

FEDERAL RESERVE BANK OF SAN FRANCISCO

ECONOMIC REVIEW

Financial Markets and Uncertainty

- I. Introduction and Summary**
- II. Variable Rate Residential Mortgages:
The Early Experience from California**
- III. Inflation and the Efficiency
of Capital Markets**
- IV. Equity Shares and the
Financial Markets**
- V. Has the Money-GNP
Relationship Fallen Apart?**

SUMMER 1976

Equity Shares and the Financial Markets

Herbert Runyon*

The renaissance of the stock market has been one of the more newsworthy aspects of the 1975-76 economic recovery. This spring, after a suitable period of suspense, the closely watched Dow Jones Industrial Average broke through the four-digit barrier which had not been breached since the January 1973 peak. Stock prices surged ahead on a rising volume of transactions. The recovery of economic activity promised a higher stream of future profits, and the price/earnings ratio—a barometer of the state of investor expectations—made at least a partial recovery from its 1974 trough.

Another important development has been the upswing in the issuance of new equity shares, amidst the hospitable environment created by rising prices and heightened investor expectations. Corporations have attempted to maximize the amount of new capital at their command without unduly diluting the earnings of shares already outstanding. Small firms, with a limited ability to raise new capital, have gone “public” and sold shares of ownership to investors. In 1975, nearly 25 percent of total long-term financing raised in the capital markets was secured in the equities markets. Yet, despite the recent increase, equity financing in the last two decades has remained a relatively minor source of new corporate financing, generally averaging about 10 percent of the funds raised in the financial markets.

In fact, over the past two decades, corporations have frequently been forced to go to market with new shares at unfavorable times. This reflects the fact that equity is only part of the capital structure of corporations. Corporate

balance sheets have been transformed since the mid-1950's, with corporations making extensive use of the debt markets to modify the composition of their capital base, despite the rising cost of such funds. On the surface, this situation might seem difficult to explain. However, a more thorough examination suggests that there are sound economic explanations of the changes occurring in corporate balance sheets over the past 20 years. Both the shift to debt of earlier years and the recent corporate response to rising inflation can be viewed as a matter of corporate treasurers trying to find the best mix of equity and debt in response to changing conditions.

Our examination of this subject gives rise to three basic questions. First, has a shift actually occurred in the composition of corporate capital structures? Second, how vulnerable have leveraged corporations become to the inflation of the 1970's and to the longer-term changes in the tax structure? Finally, to what extent did the necessity for selling equity into a rather unfavorable market spring from the need to lessen the exposure of leveraged corporations?

Changes in the corporate capital structure follow a clearly discernible sequence. An increase in corporate debt, relative to equity, results in higher leverage. The higher leverage has a two-fold effect; it leads first to an increase in profits available to stockholders, but at the same time, it increases the risks inherent in a greater dependence upon debt financing. The resulting increase in risk may lead corporate treasurers to sell more equity relative to debt, leading to a decline in the leverage of the corporate capital structure. In essence, this is just

*Research Officer, Federal Reserve Bank of San Francisco.

what has happened over the past 20 years, as this paper shows by its analysis of the changes in capital structure and their impact on the capital market.

Factors affecting return to equity

In a pioneering work, Franco Modigliani and Merton Miller demonstrated that, under certain conditions, the market value of a corporation—outstanding equity plus debt—is independent of its capital structure.¹ Given this premise, the introduction of debt into the capital structure of a firm increases the expected rate of return on a share of stock by an amount equal to the spread between the expected rate of return and the interest rate on bonds times the debt to equity ratio (i.e., leverage).

$$(1) \quad i = P + (P - r) \frac{D}{E}$$

where: i = expected rate of return on the equity to the firm.

P = internal rate of return for the firm. (Firms have differing risk characteristics and appropriate P 's will thus vary from firm to firm.)

r = rate of interest payable on the firm's outstanding bonds.

D = value of the firm's outstanding debt.

E = value of the firm's outstanding stock.

This formula says that the return on equity, i , depends upon the internal rate of return plus the spread between P and the market rate of interest *and* the capital structure of the firm (D/E , the ratio of outstanding debt to equity). If the risk associated with the stream of income is low, the firm can increase its expected rate of return by issuing debt. The price that the firm must pay is the increased risk on its return, because the reduced share of equity in total capital must bear all of the risk inherent in the profits stream.² For the individual corporation, investment will be expanded as long as P exceeds the market rate of interest. The limiting case for all firms is $i=r$. At this point, the expected return on assets (i) is equal to the market rate of interest (r), and firms will cease borrowing.

Equation 1 only holds in a situation where there is no direct income tax, and must be modified to be applicable to the U.S. Where corporate-bond interest payments are deductible from corporate income, we have the following:

$$(2) \quad \pi_t = (X - rD)(1 - t)$$

where: X = total income, including the return to debt generated by the firm

t = corporate income-tax rate

π = net income available for common stockholders

rD = cost of debt service (interest rate times outstanding debt)

Equations (1) and (2) contain all three of the elements which have contributed to the change in corporate balance-sheets over the past two decades.

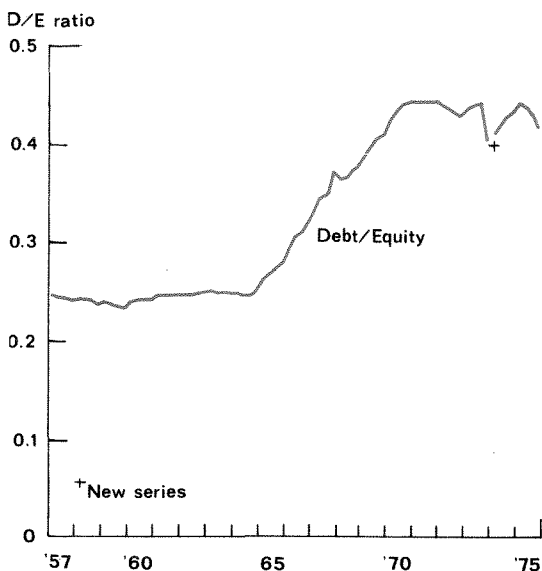
The first element is leverage, or the ratio of debt to equity. If the return on a firm's total assets consistently exceeds the market rate of interest, the firm has an incentive to borrow in the market, thus increasing the return to equity. The second factor is the corporate tax rate and the deductibility of bond interest. To the extent that bond interest payments are a deductible business expense, the government assumes a part of the risk of borrowing to increase investment. Government risk sharing does not decrease total risk taking in the economy; this will normally increase in response to corporate taxes as companies move to a riskier but higher-yield leverage position in order to get back part of the income government has taxed away.³

The last element in the picture is the interest rate. The high market rates at which corporations have had to borrow in recent years have made debt a relatively less attractive source of new funds, and have reduced the prospects of increasing the returns to equity through raising the leverage of the capital structure.

Benefits of leverage

The role of leverage in the composition of corporate capital structures has been argued for years, and cannot yet be said to be resolved to anyone's complete satisfaction. At one end of the spectrum, Modigliani and Miller argue that

Chart 1
Capital Structure of Manufacturing Corporations



the average cost of capital is completely independent of the degree of leverage.⁴ Ezra Solomon expresses the more traditional view, wherein increased leverage affects market value because total earnings rise relative to the increased use of debt capital, causing lower costs.⁵ However, all agree that, although leverage may be safely increased within a certain range, further increases will adversely affect equity earnings.⁶

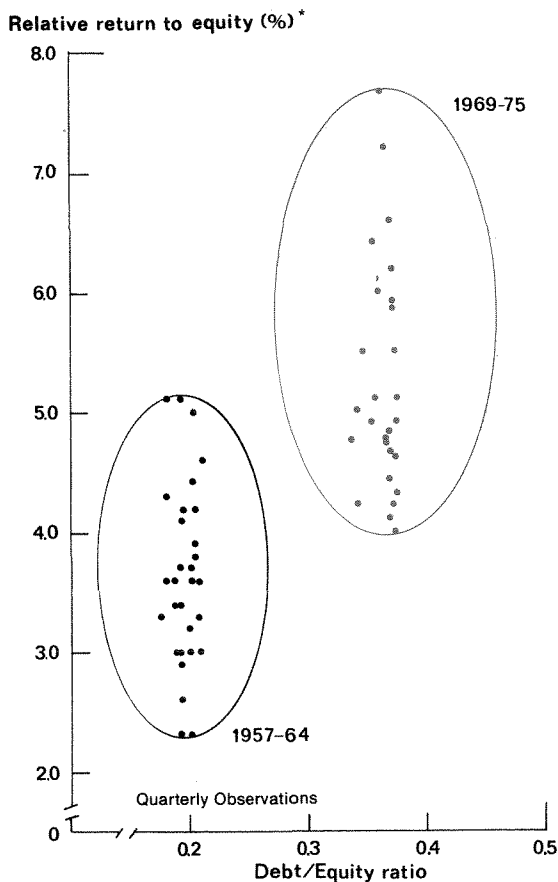
Whatever their reasoning, corporation treasurers began to alter the debt-equity mix of their capital portfolios in the mid 1960's (Chart 1). The relative costs of alternative sources of capital funds was an incidental but by no means negligible consideration in the determination of the capital structure, but the ultimate objective of the shift was to expand the share of earnings accruing to the firm's common-stock holders.

The experience of the 1957-65 period illustrates in vivid detail the advantages of debt financing to increase the leverage of the corporate capital structure. Within rather narrow limits, the debt/equity ratio (i.e., leverage) of a selected group of corporations remained near 25 percent throughout the 1957-64 period,

fluctuated for several years, and then stabilized near 44 percent throughout the 1969-75 period.⁷ The stability maintained during the 1957-69 period, and again during the 1969-75 period, strongly suggests that corporations desired the particular capital structure existing during each of those periods.

The purpose of increasing leverage is to increase the return to common stockholders. By introducing relatively more debt into the capital structure and increasing the debt/equity ratio, corporate treasurers seek to increase the return on total assets to improve their return to equity. Chart 2 describes the relation between the spread in the return to equity and the return on assets for the two periods of relatively stable leverage. Although there is a certain amount of

Chart 2
Leverage and Earnings



*Spread between return on equity and return on assets.

overlap in the yield spread in the two sets of observations, this could be expected in view of the highly cyclical nature of the return to equity.

The change in the composition of the corporate capital structure that took place between 1957-64 and 1969-75 resulted in a distinct upward shift in the return to shareholders. With a greater proportion of debt included in the capital base, the spread rose from a range of about 2½ to 5 percent to a range of 4 to 7½ percent. This finding supports the first premise of this paper; viz., corporate treasurers changed the composition of the corporate capital structure in a successful effort to improve the earnings of common stockholders.

Sources of corporate funds

Corporations thus can be seen as altering

their leverage positions by changing the proportion of equity and debt funds in response to a given capital need. But as all corporate treasurers know, other financing sources are also important. Indeed, internal sources of funds—also known as cash flow—are the mainstay of corporate capital funds for investment. In the main, these consist of undistributed profits after taxes (i.e., retained earnings) and capital-consumption allowances (i.e., depreciation). Depreciation simply provides funds for the replacement of existing capital as it wears out or becomes obsolete; therefore, depreciation does not provide for net capital expansion.

From 1957 through 1964, internally generated funds supplied most of the nation's capital-expenditure requirements. However, the situa-

Table 1
Sources of Nonfinancial Corporate Financing
1957 — 1975
(\$ billion)

	Gross Internal Funds	Retained Earnings	Net Funds Raised in Financial Markets*	Internal Funds as Percent of Capital Expenditures
1957	30.6	10.6	11.9	89.1
1958	29.5	7.3	11.7	109.6
1959	35.0	11.6	20.1	95.7
1960	34.4	9.0	12.8	89.3
1961	35.6	9.0	18.8	98.3
1962	41.8	11.1	17.2	95.9
1963	43.9	12.0	21.6	97.2
1964	50.5	16.5	22.2	98.1
1965	56.6	21.3	34.8	91.0
1966	61.2	23.0	36.3	80.1
1967	61.5	19.0	32.5	86.1
1968	61.7	17.5	51.9	82.4
1969	60.7	13.6	57.4	72.6
1970	59.5	8.3	44.1	70.7
1971	68.0	13.3	52.4	78.0
1972	78.7	20.7	69.3	76.9
1973	84.6	31.0	91.6	69.9
1974	81.5	33.5	101.8	64.7
1975	103.9	27.7	40.1	108.1

*Includes equity sales

Source: Federal Reserve Board of Governors

tion changed markedly by 1970, when funds raised in the financial markets were more than five times the amount of new equity generated by retained earnings. This situation reflected a sharp fall-off in retained earnings, which came about because of both the Viet Nam tax increase and the post-1966 profits decline. In the first period of observations (1957-64), retained earnings averaged nearly two-thirds of the average net volume of funds raised externally in the financial markets. In contrast, in the period 1969-75, the situation was dramatically reversed and retained earnings amounted to only one-quarter of externally-generated funds.

Questions arise also about internally generated funds as a source of equity. Although retained earnings may remain in the corporation's possession, this only means that stockholders are content to settle for the prospect of future capital gains as opposed to present income in the form of paid-out dividends. Retained earnings are a highly erratic source of investment funds, subject as they are to unexpected movements in both gross earnings and corporate taxes (Chart 3). In addition, retained earnings are the buffer between net profits after tax and net dividends paid, and corporate policymakers traditionally try to stabilize dividend payments, holding them steady when profits fall off and increasing them less rapidly when profits are on the rise.

On the surface, it would appear that retained earnings are a cheap source of funds to corporate treasurers. However, a number of studies have shown that the cost of retained earnings, from the shareholder's point of view, is in the neighborhood of 10 percent.⁸ Retained earnings are subject to two sets of taxes affecting stockholders—the corporate income tax and the capital gains tax—and IRS data on these tax categories (Statistics of Income for 1972) indicate the validity of this 10-percent estimate. Also, transaction costs must be incurred if the stockholder should wish to realize a capital gain by selling his stock.⁹

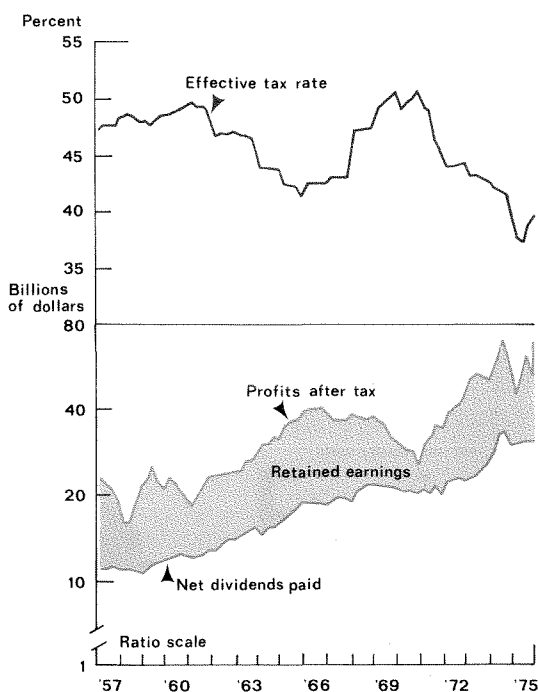
Stock prices and equity sales

If shares of common stock were to be viewed

in the general context of the usual market for commodities, a high or rising price should elicit a greater volume of the good in question. However, financial markets are not quite the same as the markets for shoes and ships and sealing wax. Common stocks gain their value from expectations of the future stream of earnings that may accrue from ownership in the corporation. If expectations are favorable for a corporation's future earning power, this will be reflected in the market price of its shares.

The relative desirability of a corporation's shares may be gauged by comparing its price/earnings ratio with that of other firms. This ratio, known as the "multiple," embodies the stock's current market price and the firm's current earnings. The value of the stock to the rational investor is the discounted value of the stream of future earnings that the stock is expected to generate. But to paraphrase Keynes, the actual price is likely to be closer to the expectations generated by what the "rational" investor perceives to be the expectations of other rational investors.

Chart 3
Profits, Retained Earnings and the Corporate Tax Rate



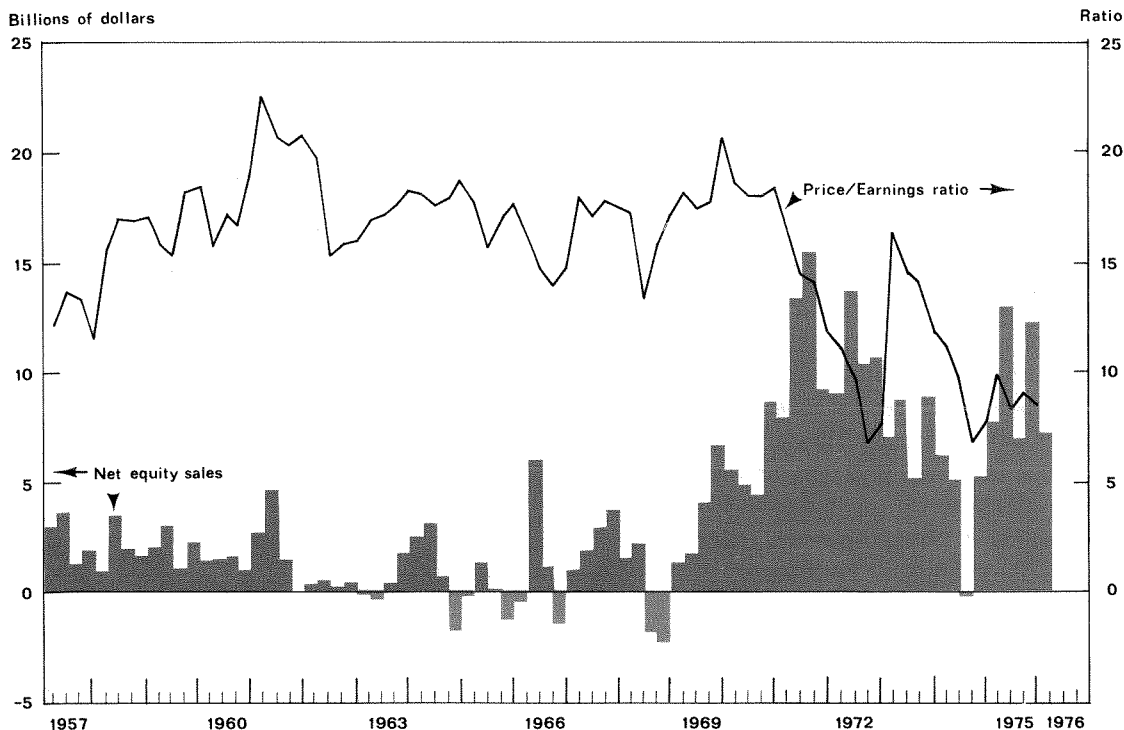
Another peculiarity of the stock market is that it is essentially a secondhand market. Stocks which have traded in the market for some time are a more-or-less known quantity (i.e., "seasoned") and unlike used cars, may command a premium over new issues just entering the market. A prevailing high price/earning ratio for the market in general would seem to create a hospitable environment for the sale of new equity shares. However, precisely the reverse has been true over much of the past two decades (Chart 4).

The combined price/earnings ratio of the 500 stocks in the Standard and Poor's industrial index averaged above 16 throughout the 1958-70 period, and during most of that time, the demands upon the equity market were fairly modest. During 1957-64, nonfinancial corporations were consistent (if small) net sellers of equity, averaging \$2-3 billion per year. In the mid- and late-1960's they retired outstanding stock almost as often as they sold it. But then, in the first half of the 1970's, these corporations

paradoxically became substantial net sellers of equity, selling new issues in the face of a price/earnings ratio that averaged about 11 and which dipped below 7 on occasion (Chart 4). In other words, corporations were reluctant to sell equity in a period of relatively high stock prices, and then turned around and marketed shares in a period of far less favorable prices.

All of this suggests that market conditions may be only a secondary factor in the decision to sell stock. Corporate treasurers stayed on the sidelines during the long period of rising stock prices, and then entered the market in the 1970's when it was much less amenable to new issues. This can be explained in terms of the desire of financial managers either to reduce the degree of leverage or, alternatively, to maintain a given leverage position but with the substitution of retained-earnings equity for market-raised equity. (The first explanation accords with a wish to reduce leverage in an increasingly risky world.) The steadiness of the leverage ratio in the 1969-75 period noted in Chart 1

Chart 4
Stock Prices and Net Equity Sales for Nonfinancial Corporations



suggests that corporate treasurers now wish only to maintain their current leverage position.

Limits of leverage

The higher rate of return on a leveraged capital structure carries with it a greater degree of risk as the costs of debt service rise relative to income. This is true in a period of price inflation, and doubly true in a recession when pre-tax profits fall. Dividend payments upon common stock may need to be trimmed or eliminated if the profitability of a firm worsens. But since interest payments are not postponable without a threat of default, the leveraged firm in this case faces more risk than the firm capitalized with equity. Thus, it should be expected that as firms come to rely more heavily upon debt as a source of capital funds, their vulnerability to fluctuations in profits and interest rates would increase accordingly.

The relationship of changes in the leverage ratio of manufacturing corporations to their interest-payment burden is described in Chart 5.¹⁰ Here, as in Chart 2, there is a bifurcation of observations, with 1957-64 observations clustering around a debt/equity ratio of 25 percent and 1969-75 observations clustering around a ratio of 44 percent, with the schedule shifting upward and to the right. During the latter period, corporations' increased reliance upon debt in their capital structure increased their possible exposure, and their high debt/equity ratio served as an effective ceiling for leverage. In 1970, when the debt-equity ratio reached 44 percent, interest costs assumed a much larger claim upon corporate revenues, and net equity sales showed a significant increase.

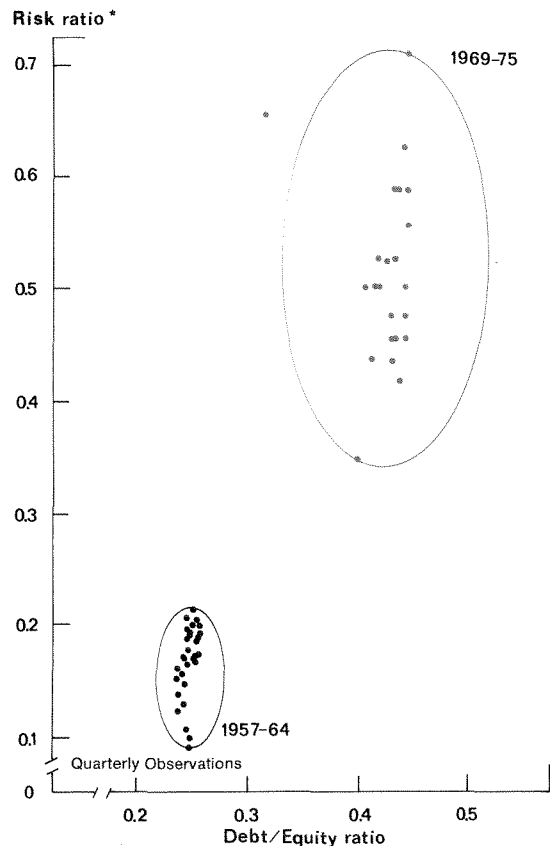
The close clustering of observations around the low (25 percent) and high (44 percent) debt/equity ratios helps illustrate the trade-off between risk and earnings that was implicit in the shift in corporate leverage between the two periods studied (Chart 6). In this comparison, the spread between return on equity and assets after taxes is used as a measure of equity earnings, and the net interest cover is used as a surrogate for risk, with a diminishing coverage corresponding to an increasing degree of risk.

Taxes, markets and risk assumption

Several sets of factors influenced the sources of corporate financing over the past two decades, the first of these being changes in the corporate income tax. The average or effective corporate tax rate varied substantially—from 50 to 37 percent—because of the institution (and suspension) of the investment tax credit, as well as changes in depreciation accounting and in tax-rate structure. These shifts had the direct effect of increasing or constricting the flow of retained earnings, depending upon the direction of the tax rate.

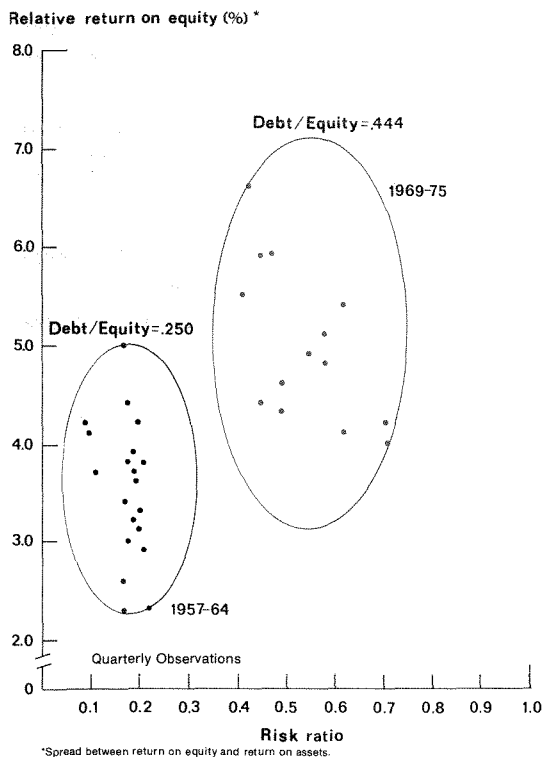
The tax rate thus represents another influence on the cost of funds raised by credit-market borrowing. Since interest costs are fully deductible for tax purposes, changes in the corporate tax rate directly affect the costs of borrowing. A high tax rate tends to insulate the firm from

Chart 5
Leverage and Risk



*Reciprocal of net interest times profits after tax.

Chart 6
Change in the Terms of the Earnings-Risk Tradeoff



market interest costs, because the government assumes a share of the borrower's risk to the extent of the amount of interest deducted. Conversely, a lower tax rate increases the net burden of interest costs to the corporation—as was seen in 1974-75, when net interest costs continued to rise in the face of falling market interest rates (Chart 7).

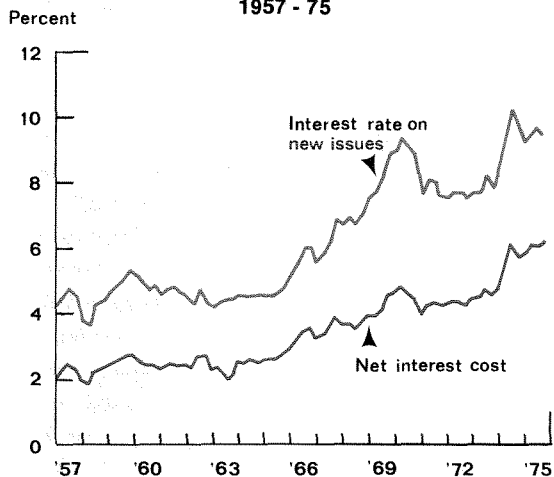
Corporate borrowers are also affected by inflation, through its impact upon the long-term interest rate. The long rate was remarkably constant, around 4½ percent, in the first half of the 1960's, when the inflation rate fluctuated around a base rate of about 1½ percent. But then as inflation increased, long-term interest rates increased, and corporate net interest costs also started to rise. Thus, throughout this decade of large net borrowing by corporations, the actual terms of borrowing were working against them with respect to the interest burden.

The decline in the effective corporate income tax over the past two decades has, on the whole,

avored equity financing—chiefly through retained earnings—over credit-market borrowing. This has been accomplished through a redistribution of the risks related to capital expansion based upon borrowed funds. Let us say that a corporation is indifferent to the tax rate when considering the risk of credit-market borrowing. If the tax rate is high and bond interest is deductible, the government essentially underwrites a part of the firm's interest cost and shoulders a corresponding part of its risk. As the tax rate falls, the corporation's net interest cost rises and the federal share correspondingly declines.

As long as interest expense is fully deductible as a cost of doing business, the corporation income tax will have a differential impact upon equity and debt financing. However, a declining tax rate tends to favor equity financing, because it forces the corporation to absorb a proportionately greater part of the total interest cost. As the debt/equity ratio rises—and the corporation becomes more highly leveraged—the interest burden becomes a much more critical consideration, especially during a period of inflation and rising market interest rates. It should also be noted, however, that the costs of capital—whether equity or debt—both rose in this period as stock prices fell and the terms of borrowing grew more onerous. Whether corporations sought to reduce leverage or to replace the

Chart 7
Corporate Bond Yields and Net Interest Cost
1957 - 75



diminished internal flow of equity, the result was the same: they sold more equity into the financial markets.

Conclusion

Corporate behavior over the past two decades with respect to equity sales is readily explainable in terms of the institutional structure within which financial markets function. As a group, manufacturing corporations followed a fairly conservative capital-financing program from the mid-1950's through the mid-1960's. At that point, however, they began to expand the debt in their balance sheets in an attempt to realize their full profit-maximization potential on equity shares. For a while they were successful, widening the spread between the return on equity and the return on assets. This was altogether in tune with the temper of the Sixties, when performance was the name of the game and the bottom line took precedence.

Manufacturing corporations, like other firms, faced a more difficult situation in the 1970's. The combination of inflation (with higher interest rates) and declining effective tax rates

increased the exposure of highly leveraged firms to both higher market interest rates and cyclical fluctuations in earnings. And these corporations reacted to their problems in the manner we have seen in recent years.

All these changes in corporate financing have demonstrated in rather dramatic fashion both the positive and negative aspects of financial leverage. The events of the past several years have probably given many painful moments to corporate treasurers. Given a world of increased risks, less leverage may be well advised. Still, the retreat from the high leverage ratios of 1970 could be rather limited. There are still advantages to be realized if the yield on the total capital base exceeds the cost of borrowed funds. The breadth and complexity of financial markets and the experience and imagination of corporate financial officers have increased apace. However, corporations in the years ahead will probably meet their capital requirements in a more balanced fashion than they have recently, drawing on both the equity and debt markets as they keep in mind the main lesson of the 1970's—leverage can cut both ways.

FOOTNOTES

1. Franco Modigliani and Merton H. Miller, "The Cost of Capital, Corporation Finance and the Theory of Investment," *American Economic Review*, June 1968, p. 267, ff.

2. As long as relatively safe investments are available, the firm will not be pressed by this limit because the proceeds of a financing can be used to lower the firm's intrinsic risk. This process—the firm's deliberate mixing of safe and risky investments—is logically no different from issuing "negative" debt. The only limit on this process is that debt cannot be less than zero, so that a firm with risky profits cannot, under equation 1, reduce the risk exposure of its earnings.

3. For a recent discussion of this point, see Richard A. Musgrave and Peggy B. Musgrave, *Public Finance in Theory and Practice*, second edition (New York: McGraw Hill, 1976), p. 307.

4. Modigliani and Miller, "The Cost of Capital, Corporation Finance and the Theory of Investment," *op.cit.*, pp. 281-282.

5. Ezra Solomon, *The Theory of Financial Management*, (New York: Columbia University Press, 1963), p. 94.

6. *Ibid.*, Modigliani and Miller, *op.cit.*, p. 275. The location of such a point of leverage is proximate rather than precise. Modigliani and Miller, after testing the effect of leverage on common stock yields for electric utilities and oil companies, concluded that the results appeared to support their theoretical construct, but that the empirical evidence was not conclusive. *Ibid.*, pp. 284-287.

7. The debt/equity ratios used in Chart 1 and thereafter are for manufacturing corporations as reported in the Federal Trade Commissions' *Quarterly Financial Report*.

The financial information for this group of corporations is presented in balance-sheet and income-statement form, with equity and debt shown on the basis of book value rather than market value. The ratios are presented in the QFC as equity/debt but are transposed to accord with the more usual definition of leverage.

8. Martin J. Bailey, "Capital Gains and Income Taxation," *Taxations of Income from Capital*, M. J. Bailey and A. C. Harberger (Washington, D.C. Brookings Institution, 1969), pp. 11-49.

9. William J. Baumol and Burton G. Malkiel, "The Firms' Optimal Debt-Equity Combinations and the Cost of Capital," *The Quarterly Journal of Economics*, November 1967, pp. 565-566.

10. The ratio of after-tax profits to interest for nonfinancial corporations is used here as a measure of the relative burden of debt service. This ratio is quite different from the usual accounting ratio, which measures before tax profits plus interest payments divided by interest payment. Because of data deficiencies, it was not possible to obtain both gross earnings and interest payments for manufacturing firms. The "times interest" ratios on an after-tax basis are much lower than on a pre-tax basis. For example, a times-interest coverage of 1.0 on a pre-tax basis indicates that the firm is insolvent, since gross earnings are zero. On an after-tax basis, a ratio of 1.0 is roughly equivalent to a ratio of 3.0 on a pre-tax basis, assuming a corporate tax rate of 50 percent, since interest payments and taxes have been deducted from gross earnings. In order to make a lower interest cover correspond to higher risk, the reciprocal of after tax times-interest is used, scaled from 0.1 to 1.0.