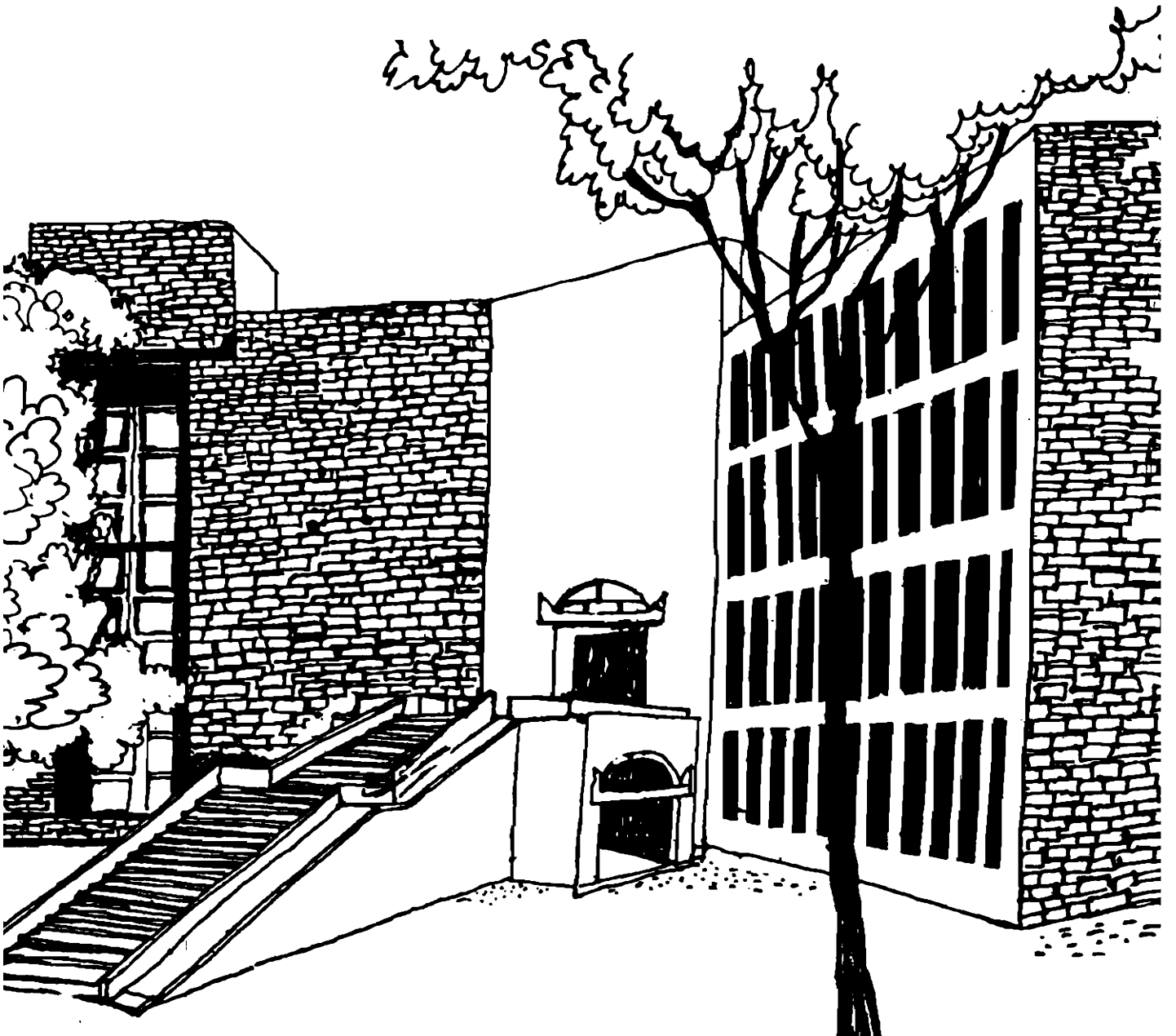




Working Paper



A NOTE ON DEBT CAPACITY IN MERGERS

By

Ashok Korwar

WP1092



WP

1993

(1092)

W P No. 1092

April 1993

The main objective of the working paper series of the IIM is to help faculty members to test out their research findings at the pre-publication stage.

INDIAN INSTITUTE OF MANAGEMENT
AHMEDABAD-380 015
INDIA

W.P. 1092

PURCHASED
APPROVAL
GRATIS/EXCHANGE
PRICE
ACC NO.
VIKRAM SARABHAI LIBRARY
I. I. M., AHMEDABAD.

ABSTRACT

Debt capacity is commonly thought to increase in a corporate merger. This note observes that the very concept of debt capacity appears to have evolved over time. In keeping with this, a fresh definition of debt capacity is proposed, placing the concept firmly in the context of optimal capital structure.

The note proceeds to show, relying on a widely accepted model of optimal capital structure under corporate and personal taxation, namely that proposed by DeAngelo and Masulis (1980) that debt capacity generally decreases in a merger, contrary to the usual result.

I. Introduction

It appears to be the general consensus among finance theorists that corporate mergers increase the debt capacity of the merging firms. Indeed, this alone is thought by some to be adequate to justify contemplating a merger (see, for example, Lewellen (1971)).

The definition of 'debt capacity' appears to have evolved somewhat over time. For example, the earliest discussions, notably Lewellen (1971) defined debt capacity to mean the level of promised payments such that the probability of default is less than or equal to some prespecified level 'alpha'. Stapleton (1982) takes debt capacity to mean the maximum amount of debt that can be raised at a given rate.

Since the risk borne by debtholders generally decreases in a merger, debt capacity as defined in these terms certainly does increase in a merger (see, for instance, Galai and Masulis (1976), Stapleton (1982), etc.).

II. A New Definition of Debt Capacity

In this paper, we propose a more 'modern' and, we hope, more meaningful definition of the concept of debt capacity. We argue here that if the concept of debt capacity is to mean anything significant, it must be related to the optimal debt level of the firm. If firms are assumed to behave rationally, they must be assumed to operate at their optimal debt levels at all times. Thus, their debt levels before and after the merger must reflect their optimal debt levels in each set of circumstances.

For the purposes of this note, we define debt capacity to mean the maximum amount of debt the firm can take on without reducing the value of the firm, that is, the optimal amount of debt for the corporation.

Using this definition of debt capacity, we shall proceed to prove that, contrary to the usual result of debt capacity increasing in a merger, debt capacity in general will decrease in a merger.

III. Optimal Capital Structure

Probably the most complete model of optimal capital structure under corporate and personal taxation is DeAngelo and Masulis (1980). In this paper, we shall draw upon this model, more specifically, on the state-preference version in DeAngelo and Masulis (1978).

The concepts behind this model are summarized below.

The model has its roots in Miller (1977), which pointed out that, in the presence of personal tax rates applicable to investors, there is no optimal capital structure for any given firm. This is

because of the fact that, in general, personal tax rates on debt income are higher than on equity-based income - specifically, the debt income is generally taxed at the ordinary income rate, whereas capital gains, which make up a substantial part of the returns from holding equity, are taxed at a lower rate. This tilts the scales again in favour of equity, where the corporate tax subsidy to debt had tilted them overwhelmingly in the direction of debt financing.

DeAngelo and Masulis extended this argument and restored the concept of an optimal capital structure by pointing out that the firm generally has tax shields which are unrelated to debt - depreciation, investment tax credits, and the like. They then go on to prove that, in general, a firm will find it worthwhile to take on debt to the point where debt and nondebt tax shields together shield the expected taxable income in future years. (To the extent that firms do end up paying taxes, it is either because of variation in taxable income around the expected value, or because of inflexibilities in debt contracts, which make it infeasible to structure debt so that the interest payments can vary with taxable income).

The logic behind this is simple: if firms borrow less than this amount, they are wasting a tax subsidy to debt at the corporate level. If they borrow more than this level, then they will have to compete in the debt markets with companies which can afford to pay investors a higher rate to make up for the higher personal tax incidence on debt income, but who have a use for the tax shield from the debt. Our company has gone beyond this point, because all its taxable income is already shielded from corporate tax. Thus, our company would be paying a rate on debt instruments which it cannot afford to, given that the market rate is determined by companies who can afford to pay that rate.

IV. The State Preference Model

The logic of the model yields the following expression for optimal debt level:

$$B(s) = \max [X (s) - R (s), 0] \quad \dots\dots\dots (1)$$

where

- s: denotes state of the world
- B(s): payout on debt in state s.
- X(s): operating earnings in state s.
- R(s): nondebt deductions in state s.

V. Applying the Model to Mergers

Assume firm A merges with firm B to form firm AB. Also assume there are no synergies etc., so as to keep the argument simple. Then:

VIKRAM SARABHAI LIBRARY
INDIAN INSTITUTE OF MANAGEMENT
ASTRAPUR, AHMEDABAD-380015

$$X_{ab}(s) = X_a(s) + X_b(s) \quad \dots\dots (2)$$

$$R_{ab}(s) = R_a(s) + R_b(s) \quad \dots\dots (3)$$

since the earnings and the nondebt deductions are simply additive in each state of nature s .

Then the optimal debt levels of A and B are given by (1).

The optimal level of debt for firm AB is similarly given by applying (1):

$$\begin{aligned} B_{ab}(s) &= \max [X_{ab}(s) - R_{ab}(s), 0] \quad \dots\dots (4) \\ &= \max [X_a(s) + X_b(s) - \{R_a(s) + R_b(s)\}, 0] \\ &= \max [\{X_a(s) - R_a(s)\} + \{X_b(s) - R_b(s)\}, 0] \\ &\leq \max [X_a(s) - R_a(s), 0] + \max [X_b(s) - R_b(s), 0] \\ &= B_a(s) + B_b(s) \end{aligned}$$

Thus we have,

$$B_{ab}(s) \leq B_a(s) + B_b(s) \quad \dots\dots\dots (5)$$

which means debt capacity decreases in a merger.

Note that the inequality holds unless $\{X_a(s) - R_a(s)\}$ and $\{X_b(s) - R_b(s)\}$ are perfectly correlated.

In general, $R(s)$ is more or less constant across states of nature, since deductions like depreciation tax shields and the like do not usually vary with states of nature. In that case, all we need to know is that X_a is generally less than perfectly correlated with $X_b(s)$ to arrive at the result that debt capacity will decrease.

The logic of this result is simple: since the operating earnings of the two merging firms will dampen each other's swings, the debt level needed in any given state of nature to completely shield the earnings from taxation will in general decline.

VI. Conclusion

The contribution of this note to finance theory is twofold: it proposes a new definition of debt capacity which is more meaningful than previous definitions because it explicitly draws upon the concept of optimal capital structure, which previous definitions had more or less ignored. Secondly, it proves that, in a world with personal and corporate taxes, corporations need less debt after they merge than they did before the merger.

REFERENCES

1. DeAngelo H., and Masulis R., A model of Optimal Capital Structure, UCLA working paper, 1978.
2. DeAngelo H., and Masulis R., Optimal Capital Structure under Corporate and Personal Taxation, Journal of Financial Economics, March 1980.
3. Galai D., and Masulis R., The Option Pricing Model and the Risk Factor of Stock, Journal of Financial Economics, January-March 1976.
4. Lewellen, W.G., A Pure Financial Rationale for the Conglomerate Merger, Journal of Finance, May 1971.
5. Stapleton, R.C., Mergers, Debt Capacity, and the Valuation of Corporate Loans, in Keenan and White, eds., Mergers and Acquisitions, D.C. Heath, Lexington, Mass. 1982.