt financing in recent years. Before we provide further findings in order to discuss the ques-

<sup>3</sup>In 1988 this ratio rose to .987 for a sample of 5001 corporations.

tion whether the use of debt financing is excessive, which may adversely affect the financial stability of the U.S. economy as a whole, it will be instructive to present the recent changes in the leverage of U.S. corporations in a historical context. Inspection of longer term trends is particularly useful given the inherent theoretical difficulty that there is no benchmark or an optimal capital structure prescribed by financial economics to which we can compare the current balance sheets of U.S. corporations. Optimal capital structure is an elusive notion which is theoretically determined by the trade-off between the tax advantage of debt and the associated cost of increased probability of financial distress with debt financing.<sup>4</sup> A brief review of the empirical work on capital structure, however, immediately reveals that there is no unambiguous way to determine the optimal capital structure operationally.<sup>5</sup>

Figure 5  
Liabilities / Assets



Standard and Poor's Compustat Services, Inc. and Taggart (1985)

<sup>4</sup>Modigliani and Miller (1958) were the first to formulate the importance of tax deductibility of interest expenses. Models focusing on this aspect of the problem alone prescribe a capital structure that consists of debt entirely, a result that might be unacceptable to some debt holders and the Internal Revenue Service but seemed to be espoused by many engaged in leveraged buyouts. Later developments in this area can be characterized in a way by models searching for economically meaningful countervailing forces against the tax advantage of debt, such as bankruptcy cost, agency cost, etc. A good summary on this subject can be found in Miller (1989).

<sup>5</sup>See for a review Friedman (1985) and Taggart (1985).

In Figure 5, we replicate the series on the total liabilities to total capitalization ratio for U.S. manufacturing corporations from Taggart (1985) for the period 1937-1977 and update it using our data from 1969 to 1988. Taggart's data point out a secular increase in the leverage of U.S. corporations since the 1950s. From a historical perspective, the recent changes in the capital structure of U.S. corporations, shown by our data, indeed seem to be a continuation of a trend which started almost forty years ago. Since the 1950's, the leverage ratio measured as total liabilities to total assets increased two fold while exhibiting some variability in shorter periods.<sup>6</sup>

Some researchers, see for example Roach (1988), Summers (1989) and Giordano (1989) agreed that recent changes in the capital structure of U.S. corporations fall along a historical and long term trend and given the remarkable low rate of failures of publicly owned corporations during the early 1980's when the U.S. suffered the worst post war recession with historically very high real interest rates and volatile foreign exchange rates, it appears that established debt trends do not threaten stability.

We may not take comfort from the fact that recent changes are merely following a long term trend. There is an upper bound to the debt financing constrained by, at least, the long term debt service capacity of an enterprise, although there may not be an agreement as to when this bound is reached. But most importantly, aggregate data may easily disguise certain problems and underlying weaknesses in some cases, if the aggregate ratios are not uniformly distributed across firms or industries. Before we take up this subject, we should mention two interesting findings from our sample that are relevant to the recent discussions in this area.

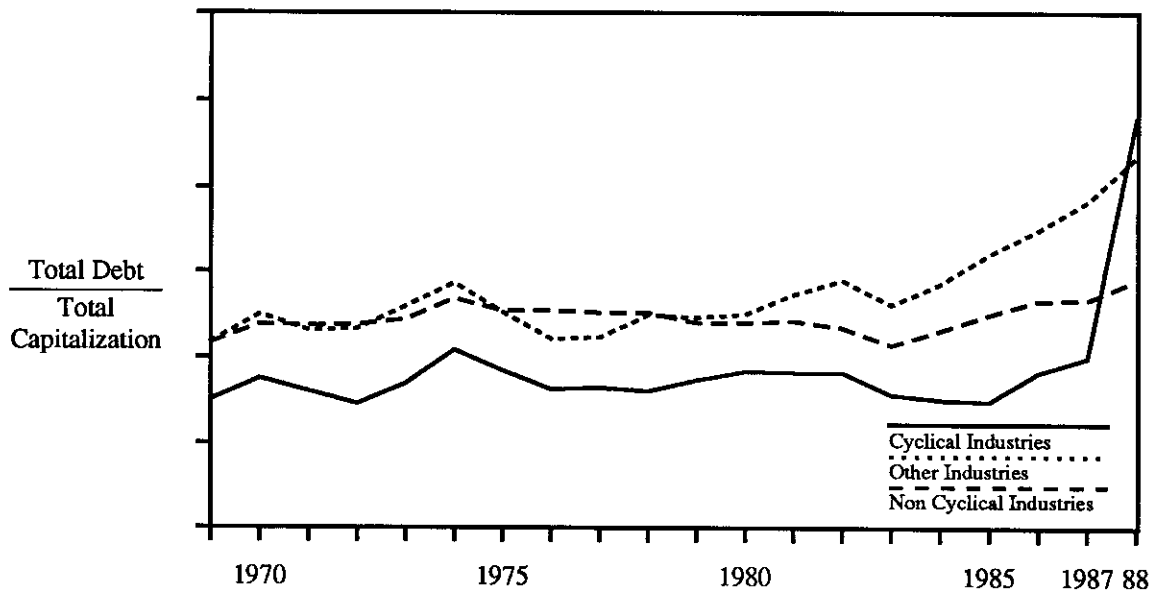
The first finding is related to the arguments that the increased leverage took place mostly in stable and non-cyclical industries where corporations have inherently higher debt capacity; therefore the recent rise in debt use, particularly in mergers and leveraged buyouts, should not be a source of concern. See for example Roach (1989). Figure 6 provides total debt to total

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<sup>6</sup>Ratios here are based on book values. Ratios adjusted for market values produce materially the same results. See Taggart (1985), Holland and Myers (1979), Campbell and Bernanke (1988).

capitalization ratios for industries customarily described as cyclical and non-cyclical.<sup>7</sup> The remaining industries are shown as other industries in the same figure. Cyclical industries indeed have lower leverage, while all groups follow a similar trend. But in 1988, cyclical industries have the higher debt ratio than noncyclical industries. The variances of the series are, however, high, which renders them statistically indistinguishable from each other.

**Figure 6**  
**Debt/Capitalization**



Source: Standard and Poor's Compustat Services, Inc.

We further break down our sample into two digit codes. Generally, there are wide differences in the capital structure of corporations across industries and often within the same industry. Such diverse capital structure patterns underscore the difficulties of relating the indebtedness and financial stability based on industry classification. Recent examples, such as Campeau, Inc. and Revco Drug Corporation show that even in presumably stable industries, individ-

<sup>7</sup>These industries (and their two digit SIC codes) are as follows: Cyclical industries: stone, clay, glass (32), primary metals (33), fabricated metals (34), non-electric machinery (35), electrical machinery (36), transportation equipment (37), textiles and apparel (22, 23), rubber and plastics (30), agriculture (01, 02, 07) and construction (15, 16, 17).

Non-cyclical industries: food (20), paper (26), printing and publishing (27), chemicals (28), instruments (38), wholesale and retail (50, 51), transportation and trade utilities (40, 41, 42, 44, 45, 46, 47, 48), services (70, 72, 73, 75, 76, 80, 81, 83, 87), petroleum (79).

ual corporations can be subject to random shocks such that (stable) industry classification per se cannot guarantee high levels of debt servicing.

The second finding is related to the change in the distribution of leverage ratios since 1969, shown in Table 2. The proportion of corporations at the tail end of the distribution, increased over time. In 1969, corporations, with debt to equity ratio greater than 80% constituted about 8% of the sample, this ratio more than doubled to 18% in 1987.

**Table 2: FREQUENCY DISTRIBUTION OF TOTAL DEBT AS A FRACTION OF TOTAL CAPITALIZATION**

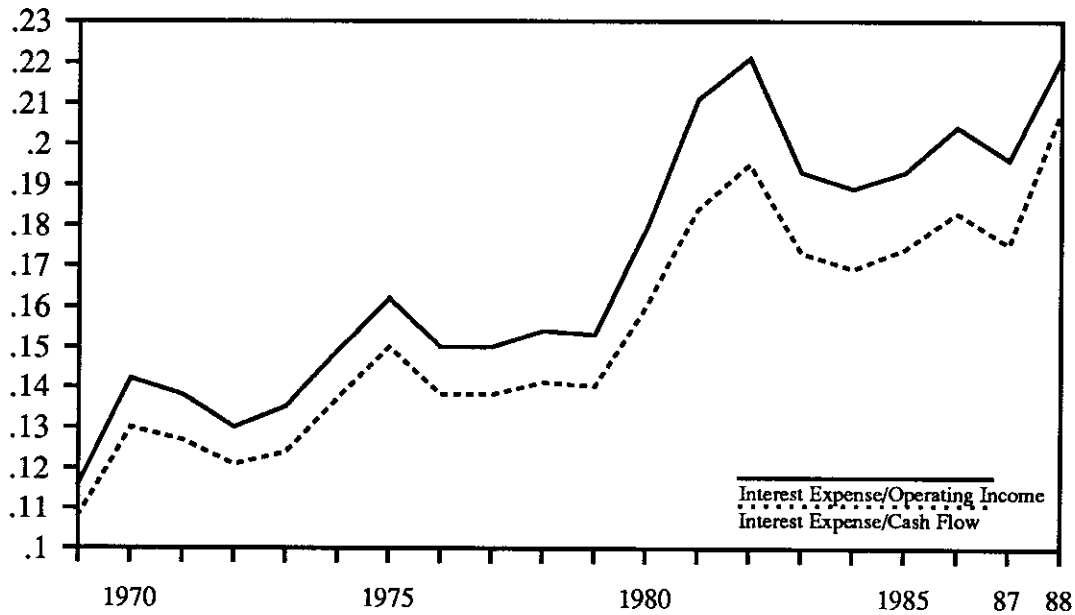
Year	Total Number of Companies	Percent of Companies in the Range:					
		.0 - .2	.2 - .4	.4 - .6	.6 - .8	.8 - 1.0	Over 1.0
1969	3147	28.2	27.0	23.4	13.0	5.1	3.3
1970	3358	25.4	26.1	23.6	14.9	5.7	4.3
1971	3508	27.2	27.1	23.0	12.9	5.1	4.7
1972	3620	28.8	27.3	22.6	12.5	4.4	4.3
1973	3983	25.0	26.3	24.7	13.1	5.2	5.7
1974	5365	22.8	23.2	23.1	14.3	7.0	9.6
1975	5402	25.2	25.5	21.7	12.2	6.6	8.9
1976	5395	26.6	25.5	22.4	11.3	5.2	9.0
1977	5417	25.0	25.3	23.5	11.3	5.7	9.2
1978	5279	24.3	24.2	24.0	12.0	6.7	8.9
1979	4991	23.1	24.2	23.9	13.1	6.4	9.3
1980	5239	25.3	24.1	23.1	13.0	5.9	8.5
1981	5286	28.5	23.6	22.7	12.0	5.2	7.9
1982	5515	28.5	22.8	21.4	12.1	5.8	9.3
1983	5736	33.0	23.3	19.8	10.5	5.2	8.2
1984	5731	30.3	23.5	20.2	11.1	5.7	9.1
1985	6012	29.8	21.4	19.9	11.6	6.3	11.0
1986	6216	30.5	19.5	19.6	11.9	7.1	11.5
1987	6124	30.8	18.7	20.5	12.5	7.0	10.5
1988	4986	29.3	19.7	20.4	12.4	7.7	10.6

Source: Standard and Poor's Compustat Services, Inc.

### Interest Coverage Ratios

Leverage ratio alone does not convey complete information about the financial health or stability of a corporation unless it is complemented by other measures describing its ability to service the interest burden. One of the most commonly used measures, interest expense to cash flow, is shown below. Cash flow is defined both as operating income before depreciation and as the sum of income before taxes, interest expense, and depreciation and amortization charges.

**Figure 7**  
**Interest Expense As A Fraction Of Cash Flow**



Source: Standard and Poor's Compustat Services, Inc.

Debt service charges of non-financial corporations as a fraction of their cash flow have nearly doubled from around 10% in 1969 to around 20% in 1988 as shown in Figure 7. An interesting observation here is the break in the data in 1980, when the debt service ratio jumps to a higher plateau, a result caused by the upward trend in the leverage shown in Figure 5 and the historically very high nominal interest rates that prevailed at beginning of this decade.

One might argue now that interest expense, although doubling in proportion to cash flow in the last twenty years, should not pose a serious problem because it absorbs only one fifth of

the available cash flow for corporations on the average. As we indicated earlier, we need to examine whether the debt burden is uniformly distributed and whether the aggregate ratios do or do not warrant concern for financial stability of the economy as a whole.

Frequency distributions of interest expense to cash flow ratios are given for six intervals in the following table. Consistent with the averages, we observe that the distribution shifted and became skewed to the right, and more interesting, the proportion of companies with interest expense exceeding their cash flow goes up from about one percent in 1969 to about six percent in 1988.

Although ratios in Figure 7 have also been frequently used in past studies, there is usually a systematic bias associated with the way these ratios are computed. They are often computed by excluding companies with zero or negative cash flows, which would bias the results in Table 3 upward. In order to correct for this bias, we compute cash flow to interest expense (i.e. the reciprocal of the ratios in Table 3) for the two measures of cash flow. For both series, shown in Figure 8, interest coverage declined from nine times in 1969 to less than five in 1988.

Perhaps a more interesting way to look at the data is to split the sample into two groups, one group with interest coverage of one and greater and the other with less than one; that is, corporations that can meet their interest payment and those that cannot in a given year. The results in Table 4 show a disturbing trend. In 1969, around 6% of firms in our sample had less cash flow than their interest expenses, but in 1988 this proportion reaches about twenty-five percent: that is, one fourth of major non-financial U.S. corporations did not generate enough cash to cover their interest expenses. The proportion of such companies almost tripled in one year in 1974 and remained high until 1980 when another big jump took place and kept steadily rising thereafter.

Inadequate interest coverage does not necessarily imply ultimate financial distress or insolvency for an enterprise. Firms may have poor operating results temporarily and may work themselves out of it eventually. So long as *expected* cash flows cover the interest expense and principal payments, a firm is considered economically solvent. What is alarming in our finding is that the proportion of companies without adequate cash flow to cover interest expenses



**Table 3: FREQUENCY DISTRIBUTION OF INTEREST AS A FRACTION OF OPERATING INCOME**

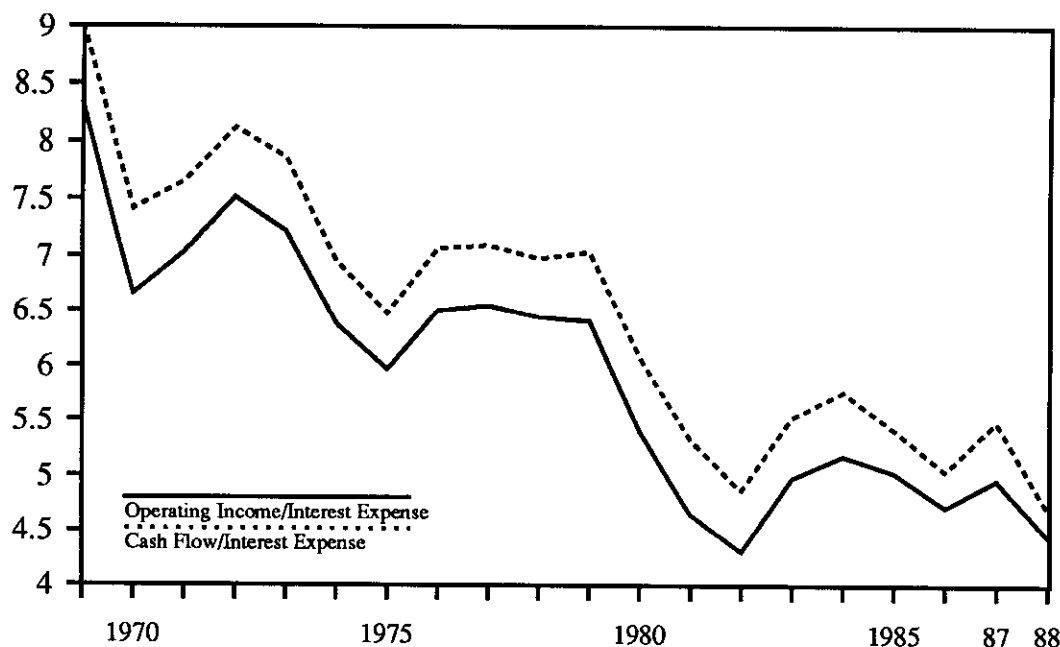
<b>Panel A: Interest Expense/Operating Income</b>								
Year	Number of Companies	Weighted Mean	Percent of Companies in the Range:					Over 1.0
			.0 - .2	.2 - .4	.4 - .6	.6 - .8	.8 - 1.0	
1969	3009	0.116	69.7	18.1	3.8	1.3	1.0	1.8
1970	2986	0.142	58.5	22.2	5.7	1.8	1.2	3.0
1971	3181	0.138	62.2	21.2	5.2	1.6	0.9	2.2
1972	3370	0.130	67.1	20.3	4.6	1.5	0.7	1.6
1973	3731	0.135	63.5	21.5	5.9	1.8	1.1	2.1
1974	4791	0.149	50.0	22.0	7.7	3.8	1.6	5.3
1975	4809	0.162	50.5	22.2	7.1	3.0	1.7	5.4
1976	4908	0.150	56.5	21.1	5.7	2.3	1.4	4.4
1977	4915	0.150	55.9	20.5	6.6	2.6	1.4	4.3
1978	4817	0.154	54.2	21.8	7.2	2.9	1.5	4.0
1979	4684	0.153	49.1	22.6	9.0	3.3	2.1	4.8
1980	4672	0.179	44.6	22.5	9.4	4.3	2.0	6.1
1981	4588	0.211	41.1	21.9	10.0	4.5	2.1	7.4
1982	4573	0.221	39.0	19.5	9.1	4.7	2.4	8.0
1983	4681	0.193	43.7	18.8	7.8	3.7	1.7	5.9
1984	4684	0.189	44.2	18.0	7.3	3.9	1.8	6.1
1985	4767	0.193	41.2	18.0	7.4	3.7	2.1	6.3
1986	4814	0.204	41.7	16.9	7.4	3.5	1.9	5.7
1987	4804	0.196	42.4	17.2	7.1	3.5	1.9	6.2
1988	3932	0.221	42.4	18.7	8.0	3.9	2.0	6.2

<b>Panel B: Interest Expense/Cash Flow</b>								
1969	3025	0.108	76.1	17.7	3.2	1.2	0.5	1.3
1970	3014	0.130	66.5	23.0	5.0	1.9	0.8	2.8
1971	3214	0.127	69.3	21.6	4.6	1.5	0.8	2.3
1972	3396	0.121	73.0	20.1	4.0	1.0	0.5	1.3
1973	3734	0.124	69.5	22.0	4.9	1.8	0.6	1.2
1974	4821	0.137	58.5	24.0	8.0	3.2	1.6	4.6
1975	4847	0.150	58.8	24.2	7.4	3.5	1.2	4.8
1976	4944	0.138	64.9	22.5	5.6	2.4	1.2	3.4
1977	4946	0.138	64.0	22.6	6.3	2.6	1.0	3.5
1978	4868	0.141	61.8	24.3	6.8	2.8	1.3	3.0
1979	4752	0.140	57.1	25.9	8.4	3.1	1.6	4.0
1980	4781	0.160	53.5	26.3	9.4	3.6	2.1	5.0
1981	4731	0.184	51.5	25.9	10.1	4.1	2.2	6.2
1982	4686	0.195	50.8	24.3	11.0	4.5	2.4	7.0
1983	4768	0.173	57.6	23.0	8.6	3.6	1.7	5.5
1984	4741	0.169	58.0	22.6	9.0	3.3	1.7	5.4
1985	4803	0.174	55.9	22.9	9.0	4.0	2.1	6.1
1986	4825	0.183	56.6	22.8	8.8	3.8	2.3	5.7
1987	4866	0.175	57.3	21.8	8.6	4.1	1.7	6.5
1988	3966	0.208	55.4	23.6	8.4	4.4	2.5	5.8

Operating income is net sales minus cost of goods sold and it is before depreciation and amortization. Cash flow is equal to the sum of income before taxes, interest expense, and depreciation and amortization. Source: Standard and Poor's Compustat Services, Inc.

**Figure 8**  
**Interest Coverage: Cash Flow/Interest Expense**



Source: Standard and Poor's Compustat Services, Inc.

reached historically highest levels and remained there during the historically longest period of sustained economic growth.

Two additional questions need to be addressed in order to establish a link between the findings in this section and financial stability and soundness of the corporate sector represented by our sample. First we need to know the relative size of those companies with inadequate interest coverage. Their numbers may be high, but if they are predominantly small firms, they may not have a significant impact on the economy. Second is there a strong relation between inadequate interest coverage and ultimate corporate failures?

In 1988, the average assets and sales of those companies with inadequate interest coverage ratio were \$137 million and \$103 million respectively. Corresponding figures for those with adequate interest coverage are \$1,171 million in assets and \$1,031 million in sales. The

**TABLE 4:**  
**FREQUENCY DISTRIBUTION OF INTEREST COVERAGE**  
Percent of companies

Year	Number of Companies	Weighted Mean	Less Than One	Greater Than One	Weighted Mean	Less Than One	Greater Than One
Panel A: Operating Income/Interest Expense					Panel B: Cash Flow/Interest		
1969	2941	8.328	6.6	93.4	9.000	5.6	94.4
1970	3069	6.655	11.2	88.8	7.415	9.9	90.1
1971	3248	7.037	9.4	90.6	7.649	8.4	91.6
1972	3362	7.514	6.1	93.9	8.119	5.0	95.0
1973	3713	7.220	6.6	93.4	7.858	5.5	94.5
1974	5067	6.374	15.5	84.5	6.947	13.6	86.4
1975	5111	5.968	16.2	83.8	6.474	14.1	85.9
1976	5126	6.500	13.7	86.3	7.069	11.5	88.5
1977	5136	6.544	13.5	86.5	7.096	11.8	88.2
1978	5033	6.439	13.1	86.9	6.980	10.6	89.4
1979	4952	6.405	14.6	85.4	7.037	12.0	88.0
1980	5037	5.396	18.0	82.0	6.073	14.0	86.0
1981	5015	4.645	21.5	78.5	5.319	16.6	83.4
1982	5255	4.304	26.7	73.3	4.866	22.3	77.7
1983	5452	4.977	25.6	74.4	5.523	22.5	77.5
1984	561	5.176	26.2	73.8	5.758	23.4	76.6
1985	5714	5.026	29.4	70.6	5.411	27.2	72.8
1986	5881	4.714	30.4	69.6	5.037	28.6	71.4
1987	5762	4.960	29.6	70.4	5.481	27.3	72.7
1988	4582	4.445	26.7	73.3	4.687	24.3	75.7

Operating income is net sales minus cost of goods sold and it is before depreciation and amortization. Cash flow is equal to the sum of income before taxes, interest expense, and depreciation and amortization.

Source: Standard and Poor's Compustat Services, Inc.

aggregate value of assets for these two groups are \$210 billion and \$4,649 billion respectively and the aggregate sales are \$274 billion versus \$4,255 billion. Companies with inadequate interest coverage represent around 5% of the total universe of companies in terms of assets and about 6% in terms of sales in 1987. Companies with poor debt service records are indeed small

ones and their aggregate size is also small despite their relatively large numbers, as can be seen in the following table:

**Table 5:**  
**ASSETS AND SALES OF CORPORATIONS WITH**  
**INTEREST COVERAGE GREATER AND LESS THAN ONE**

Year	Total Assets (Billions)		Average Assets (Millions)		Total Sales (Billions)		Average Sales (Millions)	
	Less Than One	Greater Than One	Less Than One	Greater Than One	Less Than One	Greater Than One	Less Than One	Greater Than One
1969	7.375	735.624	38.21	268.18	5.718	695.780	29.63	253.66
1970	18.891	813.724	55.08	298.94	20.564	758.273	59.95	278.67
1971	16.005	895.391	52.48	304.56	17.217	839.237	56.45	285.46
1972	7.574	987.649	36.95	313.14	14.542	943.004	70.94	299.08
1973	22.708	1147.233	92.69	330.90	31.162	1156.148	127.19	333.57
1974	45.711	1357.058	58.08	316.85	60.033	1479.243	76.28	345.46
1975	37.539	1482.939	45.39	346.08	28.927	1594.764	34.98	372.17
1976	44.188	1674.676	62.86	378.72	56.391	1814.300	80.21	410.29
1977	53.706	1887.629	77.16	424.95	69.945	2060.329	100.50	463.83
1978	51.436	2132.795	78.05	487.39	80.266	2315.784	121.80	529.20
1979	53.191	2430.474	73.47	574.85	84.949	2726.669	117.33	644.91
1980	117.450	2674.028	129.64	647.46	194.551	3027.384	214.74	733.02
1981	118.335	3015.301	109.77	765.69	169.624	3313.022	157.34	841.30
1982	210.229	3204.024	149.74	832.00	250.080	3330.531	178.12	864.85
1983	169.126	3478.284	121.15	857.35	211.643	3485.360	151.61	859.10
1984	125.900	3735.557	88.10	927.17	163.688	3811.178	114.55	945.94
1985	176.496	3874.145	105.06	960.85	237.177	3838.169	141.18	951.93
1986	199.820	4183.629	111.88	1021.64	225.356	3837.499	126.18	937.12
1987	210.386	4640.856	123.47	1145.04	274.297	4254.932	160.97	1049.82
1988	167.913	3936.276	137.29	1171.86	126.559	3464.039	103.48	1031.27

Source: Standard and Poor's Compustat Services, Inc.

On the link between interest coverage and bankruptcies, we summarize the annual number of bankruptcies in our sample in Table 6 (also graphed in the Figure 9 insert). The number of bankruptcies indeed follows the same pattern as the interest coverage ratios. Bankruptcy cases rose from one in 1969 to fifteen in 1973 and to an all time high of 57 in 1986.

**Table 6**  
**FREQUENCY OF BANKRUPTCIES**

Year	Number of Bankruptcies
1969	1
1970	5
1971	10
1972	8
1973	15
1974	13
1975	16
1976	14
1977	13
1978	18
1979	15
1980	19
1981	7
1982	15
1983	21
1984	14
1985	24
1986	57
1987	24
1988	34

Source: Standard and Poor's Compustat Services Inc.

This finding of abnormally high incidence of bankruptcies in 1986 is quite unsettling. Although the U.S. economy has experienced a continued expansion since 1982, there was a little noticed mini recession in the second quarter of 1986. Real GNP (1982 prices) declined from \$3,721 billion to \$3,704 billion, representing a 0.5% drop. This drop is made clear in the July 1989 revision of GNP statistics. The increased frequency of bankruptcies in recent years and particularly in 1986 underscores the financial fragility of a growing segment of U.S. corporations. Even though most U.S. corporations are financially healthy, an increasing number of them seem to be prone to financial distress with much higher probability now than ever before. Based

on simple descriptive statistics of our sample alone, it seems that U.S. corporations would experience an unusually high number of business failures if we have a serious recession in the near future.

Liabilities in business failures have long been known as *leading indicators* of cyclical fluctuations. Given this important attribute of very short-run reports on business failures (monthly statistics) it is worthwhile, even intriguing, to try to find out whether business failures, in part at least, are due to our present debt overhang. We have accordingly correlated non-financial corporate statistics on liabilities in business failures with the corresponding business debt position. A monthly series is readily available -- from the Federal Reserve Board or from Business Cycle Developments. Of the many specifications considered, on the basis of a priori plausibility, a straightforward calculation relates total liabilities of non-financial corporations to current and lagged values of their total debt exposure in the form of commercial and industrial loans from banks. From the flow-of-funds tables we can examine their loan position on a more comprehensive basis, but these data are quarterly and contain much less cyclical information than the monthly series. The following equation was estimated with autoregressive correction of errors from monthly data 1954.02 - 1988.12:

$$(\text{LIAB})_t = -\frac{448.54}{(6.35)} + \frac{0.0053}{(0.88)} (\text{CAIL})_t - \frac{0.016}{(1.67)} (\text{CAIL})_{t-6} + \frac{0.020}{(3.20)} (\text{CAIL})_{t-12} + \frac{0.432}{(9.73)} \text{AR}(1)$$

$$\bar{R}^2 = 0.77 \quad DW = 2.308$$

[LIAB = liabilities of business failures]

[CAIL = commercial and industrial bank loans outstanding]

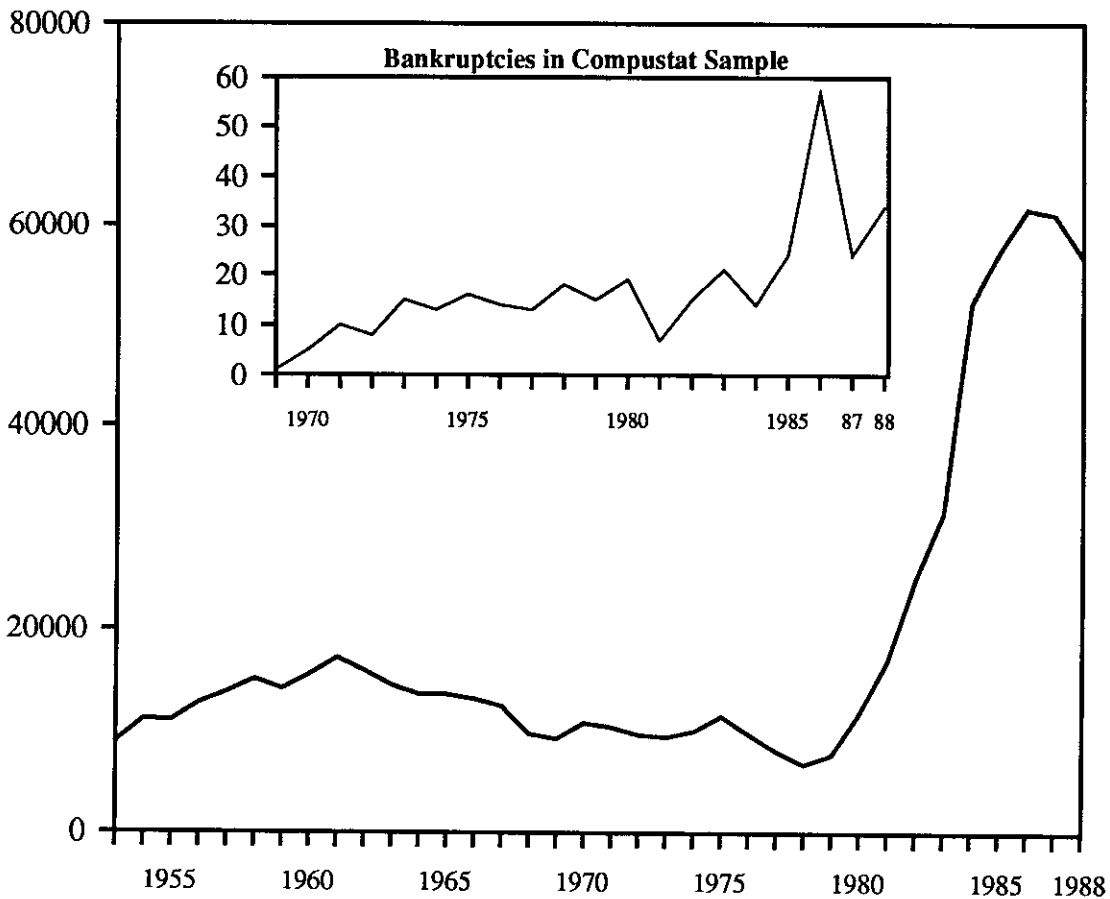
(Data Sources: Dun and Bradstreet; and the Federal Reserve System)

This equation, which has reasonably high correlation and additive random errors without much evidence of serial correlation, shows that liabilities in business failures were positively correlated with the bank debt position of non-financial corporations and are given a warning about pending failure as much as one year in advance. Other debt is related to bank lending for

small to medium size enterprise; thus even though the right-hand-side independent variables in the above equation are defined *and* available only for bank borrowing, it is not unreasonable to think that the results provide some information about the seriousness of the present debt build-up.

In first difference form, the equation gives similar strategic importance for past debt in leading to associated failures. The first difference specification, whether in arithmetic or logarithmic units, does not improve fundamentally on the equation listed here. The legal and tax rules concerning filing of bankruptcy changed in 1979, but we have not been able to detect a statistical break in the estimated equation for liabilities in business failures using explicit shift variables in the regression. In figure 9 we show the sharp increase in the number of reported failures after 1979, along with a smaller sample obtained from Compustat Data Files.

**Figure 9: Number of Business Failures in the U.S.**



Sources: Dun and Bradstreet and Standard and Poor's Compustat Services, Inc.

One of the important innovations in the financial markets recently has been the increased use of so called "junk" bonds. We provide some selected financial ratios for corporations that issued junk bonds. These ratios when compared with those corporations without junk bonds provide some insights about the properties of the companies which issued junk bonds.

Compustat Data Base provides bond ratings for companies with publicly issued debt without indicating the first issue date. The High Yield Bond Handbook (1989), published by First Boston, also reports a comprehensive list of companies with bonds below investment grade and their initial issue date. Using The High Yield Bond Handbook, we are able to determine first issue dates of bonds rated BBB or below for 561 corporations from the Compustat Files.<sup>8</sup> While more comprehensive statistics on junk bonds are readily available, Table 7 describes the junk bond universe within our sample of corporations.

Table 7:  
NUMBER OF COMPANIES ISSUING JUNK BONDS

Year	Firms With New Issues	Cumulative Number of Firms
1969	7	7
1970	5	12
1971	7	19
1972	6	25
1973	6	31
1974	5	36
1975	4	40
1976	6	46
1977	8	54
1978	23	77
1979	15	92
1980	11	103
1981	10	113
1982	21	134
1983	44	178
1984	52	230
1985	71	301
1986	118	419
1987	84	503
1988	58	561

Source: Standard and Poor's Compustat Services, Inc.

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<sup>8</sup>561 is a slightly smaller subset of all corporations with junk bonds in the Compustat Data Base. We were not able to match those corporations in the Compustat Data Base with those in The High Yield Bond Handbook if a company changed its name.



Table 8 shows selected financial ratios for corporations with and without low grade bonds. Those corporations having junk bonds in our sample were sorted into vintage years based on when they issued junk bonds first. Ratios for these vintages of corporations with continuous data are computed for each year until the end of 1988. In Panels 1 through 3, companies with junk bonds, as expected, have much larger debt/equity ratios and debt service. Panel 4 shows that the operating margin for those corporations with junk bonds are actually lower than the average of the corporate sector as a whole. These results are quite different from those reported by Yago (1989) who argued that corporations which issued junk bonds have on the average higher operating margins than those without junk bonds.

The income tax as a percent of sales for companies that issued bonds is about one third of the same ratio for the corporate sector without junk bonds. Interestingly, as seen in Panel 6, depreciation to sales ratio is lower for companies with junk bonds than those without. These results, although they are impressionistic, are suggestive that use of junk bonds creates significant tax arbitrage and support the hypothesis that corporations have been substituting debt for equity in order to exploit the bias created by our tax system where dividend payments are taxed twice while interest payments only once.

#### **IV. Efficiency Gains in Leveraged Buyouts**

The U.S. corporate sector has experienced a wave of acquisitions and restructuring activity since the beginning of the 1980's. The salient feature of the recent wave compared to the conglomerate merger wave of the 1960's has been the dramatic use of debt financing in acquisitions and the emergence of individuals or groups who are specialized in highly leveraged transactions and capable of successfully challenging the control of very large corporations.

We also observed increased use of innovative financing with instruments such as "junk bonds" not only in acquisitions, but in substantial repurchase of equities by major corporations in order to thwart takeover attempts and in some cases, compensate displeased shareholders for relatively poor performance of their stock holdings.

**Table 8: SELECTED FINANCIAL RATIOS FOR COMPANIES WITH JUNK BOND ISSUES**

<b>Panel 1: TOTAL DEBT TO EQUITY</b>										
<b>Panel A: Companies with Junk Bond Issues</b>										
Year	1980	1981	1982	1983	1984	1985	1986	1987	1988*	Number of Companies
1980	0.772	0.796	0.912	1.088	1.275	2.818	2.552	1.948	1.406	7
1981		3.031	3.797	5.807	5.949	5.655	7.304	7.045	3.896	5
1982			0.841	0.822	0.899	0.837	3.427	3.338	3.026	9
1983				0.959	0.996	1.304	1.562	1.742	2.648	28
1984					1.173	1.608	1.933	3.053	2.413	34
1985						1.782	2.215	2.106	2.105	54
1986							2.650	2.109	2.475	85
1987								3.848	3.384	70
1988									3.417	41
<b>Panel B: Companies Without Junk Bond Issues</b>										
	0.683	0.691	0.689	0.634	0.653	0.680	0.698	0.690	0.912	5899**
<b>Panel 2: INTEREST COVERAGE: CASH FLOW/INTEREST EXPENSE</b>										
<b>Panel A: Companies with Junk Bond Issues</b>										
Year	1980	1981	1982	1983	1984	1985	1986	1987	1988*	Number of Companies
1980	5.606	3.385	1.436	1.226	1.838	1.168	1.664	2.468	3.138	7
1981		2.328	1.519	1.587	2.004	1.964	1.585	1.800	1.355	5
1982			3.606	3.762	2.776	1.639	1.433	1.021	1.482	9
1983				3.970	3.144	3.012	2.235	2.480	1.822	27
1984					3.016	1.839	1.581	1.729	1.705	33
1985						2.702	2.135	2.086	1.943	53
1986							2.294	2.075	2.141	85
1987								1.918	1.453	64
1988									2.110	41
<b>Panel B: Companies Without Junk Bond Issues</b>										
	6.303	5.545	5.151	5.844	6.151	5.834	5.545	6.217	5.366	5358**
<b>Panel 3: INTEREST COVERAGE: OP INC. BEFORE DEPRECIATION/INT. EXPENSE</b>										
<b>Panel A: Companies with Junk Bond Issues</b>										
Year	1980	1981	1982	1983	1984	1985	1986	1987	1988*	Number of Companies
1980	4.854	2.534	1.304	1.602	1.940	1.146	1.119	1.797	2.451	7
1981		1.505	0.960	0.791	1.685	1.908	1.460	1.558	0.925	5
1982			3.159	2.984	2.375	1.614	0.946	0.971	1.408	9
1983				3.536	2.953	2.745	2.439	2.235	1.585	27
1984					2.746	1.826	1.305	1.450	1.340	33
1985						2.256	1.661	1.677	1.775	53
1986							2.131	1.808	1.960	85
1987								1.696	1.331	64
1988									2.081	41
<b>Panel B: Companies Without Junk Bond Issues</b>										
	5.616	4.854	4.544	5.274	5.539	5.411	5.193	5.646	5.099	5353**

<b>Panel 4: GROSS MARGIN: OPERATING INCOME BEFORE DEPRECIATION/SALES</b>										
<b>Panel A: Companies with Junk Bond Issues</b>										
Year	1980	1981	1982	1983	1984	1985	1986	1987	1988*	Number of Companies
1980	0.213	0.173	0.103	0.111	0.143	0.115	0.159	0.153	0.191	7
1981		0.063	0.050	0.046	0.103	0.103	0.101	0.111	0.077	5
1982			0.094	0.086	0.080	0.052	0.036	0.067	0.066	9
1983				0.116	0.093	0.090	0.094	0.103	0.124	28
1984					0.108	0.097	0.090	0.127	0.120	33
1985						0.104	0.108	0.108	0.120	53
1986							0.076	0.097	0.105	85
1987								0.111	0.102	64
1988									0.104	41
<b>Panel B: Companies Without Junk Bond Issues</b>										
	0.141	0.141	0.140	0.152	0.156	0.151	0.152	0.154	0.174	5724**
<b>Panel 5: INCOME TAXES/SALES</b>										
<b>Panel A: Companies with Junk Bond Issues</b>										
Year	1980	1981	1982	1983	1984	1985	1986	1987	1988*	Number of Companies
1980	0.049	0.044	0.022	0.026	0.026	0.006	0.015	0.033	0.005	7
1981		0.006	-0.003	0.002	0.003	-0.002	0.003	0.008	0.005	5
1982			0.024	0.022	0.017	0.015	0.002	-0.006	0.013	9
1983				0.025	0.018	0.014	0.009	0.011	0.000	28
1984					0.013	0.003	0.012	0.014	0.011	33
1985						0.019	0.017	0.013	0.012	53
1986							0.010	0.011	0.009	85
1987								0.009	0.004	64
1988									0.010	41
<b>Panel B: Companies Without Junk Bond Issues</b>										
	0.041	0.038	0.035	0.039	0.040	0.037	0.033	0.035	0.031	5737**
<b>Panel 6: DEPRECIATION AND AMORTIZATION/SALES</b>										
<b>Panel A: Companies with Junk Bond Issues</b>										
Year	1980	1981	1982	1983	1984	1985	1986	1987	1988*	Number of Companies
1980	0.046	0.051	0.059	0.058	0.061	0.063	0.074	0.050	0.045	7
1981		0.061	0.056	0.065	0.061	0.060	0.063	0.069	0.078	5
1982			0.025	0.031	0.029	0.031	0.028	0.033	0.026	9
1983				0.040	0.039	0.041	0.050	0.049	0.057	28
1984					0.040	0.042	0.047	0.048	0.041	33
1985						0.370	0.041	0.044	0.046	53
1986							0.035	0.040	0.043	85
1987								0.056	0.043	64
1988									0.035	41
<b>Panel B: Companies Without Junk Bond Issues</b>										
	0.400	0.043	0.048	0.052	0.051	0.054	0.060	0.057	0.060	5729**

\*These figures are from the 1989 Compustat Files. \*\*The number of companies without junk bond issues in 1988 is 4540.

There is a growing body of research attempting to explain the causes of the recent acquisitions and restructuring activity and their effects on economic efficiency. In our opinion, the recent events are a result of the culmination of many interrelated developments in the corporate sector and the financial markets of the U.S.

The corporate sector came out of the 1970's with, in historic terms, the lowest ratio of market value to replacement cost of assets. In addition, many corporations during the go-go years of conglomerate mergers in the 1960's acquired many unrelated businesses to such a degree that they looked like closed-ended mutual funds. And like most closed-end mutual funds, they seemed worth more if the parts were operated separately. Both commercial bankers and investment bankers have become more aggressive in lending and raising capital with new innovative securities. Deepening of financial markets and the growing size of institutional investors provided readily available financial resources to fuel the recent acquisitions and restructuring activity, which raised a number of important public policy questions summarized in Section I. In this section, we summarize the existing literature on the possible gains from leveraged buyouts in terms of economic efficiency.

Empirical evidence shows that shareholders of LBO targets have realized significant gains similar in magnitude to the gains from takeovers.<sup>9</sup> Stock prices of publicly traded companies have risen between 14 and 25 percent on the announcement of an offer, and the total premium paid to the public shareholders ranged between 40 and 56 percent. Gains to the investors of those LBO's which subsequently went public, called reverse LBO's, have been very high. Muscarella and Vetsuypens (1989) report that the annualized average rate of return for the investors of such reverse LBO's three years after the acquisition is in excess of 250 percent. The high return for the equity holders is a result of the increased value of the firm, which shows a median increase of 36 percent, and, of course, a high leverage, on the average order of 90%.

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<sup>9</sup>For evidence, see Harry DeAngelo, Linda DeAngelo, and Edward Rice (1984), Lehn and Poulsen (1989) and Kaplan (1989).

Kaplan (1989) studied excess returns for pre-buyout public shareholders and equity investors in a sample of 21 LBO's that were either sold to other parties in private transactions or went public. His results show that the median of excess returns to pre-buyout shareholders was approximately 42%, with an increase in median nominal returns to buyout equity investors of at least 11.95%.<sup>10</sup>

While samples in the studies reporting gains to pre-buyout shareholders and equity investors are small, the results confirm the belief that returns for investors in LBO's have been extremely high. Financial economists were naturally interested in identifying the sources of such wealth creation in connection with LBO activity. Two possible sources have been proposed: 1) reduced tax liability due to the increased interest expense and stepped up depreciation expenses; and, 2) possible efficiency gains in operations with redeployment of assets under the ownership structure of LBO's.

The issue of tax savings by corporations has already been discussed in an earlier section. Here, we relate such gains to the efficiency issue. Schipper and Smith (1989) investigate a sample of 93 management buyouts to determine the tax advantage of LBO's. They estimated that tax savings associated with writing up the assets is equivalent to 29 percent of the premia paid to the pre-buyout shareholders. They also report that interest tax savings were far in excess of subsidies from a writeup election. Their sample included buyouts with a range of tax savings from zero to 18 times the premia paid to shareholders, or 1.6 times the market value of common stock three weeks before the announcement of a buyout. The median ratio of interest tax savings to premia paid is between 95 and 65 percent depending on whether the sample of companies chose to write up the assets or not.

Kaplan (1989) reported similar figures for a sample of 72 LBO's. His sample indicated that the total tax advantage, resulting from both interest and writeup of assets, raised from 31 to 135 percent of the premia depending on the assumed marginal tax rate and whether the firm

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<sup>10</sup>When these returns are adjusted for changes in the stock market and leverage, Kaplan reports an annualized rate of return, until the date of the initial public offering or sale, of 26.1% for post-buyout equity investors.

chose to step up the depreciation charges. Total tax savings, when expended differently, varied from 11 to 55 percent of the equity value before the buyout.

Tax savings, calculated under different assumptions and based on different samples, provide substantial gains for LBO's. Although tax gains are not the sole reason for LBO's, they create additional incentives through, in effect, partial financing from the Treasury.

The tax gains in the above studies are expressed as a percent of premia in order to scale these figures. Net cost of tax gains to the Treasury depends on the tax status of pre-buyout shareholders. We identified about 53 LBO's in the Compustat files, and cross-checks from Moody's Stock Guides indicate that about 40 percent of the shareholders in these LBO's are individuals with the remaining being institutional investors. If one assumes that institutional investors are tax exempt, and 40 percent are individual investors, the total tax impact on the Treasury is reduced by 40 percent times the marginal tax of these individual investors.<sup>11</sup>

Efficiency gains due to improved operating results in LBO's have been more difficult to measure. The main source of difficulty is the lack of sufficient data, mainly because when most LBO's become private corporations they make very little or no financial or operating data publicly available.

Several studies attempt to measure efficiency gains by profitability and activity ratios using limited information from private sources or from 10-K forms filed with the SEC by those LBO's with publicly held debt.

Bull (1989) compared performance measures of business units for two years before an LBO to the average performance for the two years after a buyout. Several of the indicative measures are replicated below:

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<sup>11</sup> A paper by Kohlberg, Kravis, Roberts (KKR) and Co. (1989) argues that overall tax receipts for the Treasury would increase after an LBO. This seems to be the only study which claims that tax receipts will be higher. Long and Ravenscraft (1989) show that KKR reaches such a different conclusion partly because of their unrealistic assumptions and partly because of their faulty methodology.

**Table 9: Comparison of performance of 25 Sample Leveraged Buyouts to Industry Performance using averages of the two T- and T+ Years**

Variable	T- 2 Years		T+ 2 Years	
	Mean	Median	Mean	Median
Earnings/Beginning Equity	0.919	0.784	3.652	2.192
EBIT/Beginning Assets	1.027	1.025	1.414	1.346
Sales/Beginning Assets	1.092	0.864	1.264	1.204
Sales	0.200	0.111	0.192	0.118
Operating Profit/Sales	1.070	0.945	1.214	1.399
Cash Flow/Sales	1.454	0.975	2.166	2.099
Income Tax/Sales	1.121	1.008	0.721	0.689
Capital Expenditures/Sales	0.639	0.538	0.500	0.405

Note: Ratio of 1 equals industry performance, ratio of 2 doubles industry performance, etc.

Source: Ivan Bull in *Leveraged Management Buyouts: Causes and Consequences*, Dow Jones-Irwin, NY, 1989.

When results in Table 9 are adjusted for industry difference, improvements in Earnings/Beginning Equity, EBIT/Beginning Assets and Sales/Beginning Assets are statistically significant. Sales, when adjusted for industry, declined, but not significantly, cash flow to sales increased and income taxes to sales decreased significantly. Bull concluded that management of LBO's improve cash flows after the buyout which, he argues, should indicate real gains in efficiency.

Kaplan (1989) investigated the same issue with a different sample during the period 1980-1986. His findings on efficiency gains are summarized in the following table:

**Table 10: Median Industry Adjusted Changes in Operating Results Two Years Prior and Two Years following the Buyouts completed in 1980 - 1986**

	Changes from Year i to j					
	Annual Change			Cumulative Change		
	-2 to -1	-1 to 0	0 to +1	+1 to +2	-1 to +1	-1 to +2
Sales	-1.89 (42)	-4.36 (33)	-1.07 (29)	-0.18 (19)	-2.44 (36)	-8.31 (19)
Operating Income	-0.24 (42)	-1.40** (30)	2.08* (27)	-2.38 (19)	1.81 (36)	5.56** (19)
Operating Margin	-0.55 (42)	-1.02* (30)	0.85 (27)	-0.41 (19)	1.52 (36)	2.43** (19)
Cap. Expenditures	-0.77 (42)	-1.63** (25)	-1.41* (23)	-1.47 (17)	-2.44** (33)	-1.34 (17)

Note: The number of observations are in parentheses.

Source: Steven Neil Kaplan, "Management Buyouts: Efficiency Gains or Value Transfers?". Presented at the Salomon Brothers Center Conference on Financial-Economic Perspectives on the High-Yield Debt Market, December 8-9, 1988.

\* indicates statistically significant results at 10 percent level, and

\*\* indicates statistically significant results at the 5 percent level.

Kaplan's findings show that, compared to industry means, the buyout companies obtain positive increases in operating income and operating margins in the first two years after the buyout, while they reduce inventories and capital expenditures.

Muscarella and Vetsuypens (1989) studied a sample of reverse LBO's, that is, companies that subsequently went public. Their findings are summarized below:

**Table 11: Accounting Profitability and Activity Between the Last Fiscal Year Before the LBO and the Last Fiscal Year Before the Second Initial Public Offering (SIPO) for Corporations Engaging in Reverse LBO's in the Period 1976-1987**

Variable	Number of Observations	Median Before LBO	Median After LBO	Median Change Between LBO & SIPO
Gross Profit/Sales	35	27.5%	29.6%	13.7%
Operating Income/Sales	28	6.6%	10.4%	26.2%
Net Income After Tax/Sales	22	3.4%	3.1%	18.9%
Asset Turnover	26	1.7%	1.5%	-3.1%
Sales Per Employee	14	\$.07M	\$.09M	22.6%

Source: Chris Muscarella and Michael Vetsuypens, "Efficiency and Organizational Structure: A Study of Reverse LBO's," Working Paper, Southern Methodist University, 1989.



Smith (1989) also found results similar to those reported in the three studies above. She found that LBO's experience significant increases in operating earnings and net cash flow. She also documents improvements in profit margins, sales per employee, inventory management and working capital.

The four studies summarized above reported significant improvements in cash flows and operating margins in LBO's. These results while they are interesting and constitute important steps toward identifying the sources of efficiency gains in LBO's have also serious methodological problems.

First, samples in all studies are very small; Mergers and Acquisitions reports over 1,500 LBO transactions between 1983 and the end of 1988.<sup>12</sup> Of these LBO's, about 66 percent were divestitures, 16 percent were private transactions and 18 percent were transactions designed to take companies private. Muscarella and Vetsuypens have a sample of 35, Kaplan has 19, Bull has 25, altogether they amount to less than 5 percent of the total number of transactions and, given the magnitude of recent transactions, perhaps much less than that if adjusted for the value of transactions.

A second problem gave rise to a potential sample bias in these studies. Muscarella and Vetsuypens' sample contain only reverse LBO's, and in Kaplan's sample 13 out of 13 LBO's were sold or went public, indicating that these samples represent only successful LBO's.

The results of these studies are also difficult to generalize because of the changing nature of the LBO market. LBO's are not a new phenomenon in the U.S. Gultekin and Hasbrouck (1983) provide a survey of the LBO market before the recent wave of LBO'S of public corporations. Private sales were often prompted by management succession, estate planning and in some cases by financial distress. Divestitures were often for divisions that did not have a reasonable fit with the parent corporation.

Buyers were managers or outside investors who considered the most attractive LBO as those corporations in stable industries with mundane products and a large market share such that

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<sup>12</sup>See also Long and Ravenscraft (1989).

the cost of entry to the market is often high enough to make a new investment unattractive. Entrepreneurs interviewed in the Gultekin and Hasbrouck study claimed that their LBO's were, with the exception of those in the petroleum industry, successful, and that they were able to improve operating results, suggesting that in some way LBO's contributed to the companies' financial turnaround. The recent wave of LBO's, however, is very different from that of the 1970's; in the 1980's large publicly held corporations have also become targets for LBO's with increased frequency. Recent LBO's are realized at much higher P/E ratios than those reported in current studies, and, because their debt burden is high, they have turned to a quick sale of assets.

The studies mentioned above do not shed much light on the performance of recent LBO's. As LBO's become a common method of acquisition, rather than being a specialized method often used for cash rich companies in stable industries, we expect that their performance record may be similar to the performance record of the mergers and acquisitions market. Empirical evidence on the performance of merged or acquired companies remains mixed. All empirical studies demonstrate that shareholders of target corporations receive abnormal returns at the announcement of the acquisition, while there has been no such gain documented for the shareholders of the acquiring companies. When taken together, empirical evidence shows that shareholder wealth is increased in an acquisition; most of these studies also examine the share price movements of publicly held corporations.

Ravenscraft and Scherer (1989) investigate efficiency gains during 1975-1977. A large sample of mergers, covering over 2,700 lines of business, is available for U.S. manufacturing corporations. Using detailed data for the operations at the divisional level they find that acquired corporations were extraordinarily profitable pre-merger, the more so the smaller their size. Following the merger, the profitability of acquired entities declined in most cases except when merger partners were of equal size.

The only empirical work using plant data on the efficiency gains in mergers is by Siegel and Lichtenberg (1987) where they investigate productivity changes in 19,000 establishments during the period 1972 to 1981. Using Census Bureau data they show that total factor produc-

tivity, that is output per unit of combined inputs -- labor, capital and materials -- was lower for several years before the change of ownership but went up after the change.<sup>13</sup>

Some studies also assert that LBO's might improve efficiency above average experience, on the grounds of reduced agency costs, i.e., efficiency loss resulting from the separation between ownership and control in publicly held corporations. Some further argue, for example, that management compensation after an LBO, becomes increasingly performance sensitive in comparison to that in publicly held corporations.

Much of the literature on LBO activity suggests that leverage buyout groups are an important new form of organization. Our inference, based on the relatively weak results obtained in empirical studies on the question of efficiency gains in mergers or acquisitions, in general, and LBO's, in particular, is that great caution must be exercised before authoritative and sweeping generalizations can be made about the benefits of LBO's with respect to the question of efficiency. We need much more data and empirical evidence than are currently available to reach a firm conclusion.

## V. Conclusions

In this report we have assembled facts about changes in corporate structure and their related debt positions. We have relied on tabulations of statistical data for the last few decades, with particular reference to the period since 1982. We have presented and analyzed new data, as well as having summarized many studies in the financial literature. These aspects of our reports speak for themselves, but to interpret our analysis, we can say that evidence is very strong that there has been a cost to the Treasury, mainly in the form of reduced corporate taxes. This reduction is not fully offset by increases of personal taxes.

As for the stability issue, it appears that corporate restructuring, together with the buildup of debt, is worrisome, but it does not seem to be sufficiently large in value to cause a financial crisis. It obviously contributes to volatility in markets and bears very careful monitoring.

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<sup>13</sup>While their results are suggestive, their analysis leaves some econometric issues to be resolved concerning estimation of total factor productivity.

Whether or not recent corporate changes, especially the increased frequency of LBO's, improves or damages economic efficiency has not been definitely settled. It is hard to make a clear case, without access to more data, that these changes are leading to better productivity or more efficient use of resources in the national interest.

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