Taxing Prometheus: How the Corporate Interest Deduction Discourages Innovation and Risk-Taking

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ABSTRACT
This paper uses recent developments in the theory of optimal capital structure to demonstrate how the federal corporate income tax with an interest deduction, but without a corresponding dividend deduction, misallocates capital within the corporate sector by encouraging investment in low-risk, low-growth projects employing tangible assets over high-risk, high-growth projects employing intangible assets.

I. INTRODUCTION

PROMETHEUS is fabled to have created man out of clay in the image of the gods and to have taught his mortal progeny the various arts and sciences. Mankind’s resulting obsession with creating and building left little time for worshipping the gods. That angered a jealous Zeus, who responded by extinguishing all earthly fires, causing much suffering on Earth. Troubled by the plight of his mortal progeny, Prometheus stole fire from Mount Olympus and brought it back to Earth in a hollow fennel stalk. For his transgression, Prometheus was severely punished by Zeus,1 who permitted mankind to keep fire and continue to practice the arts and sciences.2

For his gifts to the human race, Aeschylus treats Prometheus

1. Zeus ordered Hermes to chain Prometheus to a rock on Mount Caucasus where a vulture fed daily on his liver, which grew back each night. HESIOD, THE HOMERIC HYMNS AND HOMERICA 117 (Hugh G. Evelyn-White trans., 1967). After 30 years, Zeus relented and Prometheus was freed by Heracles. Id.
2. In a myth related to us by the poet Hesiod, which reflects the sexist climate of the time, as mankind’s punishment for Prometheus’s act of stealing fire, Zeus ordered Hephaestus to create Pandora, the first woman, and sent her to Earth. Id. at 121. Ignoring Prometheus’s warning, Epimetheus married her, allowing her to remove the lid from the box she carried, releasing evil, drudgery and pestilence. Id. at 123.
as humanity's preserver in *Prometheus Bound*. That view is echoed in English literature, in which Prometheus is frequently depicted as a courageous champion of humanity. In the English language, the term Promethean has come to mean boldly creative and defiantly original. It is commonly used to describe significant technological advances. For example, the microprocessor and fusion power have been described as Promethean, as have Gordon Moore's laboratory at Fairchild Semiconductor, the technological achievements of Japan and the creativity of the United States.

Not only in mythology and modern times, but from before the time of ancient Greece, technological advances have improved living conditions. Progress, however, was slow until the eighteenth century, when a flood of innovation, called the industrial revolution, produced a rapid rise in income. The pace of both techno-


6. George Gilder, Calbraithian Truth and Fallacy, *Forbes*, Nov. 12, 1979, at 117, 129 ("There is no way to fathom the full potential of this [microprocessing] technology, now in its Promethean infancy.").

7. See generally Fusion, Sure—But for the Long Term, *Forbes*, Jan. 9, 1978, at 154, 154 (describing mankind's efforts to duplicate fusion reactions that occur on sun as "a truly Promethean challenge").


10. See Andrew Hacker, Bearish on America, *Fortune*, Nov. 24, 1986, at 213 (discussing traits of United States that will allow it to remain as world's leading economic power) (citing Oxford Analytica, America in Perspective: Major Trends in the United States Through the 1990s 1 (1986) ("[The United States] has invested so wisely in education, training, research, development and other forms of human capital, that it will continue to surprise the world with its flexibility, resilience, and sheer Promethean creativity.").


12. See generally David S. Landes, The Unbound Prometheus: Technologi-
logical advance and economic growth accelerated in the twentieth century.\textsuperscript{13} The latter half of this century has also yielded clear evidence of the relation between the two. Income growth in the industrialized nations during the twentieth century has come not primarily from capital accumulation but overwhelmingly from improvements in technology, broadly defined.\textsuperscript{14}

Recent years have seen a decline in productivity growth in the industrialized countries and a concomitant drop in the rate of income growth.\textsuperscript{15} Although the drop in productivity growth has hit most industrialized nations, the United States has been hit especially hard.\textsuperscript{16} Observers from across the political spectrum see the loss of technological leadership as a source of the current economic woes of the United States\textsuperscript{17} and believe that increasing innovative activity, especially by encouraging investment in new technologies, worker training, organizational practices and high-
tech industries is part of the solution. Commentators have identified several factors in the U.S. economy that distort incentives and retard economic growth, including the federal income tax, which imposes a higher burden on corporate than on noncorporate investment. This Article describes another growth retarding distortion caused by the federal corporate income tax. The culprit is the favorable treatment of debt relative to equity, most significantly the corporate interest deduction. The thesis of this Article is that the corporate interest deduction, which appears neutral because it permits all corporations to deduct interest, distorts the allocation of capital within the economy by encouraging investment in tangible, fixed assets and safe projects and discouraging investment in intangible assets, growth opportunities and risky projects. Thus, traditional technologies and in-

18. Many commentators advocate a concerted and direct government effort to increase investment in critical high-tech industries. See, e.g., Lewis M. Branscomb, Does America Need a Technology Policy?, HARV. BUS. REV., Mar.-Apr. 1992, at 24, 25 (arguing that government should stimulate demand for innovative technologies by “encouraging collaborative research among companies and . . . universities . . . and by helping to develop the tools and techniques that all companies need to be more productive”); Clyde Prestowitz & Kevin Kearns, Forget the Quick Fix; Fundamental Problem is Our Emphasis on Consumption Over Saving and Investment, ROLL CALL, POLICY BRIEFING NO. 37 (1992); Robert Kuttner, Facing Up to Industrial Policy, N.Y. TIMES, Apr. 19, 1992, § 6 (Magazine), at 22, 42 (arguing that tax and regulatory treatment of America’s financial markets needs to be reformed to bolster “long-term investment in technologies, production processes and people”); Robert B. Reich, Up the Workers: Industrial Policy Reconsidered, THE NEW REPUBLIC, May 13, 1991, at 21, 24 (arguing that United States government has important role to play in emphasizing emerging technologies “which are likely to form the foundation stones of future industries”). Even some critics of industrial policy favor the federal government channeling more resources to research and development generally. See, e.g., Michael Boskin, ADDRESS AT THE EX-

19. Other factors mentioned by commentators include differences in the cost of capital, the short-term outlook of business management, the dire state of primary and secondary public education, insufficient savings and capital formation, a decline in entrepreneurship through a corporate reward system that encourages playing it safe and the rise of protectionism which reduces competition. See RESEARCH AND POLICY COMMITTEE OF THE COMMITTEE FOR ECONOMIC DEVELOPMENT, PRODUCTIVITY POLICY: KEY TO THE NATION’S ECONOMIC FUTURE (1983); see also Michael L. Dertouzos et al., MADE IN AMERICA: REGAINING THE COMPETITIVE EDGE 42-45 (1989) (classifying cause of United States’ productivity problem into six categories: outdated business strategies, preoccupation with short-term results, technological weaknesses in development and production, neglect of human resources, failures of cooperation and conflicting purposes of government and industry). Some of these factors are very controversial.
dustries are encouraged at the expense of emerging technologies, new production methods and high-tech industries.

The capital distortion occurs because the federal corporate income tax, which taxes corporations as separate entities and allows corporations a deduction for interest but does not permit a corresponding deduction for dividends or retained earnings, encourages corporations to issue debt. This Article, which relies on recent economic scholarship demonstrating and explaining why corporations in different industries have different debt capacities, argues that because debt financing is tax-favored over equity financing, the larger an industry's debt capacity, the lower is its total effective tax rate and, therefore, the lower is its cost of capital. Accordingly, among projects with the same expected net present value, the federal corporate income tax encourages investment in projects with a large debt capacity and discourages investment in projects with a small capacity. In general, those activities with a large debt capacity have less earnings variability, fewer prospects for growth through profitable investment and employ more tangible assets. Conversely, riskier activities with more numerous opportunities for profitable investment that use more intangible assets have a small debt capacity. Thus, the federal corporate income tax discourages investment in the latter group of projects. Therefore, not only does the tax misallocate capital between the corporate and noncorporate sectors, as is widely recognized by commentators, it also misallocates capital within the corporate sector. This misallocation of capital within the corporate sector is an inefficient and undesirable consequence of existing tax law, which has been overlooked by scholars and policymakers. It also operates to discourage investment in precisely those industries, technologies and production methods that many observers see as critical to the nation's economic future.

Section II of this Article reviews the literature on optimal capital structure. Section III, the heart of the Article, argues that

20. Arnold Harberger first argued that the classical corporate income tax misallocates capital between the corporate and noncorporate sectors. See generally Arnold C. Harberger, The Incidence of the Corporation Income Tax, 70 J. Pol. Econ. 215 (1962). Jane Gravelle estimates that the overall effective tax rate on corporate capital is 42%, which is 70% higher than the estimated 25% rate on noncorporate investment. See JANE G. GRAVELLE, CRS REPORT FOR CONGRESS, CORPORATE TAX INTEGRATION: ISSUES AND OPTIONS 2 (1991). Thus, for example, if an investor's required after-tax return is 8%, then the required rate of return is 10% for noncorporate investments and 13.79% for corporate investments.

21. Readers who can probably skip this material without losing the argument are those with a grounding in capital structure theory at the level explained in RICHARD A. BREALEY & STEWART C. MYERS, PRINCIPLES OF CORPORATE FINANCE
the corporate interest deduction distorts investment, thereby making the nation poorer. Section IV argues that the tax advantage to debt steers capital away from risky projects, growth opportunities and intangible assets. Section V seeks to quantify the capital distortion caused by the corporate interest deduction and argues that the distortion should be remedied. Section VI provides a discussion of different methods for remediing the capital distortion and examines the effectiveness of the various corporate integration proposals in reducing that distortion. Section VII is the conclusion.

II. Understanding Corporate Capital Structure

It would be difficult to understand the consequences of the corporate interest deduction without first considering how corporations set capital structure. Although disagreements and puzzles remain, the finance community largely agrees on the economic factors that have major influences on corporate capital structure.22

Capital structure theory has both normative and positive elements. The normative question that capital structure theory addresses is what combination of debt and equity minimizes the corporation’s cost of capital. Choosing the capital structure that minimizes the corporation’s cost of capital is desirable because it maximizes the value of the corporation. Positive theory addresses the question of how corporations set capital structure. It is reasonable to assume that corporations tend towards minimizing their cost of capital, as normative theory suggests, because if they did not, investors aware of this unexploited opportunity could profit by buying the corporation and adjusting its capital structure.23

A. The Role of Taxes

Taxes are one influence on corporate capital structure.24 The

22. See Ross & Westerfield, supra note 21, at 472.
24. In a classic paper, Franco Modigliani and Merton Miller showed that if there are no taxes, no transaction costs and investment policy is fixed, then the financial policies of a corporation are irrelevant. Franco Modigliani & Merton H. Miller, The Cost of Capital, Corporation Finance and the Theory of Investment, 48 Am. Econ. Rev. 261, 268-71 (1958). Thus, if capital structure matters it must be because of the impact of taxes, transaction costs or investment policy.
federal corporate income tax, which subjects corporations to tax on their taxable income as separate entities.\textsuperscript{25} is currently 34% for all but the smallest corporations.\textsuperscript{26} In calculating taxable income, a corporation subtracts the interest it pays debtholders,\textsuperscript{27} but it cannot deduct the dividends it pays shareholders or the earnings it retains. Thus, for every dollar that the corporation earns before interest and taxes, the corporation can retain $.66 of earnings, pay a $.66 dividend or pay $1 interest. Accordingly, every $1000 bond paying interest at 10% that the corporation issues, using the proceeds to repurchase equity, will reduce the corporation's annual tax bill by $34.\textsuperscript{28} Because debt has such an attractive feature, the corporation should always have debt in its capital structure. Moreover, interest deductibility implies that the corporation's value increases by issuing additional debt.\textsuperscript{29}

The corporate income tax is not the only tax that influences corporate capital structures. There is also the investor-level tax on equity and debt, which cannot be ignored because the income from debt and equity is taxed differently.\textsuperscript{30} Although dividends received by individual investors are taxed at the investor's ordinary income rate, as is interest, much of the return to equity occurs as appreciation in value, which incurs a different and highly favorable tax treatment.\textsuperscript{31} Appreciation is not taxed until the

\begin{itemize}
\item \textsuperscript{25} I.R.C. § 11(a) (1988)
\item \textsuperscript{26} See I.R.C. § 11(b) (imposing tax of 34% on corporations with taxable income exceeding $75,000).
\item \textsuperscript{27} See I.R.C. § 163(a) (granting deduction for all interest paid or accrued within taxable year on corporate indebtedness).
\item \textsuperscript{28} This is arrived at by multiplying the annual interest payment of $100 by the 34% tax rate.
\item \textsuperscript{29} Modigliani & Miller, supra note 24, at 272-73 (explaining why deduction of interest expense in computing taxable corporate profits cannot be replicated by investors borrowing and purchasing stock in unlevered corporation). The present value of an annual tax deduction of $34 indefinitely, discounted at 10%, is $340. Thus, $340 is the value of the tax shield created by replacing equity with a $1000 bond. Modigliani and Miller's original article did not properly value interest tax shields. They described the correct method for valuing interest tax shields in a later article. See Franco Modigliani & Merton H. Miller, Corporate Income Taxes and the Cost of Capital: A Correction, 53 AM. ECON. REV. 433, 435-37 (1963).
\item \textsuperscript{30} If the income from debt and equity were taxed identically, then the tax advantage from corporate debt would be as described above. For a discussion of the tax advantage of debt if the income from debt and equity are taxed identically, see supra notes 25-28 and accompanying text. See Brealey & Myers, supra note 21, at 427-28 (illustrating relative tax advantage of taxing income from debt and equity identically).
\item \textsuperscript{31} Debt appreciation is also favorably taxed, but appreciation is a larger portion of the return to equity than to debt. See Brealey & Myers, supra note 21, at 426-29 (explaining effect of debt in corporate and personal taxes); Theodore
\end{itemize}
stock is sold, and even then it is only taxed at the rate prevailing for capital gains, which is often below the rate on ordinary income. In addition, if an investor dies holding appreciated assets, the appreciation will forever escape tax. For the above reasons, the personal tax rate on equity is likely to be below the personal tax rate on debt, and could be as low as zero.

Merton Miller recognized that corporations trying to maximize their value will choose a capital structure that minimizes total taxes, not just corporate taxes. For every dollar the business earns that is supported by debt, the total tax to the investor is the personal tax on debt income. Alternatively, if the earnings are supported by equity, the total tax to the investor is the corporate and personal tax on equity income. Because tax rates vary among investors, the corporation cannot choose whichever is cheaper, debt or equity, because neither is necessarily cheaper. To understand how corporations set their capital structures, it is necessary to use Miller’s argument based on progressive taxation.

To make the argument easier to follow, start with the assumption that the personal tax rate on equity is zero for all taxpayers. This assumption implies that the total tax to the investor from equity financing is the corporate tax and the total tax from debt financing is the investor’s personal tax. In equilibrium, so as to

S. Sims, Long-Term Debt, the Term Structure of Interest and the Case for Accrual Taxation, 47 Tax L. Rev. 313, 357 (1992) (accrual tax more important for debt than equity).


33. This is because the investor’s heirs will receive a tax basis equal to the fair market value of the securities at the time of the investor’s death. I.R.C. § 1014(a)(1) (1988).

34. See Gravelle, supra note 20, at 10.


36. Let \( T_p \) denote the personal tax rate on debt, \( T_e \) the personal tax rate on equity income and \( T_C \) the corporate tax rate. The total tax to the investor from holding debt is \( T_p \), leaving the investor with \( 1 - T_p \). The total tax to the investor from holding equity is \( 1 - (1 - T_C) (1 - T_e) \), leaving the investor with \( (1 - T_C) (1 - T_e) \).

37. This assumption, though not essential for the argument, simplifies the discussion.

38. The total tax to the investor from holding debt is still \( T_p \), leaving the investor with \( 1 - T_p \). The total tax to the investor from holding equity becomes \( T_C \), leaving the investor with \( 1 - T_C \).
minimize total taxes, investors with a marginal tax rate below the corporate rate hold only debt, whereas investors with a marginal tax rate above the corporate rate hold only equity. An investor with a marginal tax rate equal to the corporate rate is called the marginal investor and can hold either debt or equity or both.39

Because financial advisors have long been aware of the tax consequences of debt and equity, Miller argued that any advantage from issuing debt has long been competed away. Thus, it is likely that the economy is in equilibrium with respect to the issuance of debt and equity. Accordingly, the tax treatment has an impact on the optimal debt-to-equity ratio for the corporate sector as a whole, but there is no optimal debt-to-equity ratio for an individual corporation. Thus, despite the deductibility of interest payments, a corporation cannot change its value by changing its capital structure.40

Prior to the Tax Reform Act of 1986 (1986 Act),41 the corpo-

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39. An example might make this clear. Assume all corporations are taxed at a rate of 40% and that the marginal investment project generates a return of 10%. This implies that all investors receive 6% after-tax when there is only equity. Assume further that there is a system of progressive taxation, with some investors tax-exempt and others taxed at rates as high as 60%, with investors scattered over the full range. The first corporation to issue debt can offer a return just over 6%, say 7%; this will induce tax-exempt investors to buy the bonds. Once one corporation issues debt, other corporations follow. Soon all tax-exempt investors have their entire investment portfolios in debt. Assume the next large group of investors is in the 20% tax bracket. These investors would receive only 5.6% after-tax if they purchased corporate bonds paying 7%, which is less than the 6% they receive from equity. To induce these investors to purchase debt, corporations have to increase the interest rate to more than 7.5%. Assume they set the interest rate at 8%. This is still attractive to the corporations because they save 2%, the difference between 10% and 8%. The process of issuing new debt continues until the interest rate on debt is 10%, at which point corporations no longer derive an advantage from issuing debt. If, for example, the interest rate was 12%, corporations would lose 2% by issuing debt; they would, then, issue equity and retire debt until the interest rate fell to 10%.

40. Miller stated his conclusion as follows:

There will be an equilibrium level of aggregate corporate debt . . . and hence an equilibrium debt-equity ratio for the corporate sector as a whole. But there would be no optimum debt ratio for any individual firm. Companies following a no-leverage or low leverage strategy (like I.B.M. or Kodak) would find a market among investors in the high tax brackets; those opting for a high leverage strategy (like the electric utilities) would find the natural clientele for their securities at the other end of the scale. But one clientele is as good as the other. And in this important sense it would still be true that the value of any firm, in equilibrium, would be independent of its capital structure, despite the deductibility of interest payments in computing corporate income taxes.

Miller, supra note 35, at 269.

rate tax rate was 46%. Individual tax rates were progressive with a maximum individual tax rate of 50%. Prior to 1981, the maximum individual tax rate on investment income was 70%. Thus, Miller's argument implies that corporate debt would have increased after personal tax rates were lowered in 1981. Moreover, assuming a personal tax rate on equity income of zero, because the top personal rate exceeded the corporate rate, there would have been throughout this period an upper limit on the aggregate amount of debt below 100%. However, today, because the 1986 Act reduced the top personal tax rate (currently 33%) below the statutory corporate rate (34%), the Miller model implies that close to 100% debt is optimal in the post-1986 economy.

Of course, the Internal Revenue Service would disallow interest deductions for any corporation that had close to 100% debt.

45. The equity of a corporation with a capital structure that is 100% debt is worthless because there is no possibility of the equity receiving anything of value. This is a much stricter condition than the condition that the market value of the corporation is less than the face value of the debt because the possibility of good fortune gives the equity value. Although it is rare to find corporations with 100% debt, even in reorganization, 100% debt is a useful construct as an upper limit on leverage. See KLEIN & COFFE, supra note 21, at 335-38 (using approximately 100% debt in example to illustrate limits on use of debt).
47. The incentive to issue 100% debt is even stronger if the effective personal tax rate on equity income is positive, which it is because of dividends and forced sales. See GRAVELLE, supra note 20, at 5.
However, the Service rarely contests interest deductions on corporations, even those with debt-to-equity ratios as high as 10-to-1.49 Yet few corporations have a debt-to-equity ratio anywhere near this large,50 and some very successful corporations have little or no debt in their capital structure.

Jane Gravelle estimates that the spread between the effective total tax rates of equity and debt is around 50%.51 This estimate, if accurate, implies that a corporation could reduce the total tax burden on its investors by 50% by issuing debt and repurchasing equity. Although estimates of the spread vary,52 there is a consensus that there is a large tax advantage from debt.53 Understanding why many corporations issue little debt, despite the potential tax savings, is the subject of the next section, which introduces the costs of financial distress.

B. The Role of Financial Distress

The Miller model is based on two critical assumptions: that bankruptcy is costless and that all interest tax shields can be used or transferred at full value. As these two critical assumptions are

49. There is a long history of attempts to provide clear rules to distinguish debt from equity. See Boris I. Bittker & James S. Eustice, Federal Income Taxation of Corporations and Shareholders ¶¶ 4.02-03 (1987) (discussing factors that impact classification of investment instruments). The current method for distinguishing debt from equity is to look at a variety of factors, including the debt-to-equity ratio, the intent of the parties, whether all investors hold debt and equity in similar proportions and whether interest is contingent. Id. at ¶ 4.04. A myriad of other factors also affect the determination of whether a particular investment instrument represents debt or equity. See, e.g., In re Lane, 742 F.2d 1311, 1314-15 (11th Cir. 1984) (providing list of thirteen factors that merit consideration when making debt/equity determination); Fin Hay Realty Co. v. United States, 398 F.2d 694, 697 (3d Cir. 1968) (explaining that ultimate question in making debt/equity determination is whether stockholders’ entire investment represents risk capital subject to fortunes of corporate venture or whether debtor-creditor relationship exists between corporation and shareholder); see generally William T. Plumb, Jr., The Federal Income Tax Significance of Corporate Debt: A Critical Analysis and a Proposal, 26 Tax L. Rev. 369 (1971) (providing thorough discussion of factors relevant in determining whether debt should be respected or reclassified as equity).


51. Gravelle, supra note 20, at 11.

52. See Gertler & Hubbard, supra note 50, at 59 (giving examples of different experts’ estimates of spread). For example, the spread between the effective total tax rates of equity and debt is around 30%. Id.

53. See TREASURY DEPT’T REPORT, supra note 44, at ch. 1 (discussing tax advantage from debt financing).
relaxed, the model's conclusions break down, and each corporation has an optimal capital structure with less than 100% debt.

1. The Declining Value of Tax Shields

The Miller model assumes that corporations can always realize full value for their interest tax shields. This is not so. Because the federal government does not provide tax refunds to loss corporations and because tax losses are not easily salable, corporations have a limited capacity to use the interest tax shields generated by debt. Consequently, as leverage increases, the marginal value of the interest deduction falls.

If corporate after-interest income is negative, the corporation does not receive a rebate of 34% of the loss; instead, its annual tax liability is zero. The tax law provides that the corporation can use losses to obtain a refund of corporate income taxes paid in the previous three years. Losses that are not used to offset income accrued in the prior three years are suspended and carried forward to succeeding years where they can be used to reduce taxable income to zero. After fifteen years, unused losses expire. Thus, interest deductions beyond those that reduce the corporation's three-year income to zero do not generate a current benefit. Of course, current losses that are not used until later years have a smaller present value than those used currently, and the decline increases with the delay.

The tax law contains numerous rules designed to hamper the ability of corporations to transfer losses. The existence of substantial losses that corporations are not currently using implies that these provisions have an effect.

In the context of the Miller model, consider one corporation with an uncertain earnings stream that cannot transfer its excess tax shields. Such a corporation would not want to have so much

54. Tax specialists say that the corporate tax does not provide corporations with full loss offsets but only with incomplete loss offsets.
57. See BITTNER & EUSTICE, supra note 49, at ¶ 16.20 (1987) (discussing weapons available to Internal Revenue Service to combat acquiring companies seeking to use loss-carryovers of acquired companies).
58. Rosanne Altshuler & Alan J. Auerbach, The Significance of Tax Law Asymmetries: An Empirical Investigation, 105 Q.J. ECON. 61, 70-75 (1990). This does not imply that losses can never be transferred; the leasing industry proves otherwise. It suggests only that there are effective limits on transferability.
59. Assume the economy has a corporate tax rate and progressive personal taxes with a maximum above the statutory corporate rate.
debt that there was a chance of it having a taxable loss, which would occur if its annual income (after deductions including interest) were negative. Accordingly, in the event of a loss, the present value of the deduction on the last dollar of interest is less than the statutory rate of $.34. Assuming the economy was at a Miller equilibrium, and the corporation had a chance of not using its entire interest deduction in a given year, the corporation would not be in equilibrium because the expected present value of the corporation's deduction on the last dollar of interest would be less than the statutory corporate rate. Thus, the possibility that the corporation might not currently use the entire deduction implies that the total tax on debt exceeds the total tax on equity. It follows that, as long as there was any chance that some of the interest would not be immediately deductible, the equityholders would benefit by issuing equity and using the proceeds to retire debt.60

As the exception becomes the rule, and more corporations resemble the one in the above paragraph, the results of the Miller model break down. There is no longer an aggregate optimal debt level for the economy, with all corporations indifferent towards their capital structure. Instead, each corporation has an optimal debt level at which the expected marginal value of the tax shield equals the personal tax rate of the marginal taxpayer in the economy.61

For any corporation, the value of the marginal tax shield will equal the statutory tax rate only if the corporation is certain to use the deduction currently. For very low levels of debt, this might be the case for some corporations. Nevertheless, as leverage increases, the chance of not being able to use the deduction (currently, if at all) rises, thereby reducing the expected realizable tax shield on additional debt. Accordingly, the expected realizable tax shield falls as leverage increases.62 The available evidence

60. If there were any chance that the corporation could have a negative before-interest income, then it would retire all of its debt. The discussion ignores any tax on appreciation of the debt, which is usually small.

61. Harry DeAngelo and Ronald W. Masulis, Optimal Capital Structure Under Corporate and Personal Taxation, 8 J. FIN. ECON. 3, 3-18 (1980). The identity of the marginal taxpayer is determined through the interaction of all firms and investors. Id. at 3. This assumes that the income from equity escapes personal tax. Id. at 11. If it is taxed, the personal-level tax advantage to the marginal investor of equity replaces the tax rate of the marginal investor in the equilibrium condition described in the text. Id.

62. Ronald W. Masulis, The Debt/Equity Choice 23-30 (1988). Evidence supports the importance of taxes in corporate capital structure decisions. See DeAngelo & Masulis, supra note 61. For example, the announcement of capital structure changes is linked to stock price changes. Masulis, supra, at
supports the conclusion that corporations have a limited capacity for the interest deductions generated by debt because the effective corporate tax rate is below the statutory rate.\textsuperscript{63}

2. \textit{Costs of Bankruptcy and Financial Distress}

In addition to the declining value of the interest tax shields, the costs associated with financial distress discourage leverage. These costs are commonly divided into direct and indirect costs.

a. Direct Costs

Once a corporation files for protection from its creditors, or creditors to whom the corporation has defaulted file to enforce their claims, an elaborate and expensive bankruptcy proceeding, perhaps lasting many years, commences.\textsuperscript{64} The purpose of this proceeding is to determine whether the business should continue or be liquidated and to resolve the competing claims to the corporation and its assets.\textsuperscript{65}

\textsuperscript{63} Rosanne Altshuler and Alan Auerbach estimate that during the early 1980s, when the statutory tax rate was 46%, the average effective corporate tax rate was around 32%. \textit{See} Altshuler \& Auerbach, \textit{supra} note 58, at 80 (concluding that effective marginal tax rates for corporations varied from 18.9% to 38.6% in 1982 when statutory tax rate was 46%). Roger Gordon and Jeffrey MacKie-Mason estimate that in 1988, when the statutory rate was 34%, the effective corporate tax rate was around 29%. \textit{See} Gertler \& Hubbard, \textit{supra} note 50, at 59 (citing Roger H. Gordon \& Jeffrey K. MacKie-Mason, \textit{Effects of the Tax Reform Act of 1986 on Corporate Financial Policy and Organizational Form}, University of Michigan Mimeo- graph (Sept. 1989)).

\textsuperscript{64} There is extensive literature on bankruptcy, much of it critical. Michael Bradley \& Michael Rosensweig, \textit{The Untenable Case for Chapter 11}, 101 \textit{YALE L.J.} 1043, 1045 (1992); \textit{see}, \textit{e.g.}, Douglass G. Baird, \textit{The Uneasy Case for Corporate Reorganization}, 15 \textit{J. LEGAL STUD.} 127 (1986) (criticizing bankruptcy law); Lucian Ayre Bebchuk, \textit{A New Approach to Corporate Reorganization}, 101 \textit{HARV. L. REV.} 775 (1988) (same).

\textsuperscript{65} Lucian Ayre Bebchuk \& Howard F. Chang, \textit{Bargaining and the Division of Value in Corporate Reorganization}, 8 \textit{J.L. ECON. \& ORGANIZATION} 253, 253-54 (1992); Lynn M. LoPucki \& William C. Whitford, \textit{Bargaining Over Equity's Share in the Bankruptcy Reorganization of Large, Publicly Held Companies}, 139 \textit{U. PA. L. REV.} 125, 127-30 (1990) (describing legal context of bankruptcy proceedings). If a corporation becomes bankrupt either its assets will be sold to satisfy creditors claims or the corporation will be reorganized. Bebchuk \& Chang, \textit{supra}, at 253. In either case the absolute priority rule requires that investors receive value in accordance with their priority. LoPucki \& Whitford, \textit{supra}, at 134. Frequently, this means that equityholders are cut out. Bebchuk \& Chang, \textit{supra}, at 254. Nevertheless, what debtholders receive depends on how much value can be realized from the company's assets. \textit{Id.}

Although the law provides that in liquidation debtholders are paid in full before equityholders receive anything, equityholders control the corporation and their ability to delay a resolution of the bankruptcy provides them with bargain-
The direct costs of financial distress are those legal and administrative costs that the corporation and its stakeholders incur at all stages before and during the corporate bankruptcy. Assuming that these costs are not so small that they can be ignored, then under reasonable assumptions expected bankruptcy costs vary directly with the probability of bankruptcy, which varies directly with leverage. Thus, as corporate leverage increases, expected bankruptcy costs rise.

Although the magnitude of such direct costs have long interested economists, the first study of bankruptcy costs was published in 1977 by Jerold Warner, who examined the legal and administrative costs of eleven railroad bankruptcies. Warner reports that the average cost was $2 million, which was 5.3% of the market value of the railroad's outstanding debt and equity securities just prior to bankruptcy and 1.4% of their market value five years earlier. Because of Warner's small sample, the extensive regulation of the industry, and the special bankruptcy procedures that railroads followed, the applicability of Warner's results to other industries is unclear. More recent studies by Lawrence Weiss and Michelle White, using larger samples, suggest that direct bankruptcy costs average approximately 3% of the asset value of corporations with more than $100 million in assets and larger portions for smaller corporations.

b. Indirect Costs

Although there are no good quantitative measures of indirect costs of financial distress, financial economists believe that such
indirect costs exceed the direct costs.\textsuperscript{72} These indirect costs capture the difficulties and inefficiencies of running a corporation that is either threatened with or going through bankruptcy. Bankruptcy can undermine management’s control over the corporation’s operations. However, the largest indirect costs are incurred before bankruptcy when the corporation is in financial distress. These costs are of two kinds. The first is the corporation’s tendency to pursue non-value maximizing strategies; the second is interference with the corporation’s relationships.

If a single individual managed and held all of the corporation’s outstanding securities, there would be no conflicts. For example, a sole proprietor will choose to go skiing rather than spend the weekend reviewing financial statements when the pleasures of time on the slopes is worth more to the sole proprietor than the financial rewards of a better understanding of the business. The sole proprietor internalizes both the skiing and the profit. Except for very small corporations, it is not practical for one individual to make every decision and hold all securities. Several layers of management and widely disbursed holdings of the corporation’s securities characterize the modern business corporation. As a result, rational, self-interested individuals will not internalize all consequences of their actions. For example, although the manager alone enjoys the weekend ski trip, the manager does not receive all of the benefits of the manager’s additional work, much of which accrue to the corporation’s investors. This provides the manager with an incentive to shirk responsibility.\textsuperscript{73}

Financial economists have identified several potential conflicts within the modern corporation. These include conflicts between equityholders and managers\textsuperscript{74} and between equityholders

\textsuperscript{72} See Brealey & Myers, supra note 21, at 437-39; Ross & Westerfield, supra note 21, at 454-58.

\textsuperscript{73} Michael Jensen and William Meckling argue that because investors are aware of these conflicts, firms have incentives to restrain them. Michael C. Jensen & William H. Meckling, Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure, 3 J. Fin. Econ. 305, 323-28 (1976). Nevertheless, because enforcement is costly and imperfect, these conflicts can be reduced but not eliminated. Id. at 324-25; see also Eugene F. Fama, Agency Problems and the Theory of the Firm, 88 J. Pol. Econ. 288 (1980) (explaining that market aids in disciplining and giving opportunities to management).

\textsuperscript{74} Adolph A. Berle, Jr. & Gardiner C. Means, The Modern Corporation and Private Property 220-32 (1932). Managers have an incentive to pay themselves large salaries, provide generous perks and lavish working conditions and not work very hard. The investors might have a hard time monitoring their managers and might therefore find it difficult to restrain their behavior. Jensen & Meckling, supra note 73, at 327-28; see Masulis, supra note 62, at ch. 6 (reviewing literature on equityholder-manager conflicts of interest).
and debtholders.\textsuperscript{75} Many researchers have examined the equityholder-debtholder conflict and the consistent message is that these conflicts create incentives for equityholders to take actions that benefit themselves at the expense of debtholders.\textsuperscript{76}

The conflicts that exist between equityholders, who indirectly select the management of the corporation by electing the board of directors, and the corporation’s creditors are magnified as the corporation’s finances deteriorate. Indeed, the lower the market value of the equity relative to that of the debt, the more likely it is that the course of action that maximizes the equity’s value is not the one that maximizes the corporation’s value. The extent to which corporations pursue non-value maximizing policies represent one source of the indirect costs of financial distress. Financial economists have identified several such strategies. The two that follow are the most important in the context of this Article.

One strategy that a management responsive to the interests of its equityholders might take is to increase the value of the equity at the expense of the debt by increasing the corporation’s risk. Because of limited liability, when the risk of the corporation’s underlying business is increased, equityholders receive a disproportionate share of any gain whereas debtholders suffer a disproportionate share of any loss. Thus, equityholders can gain when the corporation pursues a risky project that has a negative expected value. In the financial literature, this is called asset substitution.\textsuperscript{77} The asset substitution problem is associated with fi-

\textsuperscript{75} Equity selects the corporation’s board of directors, which in turn hires the management, who operate the business. The management is responsible to the shareholders, to whom it owes various fiduciary duties. The management does not owe corresponding duties to its creditors. Instead, its obligations to its debtholders are determined by the bond indenture. Accordingly, in spite of the conflicts that exist between management and equity, the management of a corporation is thought to be and is generally treated as more responsive to equity than to debt. See Stewart C. Myers, Still Searching for Optimal Capital Structure 11 (Working Paper, rev. version, June 1990).

\textsuperscript{76} See Masulis, supra note 62, at 35 (citing other relevant sources).

\textsuperscript{77} Jensen & Meckling, supra note 73, at 334-37. An example might be useful. Consider a corporation that has the opportunity of investing $60 in a project that has three equally-likely possible outcomes. The project will either yield $100 (a gain of $40), $30 (a loss of $30), or $20 (a loss of $40). The project, thus, has an expected loss of $10. If the equityholders in an all-equity-financed corporation discovered that the corporation’s managers embarked on such a project, they would rightly be upset. However, the equityholders might change their attitude if the corporation were partially financed by debt. Assume the other assets of the corporation had a market value of $105 and were riskless, and that the corporation had debt outstanding with a face value of $100. If the corporation rejected the project, the equityholders’ stake would be worth $5. If the corporation accepted the project, then the equityholders would have a two-thirds
nancial distress because equity's incentive to accept high-risk projects that have a negative expected value is strongest when the value of the equity cushion is small and decreases as the equity cushion increases.28

Conflicts of interest can also lead equityholders to forgo projects that would increase corporate value. This can occur if the face amount of debt exceeds the debt's market value and the proposed project requires external financing. Under these circumstances, the equityholders may not be willing to fund the project because some of the benefit goes to the debtholders. This is the underinvestment problem.29 It is also associated with financial distress because the equityholders' reluctance to invest increases as the difference between the face and market values of the debt increases.30

There is a second group of indirect costs. Financial distress can interfere with the corporation's noncontractual relationships with employees, customers and suppliers.31 Because it is impractical to cover all contingencies with written contracts and impossi-

chance that their shares would be worthless. However, they would also have a one-third chance that their shares would be worth $45. Thus, by undertaking the proposed project, the expected value of the equityholders' stake has risen from $5 to $15. The loss, of course, is borne by the debtholders, who see their claim fall in value from $100 to $80. This strategy is not only harmful to the debtholders, it is also harmful to the corporation and to the economy as a whole, because the aggregate value of the corporation falls from $105 to $95.

78. See BREALEY & MYERS, supra note 21, at 441. The above project would not be attractive to the equityholders if the corporation's assets were worth $200, for they would then suffer the entire loss if the corporation undertook the project.

79. Stewart C. Myers, Determinants of Corporate Borrowing, 5 J. Fin. Econ. 147, 149-55 (1977) [hereinafter Myers, Corporate Borrowing]. As an example of the underinvestment problem, consider another corporation that has a bond with a face value of $100 outstanding. Given the projects that the corporation has currently underway, there is a 50% chance that the corporation will have a value of $80 when the bond matures and a 50% chance that its value will be $110. The corporation has a good and safe investment opportunity, an investment of $10 that will immediately yield $15. However, the corporation cannot fund the project out of its own funds, which are all tied up. If the equityholders fund the project, they will see the value of their stock increase by $7.50, from $5 to $12.50, which is less than the $10 cost of the investment. Of course, the debtholders gain the other $7.50 and the value of their bonds increases from $90 to $97.50. New equityholders will not fund the project either. The only possible purchasers are the debtholders, with whom it may be difficult to strike a deal. Indeed, the Trust Indenture Act, 15 U.S.C. §§ 77a-bbbb (1988), which requires unanimity to change the terms of the indenture, creates a severe holdout problem. Although debtholders benefit, they cannot coerce recalcitrant debtholders to participate. This provides each small debtholder with an incentive to hold out because the benefit still accrues if the other debtholders make the investment.

80. See BREALEY & MYERS, supra note 21, at 442.

81. Ross & WESTERFIELD, supra note 21, at 455.
ble to cover some, many contingencies are not provided for by explicit contracts. Instead, parties perform on the assumption that their counterparties will perform. Performing implicit commitments is not naive as long as the counterparty stands to gain more by performing than by not performing. Financial distress calls into question a counterparty's ability to perform, and therefore discourages parties from making new commitments and encourages them to break old ones.82 For example, if bankruptcy is a significant possibility, the corporation's suppliers will be reluctant to commit facilities to servicing a long-term contract and customers will be reluctant to purchase durable products from a corporation that might not be around to service them.83 Also, a corporation in financial distress can have trouble maintaining key employees; worried about their future with the company, they will be quick to accept employment elsewhere.

The little evidence that is available on the magnitude of the indirect costs of financial distress confirms the view that they are large.84 Edward Altman measured these costs, which include those costs related to loss of customers, suppliers and employees and the redirection of managerial resources, as the difference between the corporation's current sales and the product of the corporation's historical fraction of industry sales and current industry sales, all multiplied by the corporation's historical profit margin. From a sample of nineteen bankruptcies by retail and industrial corporations, Altman found that total financial distress costs were substantially higher for industrial than for retail corporations.


83. For example, many loyal Chrysler customers turned to other automakers when Chrysler was threatened with bankruptcy in the 1970s. Ross & Westerfield, supra note 21, at 455.

84. The most widely cited evidence of the indirect costs of financial distress is the approximately $2 billion rise in the stock price of Texaco when its bankruptcy suddenly ended long before expected. See David M. Cutler & Lawrence H. Summers, The Costs of Conflict Resolution and Financial Distress: Evidence from the Texaco-Pennzoil Litigation, 19 Rand J. Econ. 157, 159-64 (1988); Robert H. Mnookin & Robert B. Wilson, Rational Bargaining and Market Efficiency: Understanding Pennzoil v. Texaco, 75 Va. L. Rev. 295, 309-10 (1989). This evidence should be taken with some caution. First, it is dangerous to draw general conclusions from a sample of one. Second, there are indications that Texaco was a potential takeover target at the time, in which case the rise in price might reflect profits from a possible takeover rather than savings from an early departure from bankruptcy. See Douglas G. Baird, Revising Auctions in Chapter 11, 12 (Chi. L. & Econ. Working Paper No. 7, 2d Series, 1992).
The total costs of financial distress were 12.1% of corporate value five years prior to filing and 16.7% at the time of filing. Altman also found that average direct costs were 5% of corporate value both at the time of filing and five years prior.85

C. The Capital Structure Decision

The causal connection between corporate leverage and financial distress costs is not just in one direction. Not only does high leverage increase expected financial distress costs, but the possibility of incurring these costs encourages many corporations to avoid high leverage.86 Although there is no simple mathematical formula for optimal capital structure, the principle is straightforward. Increasing leverage increases the potential total tax shield. However, as leverage increases, two effects offset the interest deduction. First, the marginal value of the tax shield falls because the probability that the interest deduction cannot be fully used increases. Second, increasing leverage increases the probability that the corporation will experience bankruptcy or financial distress, thereby raising the corporation’s expected financial distress costs.

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86. The agency costs imposed by debt also provide corporations and their advisors with the incentive to find ways of mitigating these costs through special contract provisions. These covenants protect debtholders from equityholders by permitting debtholders to declare a default if the corporation takes certain actions or certain conditions occur. For example, it is common for covenants in an indenture to limit dividends and other transfers to equityholders, to preclude additional borrowing beyond a certain level, and to give debtholders a veto over certain extraordinary actions. Clifford W. Smith, Jr. & Jerold B. Warner, On Financial Contracting: An Analysis of Bond Covenants, 7 J. Fin. Econ. 117, 131-35, 136-38 (1979). Another means of reducing the costs of conflict are for corporations to issue convertible debt. Id. at 141. Convertible debt reduces the incentive for firms to pursue asset substitution because convertible debtholders have the right to convert their debt claims into stock and share in the transfer of wealth to equityholders. Id. This reduces the opportunities for existing equityholders to transfer wealth by increasing risk. Richard C. Green, Investment Incentives, Debt and Warrants, 13 J. Fin. Econ. 115, 124-29 (1984); Smith & Warner, supra, at 140-42. Another means of reducing conflicts is through the issuance of callable bonds, which reduce the underinvestment problem, the tendency of levered firms to reject profitable but low-risk projects that primarily benefit debtholders. Smith & Warner, supra, at 142-43. By calling the bonds, the equityholders can limit the debtholders’ benefit to the call premium. Zvi Bodie & Robert A. Taggart, Jr., Future Investment Opportunities and the Value of the Call Provision on a Bond, 33 J. Fin. 1187 (1978); Janet S. Thatcher, The Choice of Call Provision Terms: Evidence of the Existence of Agency Costs of Debt, 40 J. Fin. 549, 550-51 (1985). The equityholders can capture the rest of the gain from undertaking a profitable, low-risk project. Bodie & Taggart, supra, at 1188; Smith & Warner, supra, at 143; Thatcher, supra, at 150-51. These actions, however, are costly and only mitigate the cost of conflicts, without eliminating them.
The corporation achieves its optimal capital structure when the additional tax shield benefits equal the additional financial distress costs at the margin. Thus, each corporation in the economy has an optimal capital structure. 87

How a corporation should set its capital structure is illustrated in Figure 1. 88 Figure 1 also shows the potential net gain from leverage. The downward sloping line in that figure is the expected realizable tax shield on each additional dollar of debt. That line, the marginal benefit of additional debt, slopes downward to reflect the increased probability of suspending or losing interest deductions as leverage increases. The upward sloping line, the marginal cost of debt, is the sum of the extra tax investors paid on interest over equity income plus the net expected financial distress costs of leverage. This curve slopes up to reflect the increased probability of financial distress and bankruptcy as leverage increases. 89 The intersection of the two curves represents the optimal amount of debt. At this point, the marginal benefit from an additional dollar of debt, the present value of the expected tax shield, just equals the marginal cost, the sum of the extra tax investors paid on debt and the increased costs of bankruptcy and financial distress. The area enclosed by the marginal benefit and marginal cost curves represents the potential gain to the corporation from an optimal capital structure. 90

87. BREALEY & MYERS, supra note 21, at 431-33.
89. The cost of using debt instead of equity will include the extra tax paid by investors on interest income relative to that paid on equity income. Because the potential holders of a corporation's securities extend beyond its current securityholders to investors generally, this portion of the firm's supply curve is horizontal.
90. In addition, if debt is confined to straight debt, then replacing a dollar of debt with a dollar of equity will increase the corporation's payout. If the demand for internal financing is fixed, because retained earnings are taxed more favorably than dividends, the corporation should pay a smaller dividend.
91. The theory of corporate capital structure sketched out in the text is called the static trade-off theory because capital structure is determined by balancing the tax benefits of leverage against the non-tax costs and immediately moving to the static optimum. The static trade-off theory is not the only theory that has been offered to explain corporate capital structure. Commentators have surveyed non-tax theories of corporate capital structure. See, e.g., Milton Harris & Artur Raviv, The Theory of Capital Structure, 46 J. Fin. 297 (1991) (discussing various theories of explaining corporate capital structure).
92. For sometime financial economists have recognized that capital structure changes, because they are responses to changes in the firm's current and expected condition, can impart information to investors if insiders are privy to information not available to the market in general. Stephen A. Ross, The
The corporate interest deduction encourages corporations to

**Determination of Financial Structure: The Incentive-Signalling Approach**, 8 BELL J. ECON. 29, 27-38 (1977). Such actions are valuable as signals because of the underlying conditions they imply. *Id.* For example, increasing leverage signals an increase in expected earnings because if the increased earnings do not materialize, the corporation is bankrupt and the management out of work. *Id.*

The leading signaling theory of corporate capital structure is the pecking order theory. This theory starts with the assumption that managers do not strive for optimal financing decisions, but instead follow the path of least resistance. According to the pecking order theory, corporations prefer internal financing, and they establish their target dividend policy in order to increase the likelihood of being able to use internal financing. If external financing is required, corporations prefer to issue safe securities. That is, they will issue straight debt before convertible debt and convertible debt before equity. Stewart Myers and Nicholas Majluf have shown that this seemingly illogical theory can follow from rational economic behavior when there is asymmetric information, so capital structure decisions are useful signals. Stewart C. Myers & Nicholas S. Majluf, *Corporate Financing and Investment Decisions When Firms Have Information Investors Do Not Have*, 13 J. Fin. ECON. 187, 198-210 (1984); see Harris & Raviv, *supra*, at 306-15, 341 (discussing extensions, criticisms and evidence for this model). This model seems to have good predictive power. Masulis, *supra* note 62, at 90-91. It, however, is not inconsistent with a richer statement of the trade-off theory, which recognizes that firms do not immediately adjust their capital structure to the static optimum because of the information content of capital structure decisions but that the speed of adjustment depends on the relative costs and benefits of deviations from that optimum. See Edwin O. Fischer et al., *Dynamic Capital Structure Choices: Theory and Tests*, 44 J. Fin. 19, 21-33 (1989); Abolhassan Jalilvand & Robert S. Harris, *Corporate Behavior in Adjusting to Capital Structure and Dividend Targets: An Econometric Study*, 59 J. Fin. 127, 128-29, 139-42 (1984).

It might be thought that the misallocation of capital within the corporate sector identified in this Article depends on the validity of the static trade-off theory of corporate capital structure. However, the rejection of the static trade-off theory would not imply the absence of the distortion; it is only under very restrictive conditions that the misallocation would not exist.

First, the capital misallocation still exists with a richer statement of the trade-off theory. If the shift to an optimal capital structure is not immediate, but the speed of adjustment depends on the relative costs and benefits of deviations, then the posited distortions will exist, although their magnitude will be less. Stewart Myers, the author of both the static tradeoff theory and the pecking order theory, and now a leading critic of the former, suggests the latter is incomplete without the former. LAKSHMI SHYAM-SUNDER & STEWART MYERS, *TESTING STATIC TRADE-OFF AGAINST PECKING ORDER MODELS OF CAPITAL STRUCTURE* 5 n.6 (Working Paper, 1992). Moreover, the richer trade-off theory introduces a distortion across corporations. Under the static trade-off theory, the value of a project depends on its ability to support leverage, which is largely identical across firms. Under richer theories, the debt a project supports can vary across corporations. Thus, the corporation that finds a project most valuable might not be the one for which it has the highest positive net present value, but merely the one that is moving most rapidly towards a more levered capital structure.

Second, the distortion still exists if capital structure is independent of the costs and benefits of being away from the optimum. The static trade-off theory posits that firm capital structure is a function of certain economic variables. Accordingly, the theory is wrong if corporate capital structure is a function of other economic variables or is independent of such factors. Thus, both the static and richer trade-off theories are wrong if capital structure is independent of the posited economic variables. This suggests not that corporate capital structure is ran-
make a trade-off when they set capital structure. Corporations balance leverage's falling marginal tax shield against increased financial distress costs. Existing tax law, thus, encourages corporations to balance tax savings against increased financial distress costs.

If there were no tax advantage associated with debt, then the corporation, in setting its capital structure, would seek to minimize the agency costs of debt and equity. However, in the presence but that the factors that determine capital structure are not those that influence the value of leverage.

A simple demonstration that the distortion still exists if capital structure is independent of the variables posited by the static trade-off theory can be given by assuming that all firms have the same leverage. Under this assumption, there will be differences in the cost of capital between firms (even ignoring differences in systematic risk), as long as investors are not consistently fooled by capital structure and investment decisions are made rationally. Once again, those corporations that are better able to make use of the interest deductions will have a lower cost of capital and therefore a lower hurdle rate for projects. The projects that will be favored are still those with low unsystematic risk. Similarly, the cost of capital will be higher where the agency costs of debt are higher. Thus, corporations with high agency costs from debt will have a higher cost of capital and projects that impose high agency costs on debt will have high hurdle rates. In other words, there will be a bias against high-risk, high-growth projects using intangible assets.

In order to eliminate the capital misallocation, it is not enough for capital structure to be independent of the posited economic factors. Instead, the relationships must be the reverse of those posited by the static trade-off theory. There is neither evidence nor theory to support such an arrangement.

Finally, rejecting the static trade-off theory can lead to a decrease or an increase in the magnitude of the misallocation. This is easy to see when capital structure is the same for all corporations. Assume all corporations can be divided into two groups: those that the static trade-off theory predicts would have low leverage and those that would have high leverage. If all corporations had the low leverage capital structure, the predicted low leverage firms would receive their maximum benefits from leverage but the predicted high leverage firms would achieve less than their optimal benefits from leverage. Because the predicted high leverage corporations are receiving a smaller advantage, the misallocation would be less than implied by theory. Alternatively, if all corporations had the high leverage capital structure, the predicted low leverage firms would receive less than their optimal benefits. This exaggerates the advantage enjoyed by high-leverage firms and increases the misallocation.

91. Equity imposes agency costs that debt can sometimes mitigate. Payments to equityholders are discretionary. When these payments are made, managers have fewer resources under their control, reducing their power and increasing the probability that they will have to undergo the monitoring of the capital markets that occurs when firms raise new capital. Thus, managers have an incentive to retain earnings and increase the size of operations past the point at which positive net present value projects are available.

Michael Jensen argues that debt can be used to restrain these conflicts. Michael C. Jensen, *Agency Costs of Free Cash Flow, Corporate Finance and Takeovers*, 32 AM. ECON. REV. 323, 323-24 (1986). Jensen defines free cash flow as the cash flow the firm generates in excess of the cash required to fund all positive net present value projects. Id. at 323. Debt constrains the conflicts between managers and investors over free cash flow by taking away managers' control over free
ence of a classical tax regime with an interest deduction, corporations balance the increase in financial distress costs from greater leverage against the reduction in taxes.\textsuperscript{92} Thus, the corporate interest deduction forces corporations to accept greater financial distress costs than they otherwise would. Viewed from the perspective of the economy, the current tax system is inefficient. The tax saving is a transfer from the federal treasury to the corporation’s stakeholders, but the additional financial distress costs are real economic costs.\textsuperscript{93} Thus, the classical two-level tax on corporate income with a deduction for interest imposes additional financial distress costs on the economy.\textsuperscript{94} This is undesirable because it reduces national income.

III. IMPACT OF CORPORATE INTEREST DEDUCTION ON INVESTMENT

The previous section described how corporations set their cash flow. \textit{See id.} To spend additional money, the managers must subject their plans to the discipline of the capital market. \textit{Id.} at 323-24.

Critics argue that the usefulness of debt as a disciplining mechanism is limited. Gertler & Hubbard, \textit{supra} note 50, at 51-53. For example, debt is a poor mechanism for inducing managers to bear residual risk for their actions when cash flow is highly variable. \textit{Id.} at 51.

92. If debt and equity were taxed equally, capital structure would be chosen to maximize firm value or equivalently minimize the cost of capital. Leverage would, then, depend on the relative financial distress costs of debt and equity. However, given the tax advantage to debt provided by current law, the capital structure that minimizes total financial distress costs is not optimal. Consequently, at the margin, corporations balance the tax advantage of debt against increased financial distress costs. Thus, corporate leverage would be lower, but not necessarily zero, if debt and equity were taxed equally.

93. Returning to Figure 1, the upper line, the expected realizable tax shield, slopes down because as leverage increases the likelihood that deductions will be suspended or lost increases, thereby decreasing the value of the marginal deduction. This curve represents a transfer payment from the government to the corporation. The lower line in Figure 1 is the sum of the extra tax paid by investors on interest over equity income plus the net expected bankruptcy and financial distress costs of leverage. The former is horizontal, independent of the firm’s leverage, because the additional investor-level tax on interest depends on the marginal taxpayer’s tax bracket, which is not affected by the financial policies of any single firm. (This assumes that interest paying debt replaces an equivalent amount of dividends, so that there is no additional investor-level tax.) The latter slopes up, reflecting the increased probability of financial distress and bankruptcy from additional leverage. Once again, the former is a transfer payment between the government and the corporation. The latter, however, is not. The bankruptcy and financial distress costs are real resource costs incurred by the corporation.

target debt-to-equity ratios. Essentially, they balance the tax advantages of debt against the costs of financial distress. When these two are equal at the margin, the corporation has achieved its optimal debt-to-equity ratio. If all corporations saw the value of their interest tax shields decline and financial distress costs rise at the same rate when leverage increased, they would all have the same debt-to-equity ratio and they would all enjoy the same benefit from leverage. However, by virtue of their different activities, the rate at which interest tax shields decline and financial distress costs increase with leverage varies across corporations. Consequently, corporations have different capital structures; therefore, some corporations benefit more than others from the lower tax on debt.

This section argues that because of the preferential tax treatment of corporate debt, capital will be drawn into corporations with high debt capacities and away from corporations with low debt capacities. It also argues that this misallocation is harmful to the economy because it diverts investment away from valuable projects that cannot support a lot of debt to less valuable projects that can support more debt.

According to a 1991 report written by Jane Gravelle and issued by the Congressional Research Service, the total effective federal income tax on corporate equity is 42%, taking into account both shareholder and corporate level taxes. Gravelle further estimates that the total effective federal income tax on corporate debt is minus 10%. Using these values, the following example illustrates how the classical corporate income tax with an

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95. The number is derived from a simulation. It assumes a rate of inflation of 4%, a 57% dividend payout rate, an average holding period of seven years, that two-thirds of capital gains are deferred until death and that 30% of assets are held by tax-exempt entities. Gravelle, supra note 20, at 8-9.

96. Id. at 10. The negative corporate tax rate on debt, which means that debt is subsidized by the tax system, arises because corporations can deduct both the real interest rate and the inflation premium and because borrowers' tax rates generally exceed those of lenders. Id.

97. Merck, one of the leaders in the pharmaceutical industry, has virtually no debt. Brealey & Myers, supra note 21, at 424-25.

98. Because this example concentrates on the effect of taxes, not risk, the project is assumed to have no systematic risk. In the language of finance, beta (β) is zero. This assumption simplifies the exposition because the after-tax required return on equity is independent of leverage. However, the distortion from the interest deduction does not depend upon the assumption. See Brealey & Myers, supra note 21, at 405-07 (describing Modigliani-Miller Theorem II—expected return on equity of levered firm increases in proportion to debt-equity ratio); Ross & Westerfield, supra note 21, at 425-27 (same).
interest deduction misallocates capital through its impact on the cost of capital.

Assume that corporations in the pharmaceutical industry have no debt because of high financial distress costs. These corpora-

99. The value 13.79% is calculated as follows: \(8\%/(1 - .42)\).

100. The value 10.53% is calculated as follows: \(.5 \times 8\%/(1 - (-.1)) + .5 \times 8\%/(1 - .42)\). The two .5s represent the fraction of the firm's capital in debt and equity.

101. The proper means of capital budgeting is to use the net present value (NPV) rule. This rule requires that future cash flows of a proposed project be estimated and then discounted using a discount rate appropriate for the project's risk. The initial investment is then subtracted from the present value of the future cash flows. If the difference, the NPV, is positive, the project should be accepted, and conversely. The NPV rule is the proper technique for capital budgeting, because it reduces to accepting a project if it increases net worth, and conversely. BREALEY & MYERS, supra note 21, at ch. 2; ROSS & WESTERFIELD, supra note 21, at ch. 3.

The internal rate of return (IRR) rule requires that the future cash flows be estimated. The IRR is the rate of return for which the NPV is zero. The IRR rule calls for the project to be accepted if the IRR exceeds the hurdle rate, the minimally acceptable rate of return, and conversely. Under normal circumstances, the two rules produce identical results. However, under other circumstances, the IRR rule yields misleading results, whereas the NPV rule always produces the correct result. BREALEY & MYERS, supra note 21, ch. 4; ROSS & WESTERFIELD, supra note 21, at ch. 6.
tions, which have many opportunities for profitable investment, want to avoid the asset substitution and underinvestment problems. They also want to avoid bankruptcy because it would be costly to take a pharmaceutical company through bankruptcy. These corporations use little tangible capital, relying heavily on the accumulated knowledge of their employees who develop and market new drugs. If the employees' jobs are not secure, they will leave. Assume that corporations in the cement industry have a debt-to-equity ratio of one-to-one. They have more leverage than corporations in the pharmaceutical industry because debt imposes lower financial distress costs. There are few opportunities for asset substitution or underinvestment in the cement industry because the major asset, the plant, is committed to cement production. In addition, if a cement producer goes bankrupt, it is easy for another producer to takeover the plant because cement plants are very similar.98

Assume further that the after-tax rate of return required by investors in both debt and equity is 8%, that the effective total federal income tax rate on equity is 42% and on debt is minus 10%. This implies that the cost of capital to pharmaceutical companies is 13.79%,99 whereas the cost of capital to cement companies is only 10.53%.100 A firm's cost of capital is the pre-tax return it must earn to cover the required after-tax return of its investors. The cost of capital is sometimes referred to as the hurdle rate for investments because a firm will increase the value of its outstanding securities if it selects projects with a return exceeding its cost of capital and it will decrease the value of its securities if it selects projects with a lower return.101

Because the investment policy that maximizes the firm's value is to undertake all projects that have an expected rate of return above its cost of capital but to refuse all projects that have an expected return below its cost of capital, the pharmaceutical company will only invest in projects with an expected return above 13.79%. However, the cement company will pursue projects above its hurdle rate of 10.53%.

Assume that there are two $1 million projects under consideration. A pharmaceutical company is considering investing in a new drug and estimates that the project would return 13%, and a cement company is considering a new plant, which it estimates would yield 11%. (Both estimates are before any taxes.) From the perspective of maximizing domestic wealth, an investment in the new drug is preferable to an investment in a new cement plant.
However, the investment in a new cement plant will occur because its 11% return exceeds the cement company's 10.53% hurdle rate, whereas the investment in the new drug will be rejected because its 13% return is below the pharmaceutical company's 13.79% hurdle rate.

The reason for this result is the much higher tax burden imposed on the pharmaceutical company's project. Because the drug company cannot support the new project with debt but instead must use equity, the investment in a new drug is, in effect, subject to a higher tax rate.102 The income from the drug investment is effectively subject to a 42% combined corporate and personal tax rate, whereas the investment in a new cement plant is subject to an effective total tax rate of 24%.103

More generally, as the amount of debt in the capital structure increases, the corporation's effective total tax rate and cost of capital decline. The effective total tax rate approaches minus 10% and the cost of capital approaches 7.27% as leverage approaches 100%. Because there are fewer projects with an expected return above 13.79% than with an expected return above 10.53%, or 7.27%, the classical corporate tax discourages investment in corporations with low leverage and encourages investment in corporations with high leverage.104

Differences in the cost of capital lead to a misallocation of capital within the corporate sector. Projects with a large debt capacity have a lower hurdle rate than projects with a small capacity. Thus, some of the latter are foregone whereas the former with lower rates of return are undertaken. As a consequence, too many resources will be invested in projects that can support a lot of debt and too few resources in projects that cannot support as much debt.105 Expressed in slightly different language, the existing

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102. The example suggests that one way for corporations to respond to the tax advantages of debt is to increase their leverage. However, the discussions of excess tax shields and financial distress in the previous section showed that not all corporations can increase their leverage as easily. Corporations for which leverage is expensive will have less debt and higher capital costs. These corporations will have to be more selective in approving investment projects.

103. The 24% effective total tax rate is calculated as follows: (10.53% - 8%)/10.53%.

104. The difference in the cost of capital is an approximate measure of the difference in the true cost of investment. It ignores the declining value of the tax shield and the costs of financial distress. The exact measure is given as in Figure 1. Unfortunately, there are no simple methods for measuring the marginal benefit and marginal cost curves.

105. In general, corporations that are unlikely to have excess losses and will suffer only small declines in value in the event of bankruptcy or financial distress
classical corporate tax with an interest deduction taxes projects in inverse proportion to their capacity for debt. The harm from this effect is that it causes some projects to be adopted that have a lower pre-tax net present value than some of the projects it causes to be turned down. By reducing the return on investment, this effect makes the nation poorer and reduces its rate of income growth.

How important are these differences in rates of return brought about by distortions? Before dismissing the differences as small and therefore insignificant, it is important to recall the effect of compound interest. The difference between accumulation at 8% and at 10% is only 2% per year. However, $1 invested over a period of twenty years with annual reinvestment grows to only $4.66 at 8%, but it reaches $6.73 at 10%, a 44% difference in accumulated value. This difference continues to grow as the reinvestment horizon increases.106 Thus, differences in hurdle rates for investment in different sectors, brought about by the tax-favored treatment of debt, can over time result in large differences in value.107 Moreover, the differences are pure social gains that can result from shifting investment at the margin from tax-advantaged projects to tax-disadvantaged projects.

A second reason to believe that the difference is important is provided by a study from Mervyn King and Don Fullerton on the taxation of income from capital and economic growth.108 King and Fullerton conclude that the variance in tax rates throughout the economy across investments, and not the average level of tax

will have more leverage than corporations that are likely to have excess losses and will suffer large declines in value when they experience bankruptcy or financial distress. Expressing this result in terms of Figure 1, the size of the enclosed region will differ across corporations. How large the potential gain from corporate borrowing is will depend on the factors previously described: the probability of being able to use the interest deduction and the loss in value that would result from financial distress or bankruptcy. Depending on these factors, a corporation will have a large or a small potential gain from leverage. If its potential gain is large relative to that of other corporations, and the corporation takes advantage of the opportunity by issuing nearly the optimal amount of debt, then it will receive an advantage through the interest deduction. Alternatively, if its potential gain is small, then it will be disadvantaged by the interest deduction.

106. After 50 years, the accumulated value is 150% greater with the higher rate of return. The investment is worth $46.90 at 8% compared with $117.39 at 10%.


rates, is most closely related to low growth rates. Although the distortion identified in this Article is not the only difference in effective tax rates in the U.S. economy, if King and Fullerton are correct in their conclusion, then eliminating such distortions is likely to have a high payoff.

IV. DISADVANTAGED ACTIVITIES

The corporate tax literature has long recognized the advantage afforded debt over equity financing. Although corporations might be legally free to set any capital structure (at least before providing restrictive covenants), they are not economically free. There are significant economic constraints on capital structure. Moreover, and most important, the constraints are not the same for all corporations. Accordingly, those corporations that can best take advantage of the differential tax treatment will benefit the most. Thus, the harm from the differential treatment of various kinds of corporate financings is not that some forms of financing are encouraged over other forms but that corporate activities are encouraged or discouraged based on their affinity for different kinds of financing.

A. Economic Variables Affecting Debt Capacity

The argument that capital structure decisions are influenced by economic considerations, such as federal income tax and bankruptcy laws, risk, growth prospects and asset nature, suggests that corporations within an industry should have similar capital structures. Studies of industry capital structure patterns confirm this result. The nature of the projects that cannot support a lot of

109. Id. at 302 (noting that Britain has high variance in tax rates and low growth while Germany has low variance in tax rate and high growth).
110. See, e.g., William D. Andrews, Tax Neutrality Between Equity and Debt Capital, 30 WAYNE L. REV. 1057, 1058 (1984). Recently, the literature has recognized that the advantages are not all one way and commentators have become more concerned with how the tax law encourages and discourages various forms of financing. William Andrews, for example, has criticized existing tax law because it encourages both debt financing over equity financing and retained earnings over dividend payments accompanied by new issues. Id. at 1058-64. However, Andrews does not explain why it matters if debt is favored over equity. Douglas A. Kahn, Comments on "Tax Neutrality Between Equity Capital and Debt", 30 WAYNE L. REV. 1081, 1081-82 (1984) (suggesting that Andrews should explain why favoring debt over equity is problemactic). This Article explains the significance or consequences of favoring debt over equity.
111. Several studies have found that there is more variation in mean firm leverage ratios across industries than within industries. See MASULIS, supra note 62, at 81. For a discussion of evidence that firm leverage ratios tend to cluster within an industry, see id. at 21-22 (citing CYNTHIA CAMPBELL, INDUSTRY LEVER-
debt, and are therefore discouraged by the tax law's favoring debt over equity, are described below.

1. **High-Risk Projects Discouraged**

The corporate interest deduction discourages investment in high-risk projects.¹¹² This occurs because a corporation's debt capacity is inversely related to risk, measured by the variance of the corporation's total returns. Risk discourages leverage in two ways. First, at any given debt level, the larger the variance in earnings, the greater the probability that the corporation will not have a tax liability in a given year. Thus, risk increases the rate at which the tax shield declines as leverage increases. Second, at any given debt level, the larger the variance in earnings, the more likely it is that the corporation will be bankrupt or in financial distress and suffer the associated costs.¹¹³ Thus, increased risk raises the financial distress costs of leverage. Expressed in terms of Figure 1, increased risk shifts the marginal benefit curve down and the marginal cost curve up, reducing the optimal amount of leverage. Accordingly, the riskier the corporation, the higher its cost of capital.¹¹⁴

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¹¹². The claim that the corporate interest deduction discourages investment in high-risk projects is based on a comparison of the existing tax system to one without the interest deduction but with a lower corporate tax rate, so that the net tax revenue is the same, and which is otherwise identical to the current system. The comparison is not between the current tax system and a no-tax world. Because of the numerous distortions created by the existing tax system, that comparison would be extremely difficult to make.

¹¹³. Firms that employ certain production technologies and produce certain products are associated with greater earnings variability than are other firms. Masulis, supra note 62, at 31. Under reasonable conditions this will lead to a greater risk of bankruptcy. Id. However, the relationship between earnings variability and firm bankruptcy rates has not been documented. Id. at 32.

Among two projects with the same before-tax net present value, the riskier project will not support as much debt. Consequently, because the effective tax rate on the riskier project will exceed that on the less risky project, the riskier project will yield a lower after-tax return. Thus, the corporate interest deduction causes U.S. corporations to undertake more low-risk projects and fewer high-risk projects than they might otherwise undertake.

There are additional distortions from the corporate interest deduction because of the bias against risk. The deduction encourages corporations to diversify. Other things being equal, a diversified corporation has less earnings variance. Consequently, a diversified corporation can employ more leverage and have a lower cost of capital.  

By encouraging corporations to diversify, the corporate interest deduction spurs conglomerate mergers. When two corporations whose returns are not strongly correlated merge, they will reduce the variation in their total returns. This increases their debt capacity, thereby reducing their combined taxes and lowering their cost of capital. The tax savings from a conglomerate merger can induce corporations to merge that otherwise would not. In effect, such corporations are trading economic inefficiencies for tax savings. Thus, the corporate interest deduction encourages inefficient conglomerate mergers. This reduces

Sheridan Titman & Roberto Wessels, The Determinants of Capital Structure Choice, 43 J. Fin. 1, 11-15 (1988). The evidence is compiled and discussed by Ronald Masulis, who concluded that “[s]upport is found for leverage being negatively influenced by the total risk of the firm’s assets.” Masulis, supra note 62, at 90. The argument that volatility is inversely related to leverage is based on the assumption that bankruptcy costs are not trivial. Volatility is a proxy for the probability of bankruptcy. Evidence on the relationship between leverage and the probability of bankruptcy was collected by Richard Castanias, who found that industry bankruptcy rates maintain stability over time and that firms in industries with higher bankruptcy rates tend to have lower leverage ratios. Richard Castanias, Bankruptcy Risk and Optimal Capital Structure, 58 J. Fin. 1617, 1629 (1983).


116. Without the corporate interest deduction, there would still be a tax-driven incentive to merge because of incomplete-loss offsets. Id. at 17-22. However, the incentives would be weaker without the deduction.

117. Whether greater concentration in the form of conglomerate mergers encourages or discourages innovation and the welfare implications of these effects are the subject of much debate. See Dennis W. Carlton & Jeffrey M. Perloff, Modern Industrial Organization ch. 20 (1990); Scherer & Ross, supra note 17, at ch. 17 (citing other relevant works and discussing the effects of greater concentration). There is a rich economic literature on how market structure affects R&D spending that can be traced to Joseph Schumpeter. See Joseph
national income.

In addition, the corporate interest deduction gives a con-
glomerate an advantage over a small corporation in pursuing a
project.\textsuperscript{118} Between two corporations, other things being equal,
the more diversified corporation can support more debt, so it will
have a lower cost of capital for the project. As a consequence, the
corporation undertaking a project might not be the most efficient,
but merely the one with the largest tax advantage.

2. \textit{Growth Projects Discouraged}

The corporate interest deduction discourages investment in
projects with opportunities for further profitable investment. The
market value of a corporation is the market value of its assets in
place plus the market value of its future growth opportunities.
What is crucial about the latter is that it depends on future discri-
nionary investment.\textsuperscript{119} These opportunities can be of any kind. As
examples, Stewart Myers lists advertising, incorporating new tech-
nologies, improving efficiency, and recruiting and training
employees.\textsuperscript{120}

Because of the underinvestment problem, increased leverage
reduces the likelihood that future profitable investments will be
made. Accordingly, corporations with good investment prospects
avoid leverage, which translates into a high effective tax rate and
therefore a high cost of capital. As a consequence, some high-
growth investments will be passed over in favor of low-growth in-
vestments.\textsuperscript{121} Thus, the corporate interest deduction diverts capi-

\textbf{Schumpeter, Capitalism, Socialism and Democracy} (1942). Schumpeter ar-

gued that monopolistic firms would set inefficiently high prices but would innov-
ate faster because of better access to capital, superior risk pooling and
economies of scale in R&D. \textit{Id.} at 106. Critics argue that the greater flexibility of
small outfits is more conducive to R&D than the bureaucracies of large
organizations.

\textsuperscript{118} The corporate loss limitations also have these effects. \textit{Majd \& Myers,
n} supra note 115, at 20-21 (demonstrating effects of loss-offsets on risk-taking);
Mark Campisano \& Roberta Romano, \textit{Recouping Losses: The Case for Full Loss Off-
sets}, 76 Nw. U. L. Rev. 709, 722-30 (1981) (same); J.E. Stiglitz, \textit{The Effects of In-
come, Wealth, and Capital Gains Taxation on Risk-Taking}, 83 Q.J. Econ. 263, 275-79
(1969) (same).

\textsuperscript{119} In the language of finance, the opportunity is an option that expires
without being exercised if the necessary investment is not later made.

\textsuperscript{120} Myers, \textit{Corporate Borrowing}, supra note 79, at 156 (noting continual ef-
forts towards these activities requiring discretionary investment).

\textsuperscript{121} Corporations with numerous investment possibilities are also more
susceptible to the asset substitution problem. Because low leverage reduces the
opportunity for asset substitution, these corporations have an additional reason
avoid leverage. This reinforces the effect described in the text.
tal away from projects with growth opportunities towards projects that rely more heavily on assets in place.\footnote{122}

3. Investment in Intangible Assets Discouraged

The corporate interest deduction discourages investment in assets that lose value sharply in times of bankruptcy or financial distress. Stewart Myers argues that the loss in value is greatest for intangible assets that are linked to the firm as a going concern.\footnote{123} The examples that he gives are advertising, technology, research and development (R&D), and human capital.\footnote{124} Sheridan Titman argues that the loss of value is directly related to asset uniqueness and offers similar examples.\footnote{125}

Corporations that use intangible and unique assets avoid leverage because of the high costs of financial distress. Accordingly, they have a high effective total tax rate and a high cost of capital. This discourages investment in activities that employ intangible or unique assets.\footnote{126}

\[\text{MEAN EFFECTIVE TOTAL TAX RATES} \quad 1495\]

\begin{itemize}
  \item The only study to test the hypothesis that growth is inversely related to leverage found the hypothesized negative relation, although it was not statistically significant. Titman & Wessels, supra note 114, at 11-15.
  \item Titman, supra note 82, at 137; Titman & Wessels, supra note 114, at 5.
  \item There is evidence supporting the inverse relationship between leverage and the reliance on intangible assets. Michael Long and Ileen Malitz found a positive relationship between capital expenditures and leverage. Michael S. Long & Ileen B. Malitz, The Investment-Financing Nexus: Some Empirical Evidence, 3 MIDLAND CORP. FIN. J. 53, 57-59 (1985) [hereinafter Long & Malitz, Investment-Financing Nexus]. Because capital expenditure is a proxy for tangible capital, Long and Malitz interpret this finding as support for the hypothesized negative relationship between intangible assets and leverage. Id. Further support for this position comes from a study by Michael Bradley, Gregg Jarrell and E. Han Kim, who found a negative relationship between advertising and R&D expenditures and leverage. Bradley et al., supra note 114, at 873-76. Sheridan Titman and Roberto Wessels found a positive but insignificant relationship between tangible assets and leverage. Titman & Wessels, supra note 114, at 11-15. They did, however, find a statistically significant inverse relationship between asset uniqueness and leverage. Id.
  \item The difficulty in finding a strong relationship between intangible assets and leverage is probably a result of the importance of nondebt tax shields. Harry DeAngelo and Ronald Masulis observed that nondebt tax shields, such as depreciation, depletion allowances, foreign and investment tax credits, influence the demand for debt. DeAngelo & Masulis, supra note 61, at 12-19. As long as excess tax shields are difficult to transfer, firms with nondebt tax shields that are
\end{itemize}
B. The Nature of the Bias

The biases against growth, risk-taking and intangible assets translate into biases against high-tech industries, emerging technologies, innovative production and management practices and long-term noncontractual relations.

Although there are no commonly accepted principles for characterizing high-tech industries, "[t]hese industries are said to make significant use of scientific, engineering, and other technical personnel and to invest in a greater than average level of R&D funding." Thus, one characteristic of high-tech industries is their heavy use of intangible capital, which cannot support a lot of debt because it tends to depreciate rapidly when the corporation is in financial distress. In addition, many high-tech goods have short product life cycles. For example, the average product life cycle for dynamic random access memory (DRAM) chips is three years. Short product life cycles suggest numerous growth opportunities and high risk. Competitive pressures to innovate discourage leverage because leverage increases the opportunities for asset substitution and underinvestment. A corollary of the competitive pressures to innovate is that failures sometimes occur, which suggests that the industries are risky. Thus, because the factors identified here as discouraged by the corporate interest deduction—high-risk, good growth prospects and use of intangible assets—are characteristic of high-tech industries, the corporate interest deduction discourages investment in such industries.

The corporate interest deduction also discourages investment in emerging technologies and new production techniques. By definition, these are growth opportunities that cannot support much debt. They also rely heavily on intangible assets, although they might or might not be very risky. Finally, the corporate interest deduction discourages investment in noncontractual long-term

large relative to expected earnings before interest and taxes will issue less debt. Id. One implication of DeAngelo and Masulis' result is that it suggests that capital structure considerations mitigate but do not eliminate the income-nature—as opposed to the consumption-nature—of the federal corporate income tax. The disadvantage that results from not being able to take currently a full deduction for certain expenditures but being required to depreciate or even defer the recovery until disposition is the reduction in the present value of deductions. Thus, expected income before interest and taxes is larger when expenditures cannot be currently deducted. This increases the corporation's capacity for debt, which can partly compensate for the reduced value of deferred deductions. See generally Edward J. McCaffery, Tax Policy Under a Hybrid Income-Consumption Tax, 70 Tex. L. Rev. 1145 (1992) (discussing income/consumption tax debate).

128. Id. at 237.
understandings between the firm and its employees, suppliers and consumers.  

V. THE CASE FOR REMEDYING THE DISTORTION

Because any tax other than a head tax creates distortions, the mere identification of a distortion cannot justify its removal. Because the market will still remain distorted if the identified distortion is remedied, the question becomes will reform increase the total distortion imposed by the entire tax system? Unfortunately, as long as there are other distortions, the general theory of the second best implies that it is always theoretically possible for the total distortion to increase or decrease when a single distortion is removed. Thus, absent a thorough empirical study of the entire economy, there is no absolute answer. Because of the tremendous difficulty and expense of such studies, especially the trouble in conducting predictive studies of potential law reform, requiring them would place a nearly impossible burden on the proponents of change. Accordingly, in the tax literature, it is common for pro-

129. Such long-term understandings are at the heart of the Japanese Keiretsu, a system of interlocking banks and industrial companies. See Ronald J. Gilson & Mark J. Roe, Understanding the Japanese Keiretsu: Overlaps Between Corporate Governance and Industrial Organization, 102 YALE L.J. 871, 882-95 (1993). It is further worth noting that the six key similarities the MIT Commission on Industrial Productivity finds among best-practice firms, and which it recommends other firms adopt, are unlikely to support a lot of leverage. These six similarities are: simultaneous improvement in quality, cost and delivery; closer customer links; closer supplier links; using technology for strategic advantage; more flexible organization structure; and innovative human resource policies. DERTOUZOUS ET AL., supra note 19, at ch. 9. The existing tax law, thus, discourages firms from adopting these best-practice techniques.


131. Kahn, supra note 110, at 1081 (stating that “the elimination of a distortion in a specific area is not a sufficient justification for a proposed change in the tax law”); see also Edward A. Zelinsky, Efficiency and Income Taxes: The Rehabilitation of Tax Incentives, 64 TEX. L. REV. 973, 973 (1986) (discussing “propriety of tax incentives in the federal income tax and the use of economic analysis to examine questions of concern to academic lawyers”).

132. The total distortion imposed by taxes, also called the excess burden or dead-weight loss, measures the loss imposed by taxes from interfering with economic decisions and distorting choices. MUSGRAVE & MUSGRAVE, supra note 130, at 277-80.
ponents of reform to argue that a distortion biases choice in a way that is undesirable, that it creates problems of sufficient magnitude to warrant attention, and that it is not likely to interfere with another choice in a way that will create a large distortion. In this section, I argue that the tax treatments of debt and equity should be equalized. Having argued above that choice is biased in an undesirable way, I turn to estimating the magnitude of the distortion before presenting the argument that a remedy is likely to cause more good than harm.

A. Measuring the Capital Misallocation

Michael Long and Ileen Malitz have calculated debt-to-capital ratios, the face amount of corporate debt as a percentage of invested capital, on an industry-by-industry basis. Although such accounting measures of debt-to-capital ratios are only proxies for actual debt-to-value ratios, these measures provide an idea of the magnitude of the bias across industries from the tax law's favorable treatment of corporate debt.

Long and Malitz identified sixty-three industries classified by four digit Standard Industrial Codes (SIC). Because many of the industries consisted of only a few firms, they reduced their sample to thirty-nine industries, each with at least eight firms. Long and Malitz found a mean debt-to-capital ratio in the economy of 22.4%. The five industries with the lowest leverage and the mean debt-to-capital ratio in these five industries are as follows: cosmetics and toiletries (9%); drugs (10.9%); photographic

133. See Kahn, supra note 110, at 1081-82 (commenting on proposal to eliminate distortion).
134. Musgrave & Musgrave, supra note 130, at ch. 13; see also Andrews, supra note 110, at 1058-59 (discussing relationship between taxation of equity capital and debt).
135. Invested capital is calculated as the book value of long-term debt and equity plus capitalized R&D spending and advertising.
139. Id.
140. Id. at 57 tbl.2.
equipment (11.2%); aircraft (13.4%); and radio and television receiving (14.2%).141 The five industries with the highest leverage are petroleum refining (29.4%); textile mill products (30.8%); paper and allied products (32.2%); blast furnaces and steel (33.7%); and hydraulic cement (44.1%).142

To get a rough estimate of the bias, I employed Gravelle's estimate that the effective total federal income tax rate on corporate equity is 42% and on corporate debt is minus 10% and assumed an after-tax rate of return of 8%. Treating Long and Malitz's debt-to-capital ratio as an estimate of the actual debt-to-value ratio, the mean effective total tax rate for U.S. corporations in the Long and Malitz sample is 30.35%. For the cosmetic and toiletries industry, the effective total tax rate would be 37.32%, whereas for the hydraulic cement industry it would be 19.07%. Thus, this back-of-the-envelope estimate of the bias introduced by the interest deduction is that the effective total tax rate on the cosmetic and toiletries industry is nearly double that on the hydraulic cement industry.

Table I provides estimates of the effective total tax rate for the ten industries described above.143

The leverage figures reported by Long and Malitz are ten years old.144 Since that time, aggregate debt-to-equity ratios for U.S. corporations have increased substantially.145 According to John Shoven and Joel Waldfogel, by 1986, the book value aggregate debt-to-capital ratio for U.S. corporations was 27.3%.146 As-

141. Id. at tbl.3. Among 238 U.S. manufacturing industries in 1977, drugs, aircraft and photographic equipment ranked first, third and fifth based on the ratio of R&D to sales. Scherer & Ross, supra note 17, at 615-16 (citing Federal Trade Commission, Statistical Report: Annual Line of Business Report 21 (1977)). This provides anecotal support for the claim, more thoroughly documented by Bronwyn Hall, that R&D does not support a lot of debt. See Bronwyn H. Hall, Corporate Restructuring and Investment Horizons 6-13 (National Bureau of Economic Research Working Paper No. 3794, 1991).

142. Long & Malitz, Investment-Financing Nexus, supra note 126, at 57 tbl.3.

143. I did not calculate costs of capital for the various industries because an industry's cost of capital is a function not only of its effective total tax rate but also of its systematic risk. See Brealey & Myers, supra note 21, at 161-65 (discussing relationship between systematic risk and cost of capital); Ross & Westerfield, supra note 21, at 304-07; see also Burton G. Malkiel, A Random Walk Down Wall Street ch. 9 & 10 (5th ed. 1990) (providing non-technical discussion of relationship between systematic risk and cost of capital).

144. Long & Malitz, Investment-Financing Nexus, supra note 126, at 157-59 (publishing figures in 1985).


146. Id. at 8.
TABLE I
MEAN EFFECTIVE TOTAL TAX RATES FOR SELECTED INDUSTRIES

<table>
<thead>
<tr>
<th>Industry Name</th>
<th>Leverage</th>
<th>Total Effective Tax Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cosmetics</td>
<td>9.0</td>
<td>37.32</td>
</tr>
<tr>
<td>Drugs</td>
<td>10.9</td>
<td>36.33</td>
</tr>
<tr>
<td>Photographic Equipment</td>
<td>11.2</td>
<td>36.18</td>
</tr>
<tr>
<td>Aircraft</td>
<td>13.4</td>
<td>35.03</td>
</tr>
<tr>
<td>Radio and TV Receiving</td>
<td>14.2</td>
<td>34.62</td>
</tr>
<tr>
<td>Petroleum Refining</td>
<td>29.4</td>
<td>26.71</td>
</tr>
<tr>
<td>Textile Mill Products</td>
<td>30.8</td>
<td>25.98</td>
</tr>
<tr>
<td>Paper &amp; Allied Products</td>
<td>32.2</td>
<td>25.26</td>
</tr>
<tr>
<td>Blast Furnaces &amp; Steel</td>
<td>33.7</td>
<td>24.48</td>
</tr>
<tr>
<td>Hydraulic Cement</td>
<td>44.1</td>
<td>19.07</td>
</tr>
<tr>
<td>Economy Wide</td>
<td>22.4</td>
<td>30.35</td>
</tr>
</tbody>
</table>

Table I assumes an effective total tax on debt of minus 10% and an effective total tax on equity of 42%.

Assuming Shoven and Waldfogel’s numbers are comparable to Long and Malitz’s, this would suggest an increase in the cost from the lost interest deductions to corporations that eschew leverage. This is especially likely to be true if the increase in leverage was not uniform across industries but was greatest for those industries with relatively high leverage.

The bias across industries understates the biases against growth, risk and intangible assets. Staid industries contain some dynamic firms, and dynamic industries contain some staid firms.147 A single industry debt-to-capital ratio averages across all firms in an industry, lumping staid and dynamic firms together.148 For a corporation with no debt, such as Merck, the effective total tax rate would be 42%, which exceeds the mean effective total tax rate by 11.65%. For a corporation with a debt-to-value ratio of 80%, the effective total tax rate would be .40%, which is nearly 30% below the mean.

147. At a glance, the pharmaceutical companies listed in Value Line show that firms that perform a lot of R&D have little debt, and conversely. I am indebted to my colleague, Jeff Strnad, for this observation and for the argument that flows from it.

148. There is more variation in capital structure across firms than across industries. For a discussion of this variation, see supra note 111 and accompanying text.
Michael Long and Ileen Malitz sort their sample of 549 corporations into quartiles based on leverage. The mean debt-to-capital ratios and corresponding mean effective total tax rates for the four quartiles, arranged from least to most highly leveraged, are given in Table II. Table II demonstrates that looking across quartiles of corporations in the U.S. economy, there is wide variation in effective total tax rates as a result of the differential treatment of debt and equity. This strongly suggests that the differential tax treatment produces a large capital misallocation.

Arguably, the measured bias across corporations also understates the actual bias. For even the dullest corporations have some growth opportunities and some assets that will lose value in bankruptcy, and the most dynamic corporations have some dull assets that can support a lot of leverage.

B. Second Best and Other Considerations

The corporate interest deduction misallocates capital, thereby reducing national wealth, because some projects are pursued with expected returns below those of other projects that are rejected. One school of thought in tax policy believes that whenever a distortion is found it should be eliminated. The weight of current
scholarly opinion, however, is more reluctant to act. These authors, wary of second-best problems, require more than a showing of a distortion to justify its elimination. 151

Although there is widespread agreement that the (relative) competitiveness of U.S. corporations has declined substantially since the end of the second world war, agreement ends there. There is substantial debate over the causes of this decline, whether the causes are benign or indicative of deeply-rooted infirmities in the U.S. economy, whether the decline will stop at parity or continue, and what, if anything, should be the response. 152 For those who believe that reversing declining U.S. competitiveness is the overriding economic imperative, the case for remedying the distortion is strong. For these people, any countervailing considerations from remedying the bias are dominated by the need to encourage investment in new technologies and organizational practices. However, even for the more skeptical, there are reasons to believe that the harm from the capital misallocation is large and that the benefit from eliminating it will exceed the costs. 153

Because of the general theory of the second best, theory alone cannot provide a definite answer to the question of whether placing debt and equity on par will reduce the total distortion fostered by the tax law. This Article identifies three ways in which the corporate interest deduction biases investment. However, in none of these three ways is the existing tax law without bias. In each instance, there are provisions in the law tending to cause biases both in favor and against such investment. The bias against risk-

151. See, e.g., Kahn, supra note 110, at 1081-82 (suggesting caution in eliminating distortions because eliminating one distortion may create other distortions and discussing propriety of tax incentives in federal income tax and use of economic analysis to examine questions of concern to academic lawyers).

152. The literature is voluminous and beyond the scope of this Article to review. See, e.g., Paul Kennedy, Preparing for the Twenty-First Century ch. 13 (1993) (discussing reasons for United States economic decline and possible remedies); Kevin Phillips, Boiling Point: Republicans, Democrats, and the Decline of Middle-Class Prosperity 171-75 (1993) (discussing decline in relative competitiveness of U.S. corporations and its effect on U.S. middle-class).

153. Comparisons with other countries are difficult. Although the United States is practically alone in providing no tax relief on dividends and retained earnings, leverage ratios for nonfinancial corporations are higher in Germany and Japan than in the United States. See Eli Remolona, Understanding International Differences in Leverage Trends, FRBNY Q. Rev. 31, 32 tbl.1 (Spring 1990). However, unlike in the United States, where financial institutions are prohibited by law from participating in the management of the firm, the financial institutions that supply debt to German and Japanese businesses frequently participate in their management. Gertler & Hubbard, supra note 50, at 54. Financial economists believe that this participation tends to mitigate the agency problems from debt. Id. at 53-56 (discussing harm from capital misallocation).
taking is reinforced by incomplete-loss offsets;\(^{154}\) the bias is offset by limited liability\(^ {155}\) and the realization requirement, which allows taxpayers to accelerate deductions and defer inclusions by selling loss assets and holding gain assets.\(^ {156}\) The implementation of a capital tax can operate in either direction.\(^ {157}\) The bias against growth investments is reinforced by a tax system that captures accretions, even if they do not produce increases in net present value;\(^ {158}\) this bias is offset by the realization requirement that permits gain on appreciated property to escape tax until the gain is realized.\(^ {159}\) The bias against investment in intangible assets is reinforced by the nondeductibility of most educational expenses\(^ {160}\) and the prohibition against depreciating property with an indefinite life, such as goodwill;\(^ {161}\) this bias is offset by the immediate deductibility of many of the expenses that are used to produce intangible assets, such as wages and training costs.\(^ {162}\)

Looking beyond the three biases, there is reason to believe that eliminating the differential treatment of debt and equity will not create another large distortion, although it will cure one.\(^ {163}\) As the reader might recall, one effect of the favorable treatment of debt is to encourage corporations to take on more debt as they balance the tax savings from debt against increased agency costs.\(^ {164}\) Because the former is a transfer payment and the latter a

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\(^{154}\) Stiglitz, supra note 118, at 275-79; see also Majd & Myers, supra note 115, at 20-21 (discussing how tax asymmetries impact after-tax net present value of projects); Campisano & Romano, supra note 118, at 722-30 (discussing treatment of net operating losses and its effect on risk taking).

\(^{155}\) Without limited liability, there would be no asset substitution. Thus, limited liability encourages risk taking.


\(^{162}\) See Stephen, supra note 160, at 1368 (discussing concept of human capital as it relates to federal income tax system).

\(^{163}\) Because of the complex interactions, one cannot be sure of the former.

\(^{164}\) For a further discussion of the favorable tax treatment of debt, see supra notes 86-90 and accompanying text.
real cost, the differential treatment of debt and equity wastes resources. Hence, eliminating that differential will cure the bias and end the waste.

The close relationship between technological advance and real income growth provides additional support for eliminating the differential tax treatment. There are two links in the chain: the first link is between technological advance and productivity growth; the second is between productivity growth and income growth. The latter is obvious; the former is not.

The argument that economic growth is fueled by technological advance was put forth by Joseph Schumpeter at the turn of the century. Schumpeter argued that the accumulation of capital was not the principal engine of economic growth, but rather entrepreneurship and innovation were the driving forces. For fifty years, this bold thesis was met with skepticism, not only by Marxists, who viewed capitalism as the accumulation of capital and therefore, might be expected to be critical, but also by mainstream economists schooled in the static view of the marginalist revolution. Schumpeter's argument continued to be questioned until Robert Solow provided evidence confirming Schumpeter's thesis.

In the 1950s, Solow set out to measure how much of the 1.79% average annual increase in U.S. nonfarm labor productivity that occurred in the first half of this century was due to increased capital intensity. Consistent with Schumpeter's thesis, Solow found that less than 20% of the increase was due to capital accumulation, the remainder being attributable to improved production practices and a more highly skilled labor force. In 1985, following Solow, Edward Denison calculated that only 13% of the growth in worker productivity between 1929 and 1982 was due to increased capital intensity. Denison concluded that 34% of the growth was due to improved worker education and 68% to improved technology. Although scholars have quibbled over the numbers, the conclusion is clear: U.S. income growth has over-

168. Frederick Scherer & David Ross, Industrial Market Structure and Economic Performance 613 (3d ed. 1990) (citing Edward F. Denison, Trends in American Growth, 1929-82 30 (1982)). Denison's percentages total more than 100% because some factors, such as reduced hours worked, decreased productivity.
whelmingly come from increasingly skilled workers applying new and better technology. The same holds true for the other industrialized nations. Thus, the important role that technological advance plays in fueling economic growth supports remedying the capital misallocation caused by the corporate interest deduction.

The argument for eliminating the differential treatment of debt and equity is strengthened by studies showing that, at least for major technological advances, only a small portion of the benefit is captured by the innovator, the remainder going to imitators and other competitors, upstream and downstream producers, and consumers. Thus, the differential tax treatment, by discouraging innovative activity, is discouraging activities that produce large external benefits. Given such benefits, the social costs of discouraging these activities through the tax laws could be stagger-

169. Edward F. Denison, Why Growth Rates Differ: Postwar Experience in Nine Western Countries 297-300 (1967) (discussing sources of economic growth in U.S.); see also Scherer & Ross, supra note 168, at 613-14 (discussing reasons for increase in U.S. income).

170. Scherer & Ross, supra note 168, at 614; see generally Landes, supra note 12 (discussing relationship between technological change and economic development over last two centuries in Western Europe); Nathan Rosenberg & L.E. Birdzell, Jr., How the West Grew Rich: The Economic Transformation of the Industrial World ch. 8 (1986) (discussing reasons for increase in United States and Western European incomes during late 19th and early 20th centuries).

171. There are also non-economic reasons for concern over the capital distortion. International differences in the ability to develop and apply state-of-the-art technology are an important determinant of the balance of military power. Scherer & Ross, supra note 168, at 614. In addition, it is widely acknowledged that political and military power depend ultimately on economic productivity. Dertouzos et al., supra note 19, at 2.

172. See, e.g., Timothy Bresnahan, Measuring the Spillovers from Technical Advance: Mainframe Computers in Financial Services, 76 Am. Econ. Rev. 742, 753 (1986) (noting that social benefit equals 1.5 to 2 orders of magnitude above invention cost); Zvi Griliches, Research Expenditures, Education and the Aggregate Agricultural Production Function, 54 Am. Econ. Rev. 961, 964-71 (1964) (noting that social return from agricultural research at least 1.5 times greater than private return); Edwin Mansfield et al., Social and Private Rates of Return From Industrial Innovations, 91 Q.J. Econ. 221, 233 (1977) (noting that for 17 major products innovations, social return exceeded private return by between 77% and 150%). For a survey of these and other studies, see Edwin Mansfield, Intellectual Property Rights, Technological Change and Economic Growth, in Intellectual Property Rights and Capital Market Formation in the Next Decade ch. 1 (Charles E. Walker & Mark A. Bloomfield eds., 1988). I am indebted to Rob Merges for directing me to these sources.

173. Levelling the tax treatment cannot make up for the externalities. However, if the activities discouraged by the corporate interest deduction are generally of the kind that produce large external benefits, then a case could be made for reversing the existing tax treatment to encourage, as opposed to merely not discouraging, high-growth, high-risk activities that employ intangible assets.
ing, and are likely to exceed any offsetting second-best effects. Absent a detailed prospective empirical study, it is not possible to be certain whether eliminating the differential treatment of corporate debt and equity will improve welfare. However, there are good reasons to believe that eliminating the differential will produce significant improvements in welfare.

VI. Proposals to Eliminate Favorable Treatment of Debt

This section reviews several possible solutions to the misallocation of capital within the corporate sector. These possible solutions include, among others, full-loss offsets for corporations, the elimination of the corporate interest deduction and corporate integration.

A. Full-Loss Offsets

It might be thought that the misallocation of capital described in this Article is derivative of the misallocation caused by incomplete-loss offsets for corporations. Although the two problems are related, neither one encompasses the other. Accordingly, a system of full-loss offsets, such as that proposed by Mark Campisano and Roberta Romano, would be only partially effective in remediating the distortion caused by the corporate interest deduction. It would reduce, not eliminate, the disincentive to invest in high-risk projects, but it would have no significant effect on the disincentive to invest in growth projects employing intangible assets.

In contrast with existing tax law, under full-loss offsets the government would provide a refund to a corporation with negative taxable income. Thus, with a flat 34% federal corporate in-

174. The debate over industrial policy, sometimes referred to as picking winners and losers, comes down to the extent to which the economic benefits of technological and managerial improvements can be internalized by firms that develop them and the extent to which the government will get mired down in politics if it pursues an industrial policy. Critics of industrial policy disparage the ability of government bureaucracies to do a better job than entrepreneurs and investors and fear the possibility of government largesse being distributed on the basis of political clout, not economic merit. The winners that everyone is searching for are high-growth companies. The winners might also be risky companies that are good bets. However, risky companies and growth companies are disadvantaged by the tax law because of their low debt capacity. The proposal advanced in this Article is to eliminate the higher tax burden on risky ventures and growth opportunities. This would encourage investment in these activities while still permitting the market, as opposed to the government, to determine which projects are funded and which are not.

175. Campisano & Romano, supra note 118, at 709.
come tax and full-loss offsets, a corporation that had a $10 million net loss in 1992 would receive a $3.4 million refund.

Proponents of full-loss offsets point to the detrimental effect on risk taking that the current system of incomplete-loss offsets has. Because the tax system provides only a partial deduction for losses, risky projects are taxed more heavily than are less risky projects, with the result that too few risky projects are undertaken.176

A system of full-loss offsets would ameliorate but not eliminate the bias against risky investments. Investment in risky projects is discouraged because corporations are taxed more heavily if they cannot use their interest deductions currently. Thus, giving corporations the right to use these deductions would eliminate the costs associated with carrying losses forward and possibly seeing them expire. Risky firms also avoid debt because of the associated financial distress costs. Full-loss offsets would not reduce this incentive for risky firms to eschew leverage.177 Therefore, full-loss offsets would not eliminate the bias against risky investments identified in this Article.

Furthermore, full-loss offsets would not ameliorate the tax law's biases against investment in growth projects and intangible property. Growth industries and industries that intensively use intangible property employ little debt not because they cannot use the interest deductions but because bankruptcy and financial distress are costly.

These results can be illustrated with Figure 1. Full-loss offsets can only cure the bias introduced by the differential declining value of tax shields; that is, full-loss offsets can straighten out the marginal benefit curve. Full-loss offsets cannot ameliorate the bias from differential financial distress costs because it has no ef-


177. Although full-loss offsets would reduce the bias against risk taking, this comes at a cost in real resources. By increasing the value of the expected interest tax shield, a system of full-loss offsets would encourage firms to use more leverage. Firms will, therefore, incur greater expected financial distress costs, which are real resource costs to society, when they balance these costs against the greater expected tax savings. The welfare effect of implementing a system of full-loss offsets depends on whether the benefits of improved risk bearing exceed the financial distress costs of additional leverage. If, however, full-loss offsets are implemented and the interest deduction is simultaneously eliminated, there is no trade-off, only the improved risk-bearing occurs.
fect on the marginal cost curve.\textsuperscript{178}

B. \textit{Elimination of Corporate Interest Deduction}

Eliminating the corporate interest deduction would remedy the bias against investments in risky growth projects employing intangible assets. Because that action, by itself, would raise corporate tax revenues, the federal government could simultaneously eliminate the corporate interest deduction and reduce the corporate tax rate from the current 34\%,\textsuperscript{179} without reducing corporate tax revenues.\textsuperscript{180} Of course, eliminating the corporate interest deduction and reducing the statutory corporate tax rate would not remedy the misallocation of capital between corporate and noncorporate sectors; investment in the corporate form would still be discouraged.\textsuperscript{181}

Furthermore, although the proposal would eliminate the tax-induced incentive to issue debt, because interest would no longer be deductible, it would not remove tax considerations from the capital structure decision. Eliminating the corporate interest deduction, while maintaining the tax advantages of equity—the deferral of investor-level tax on retained earnings—would encourage corporations to issue equity.\textsuperscript{182} A means of eliminating the resulting advantage from retained earnings would be to tax equity investors on their portion of a corporation’s retained earnings and give them a basis adjustment in their stock. Taking these actions would place debt and equity, as well as dividends and re-

\textsuperscript{178} Similarly, eliminating the tax advantage of debt would not eliminate the bias against risk taking introduced by incomplete-loss offsets, but it would reduce it.

\textsuperscript{179} Because the corporate income tax is highly distortionary, it is a poor vehicle for raising additional revenue through a tax hike. For a discussion of the corporate income tax’s distortionary effect, see \textit{infra} note 191 and accompanying text.

\textsuperscript{180} Presenting the reform as revenue neutral isolates the impact of restructuring the corporate tax from the effect of raising or lowering taxes on corporations.

\textsuperscript{181} The argument presented in this Article, that the corporate interest deduction misallocates capital, does not apply to individual taxpayers and pass-through entities, such as partnerships, because income earned by individuals and pass-through entities is subject to only one level of tax. Thus, there can be a deduction for interest paid by individuals, whether for business or investment reasons or, more generally, even if there is not a corporate interest deduction, without creating problems of the kind described here.

\textsuperscript{182} One implication of encouraging corporations to issue equity rather than debt is that it would encourage investment in growth companies because they can put retained earnings to good use. Furthermore, it would encourage corporations to retain capital for unproductive investments and would increase the cost of using debt to discipline management.
tained earnings, on par, thereby removing tax considerations from the capital structure decision.

Assuming that the bias against investment in the corporate form will not be simultaneously eliminated by integrating the corporate and personal tax systems, a possibility which is taken up next, a strong case can be made in favor of the proposed changes: eliminate the corporate interest deduction, lower corporate tax rates, and tax equityholders on their allocated share of retained earnings while providing them with a basis adjustment. By equalizing the tax treatment of debt and equity, the proposed changes would have two advantages. First, the changes would eliminate the waste that results from the tendency to encourage corporations to balance reduced taxes against increased financial distress costs. Second, the changes would eliminate the misallocation of capital within the corporate sector. Such changes are likely to improve welfare. If any biases that should be eliminated remain after implementing the proposed changes, it would

183. Edward Kleinbard proposes replacing the corporate interest deduction with a cost of capital allowance (COCA), which would permit a corporation a deduction equal to the product of its invested capital and a statutory COCA. COCA would be a fixed fraction of the cost of capital, and invested capital would be the adjusted tax bases of the corporation's assets. Edward D. Kleinbard, Beyond Good and Evil Debt (and Debt Hedges): A Cost of Capital Allowance System, 67 TAXES 943, 957 (1989); see also Edward D. Kleinbard, Equity Derivative Products: Financial Innovation's Newest Challenge to the Tax System, 69 TEX. L. REV. 1319, 1363-68 (1991) (discussing implementation of COCA deduction). A similar proposal was advanced by the Institute for Fiscal Studies. See INSTITUTE FOR FISCAL STUDIES, EQUITY FOR COMPANIES: A CORPORATION TAX FOR THE 1990'S (Fourth Report of the Institute for Fiscal Studies Capital Taxes Group, Commentary No. 26, London, 1991). Like the proposal to eliminate the interest deduction and reduce corporate taxes, COCA would eliminate the interest deduction. However, to compensate for the loss of the interest deduction, it would not lower corporate tax rates but would instead provide a deduction for all of the capital used in the business. Consideration of this complex and intriguing proposal for reform must wait for another opportunity.

There are several problems with COCA as an alternative to the corporate income tax without an interest deduction. First, COCA, by reducing taxable income, would exacerbate the disincentive to invest in risky projects caused by incomplete-loss offsets. Second, the higher tax rate under COCA implies a larger distortion from the corporate tax.

184. For a discussion of the waste that results from the tendency to encourage corporations to balance reduced taxes against increased financial distress costs, see supra notes 91-94 and accompanying text.

185. By eliminating the misallocation, it would also increase corporate investment in risky projects and growth opportunities, which most commentators would applaud.

186. Because of the general theory of the second best, the previous conclusion cannot be stated categorically. For a discussion of the effects of such changes on the general welfare of the country, see supra notes 130-134 and accompanying text.
be desirable to eradicate such biases by amending the tax law in a manner that does not waste real resources.\textsuperscript{187}

\textbf{C. Corporate Integration}

The Treasury Department (Treasury) recently released a long-awaited and lengthy (247 pages) study of corporate integration.\textsuperscript{188} The idea behind corporate integration is to eliminate the double taxation of corporate earnings, which discourages businesses from using the corporate form and reduces investment in activities that can best be done in that form.\textsuperscript{189} In addition to subjecting corporate income to only a single level of tax, thereby placing it on par with noncorporate investments, corporate integration is also intended to eliminate the distortion between debt and equity finance.\textsuperscript{190}

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\textsuperscript{187} Ultimately, the differential treatment of corporate debt and equity is not likely to be desirable. It would be more efficient to correct any biases that might possibly justify the differential treatment with direct taxes and so avoid the waste the trade-off produces.\textsuperscript{188} \textsc{Treasury Dep’t Report, supra} note 44.\textsuperscript{189} The interaction between taxation and the choice of business form is formally modelled by Jane G. Gravelle & Laurence Kotlikoff, \textit{The Incidence and Efficiency Costs of Corporate Taxation When Corporate and Noncorporate Firms Produce the Same Goods}, 97 J. Pol. Econ. 749 (1989).\textsuperscript{190} A normative argument for taxing debt more heavily than equity might be based on limited liability, which numerous commentators have critically viewed as an inappropriate subsidy that permits corporations to externalize risk. See, e.g., Henry Hansmann & Reinier Kraakman, \textit{Toward Unlimited Shareholder Liability for Corporate Torts}, 100 \textsc{Yale L.J.} 1879, 1882-83 (1991); Jonathan M. Landers, \textit{A Unified Approach to Parent, Subsidiary and Affiliate Questions in Bankruptcy}, 42 U. \textsc{Chi. L. Rev.} 589, 619-20 (1975). Financial economists have recognized that limited liability can be viewed as a put option on the firm’s assets with an exercise price equal to the outstanding debt, the value of which (other things being equal) increases with the variance of earnings. Ross \& Westerfield, \textsc{supra} note 21, at 627, 637. Consequently, because debt capacity decreases with risk, the tax burden is directly related to the limited liability subsidy. Thus, the argument goes, because the higher tax counteracts the limited liability subsidy, the differential treatment of debt and equity should not be eliminated. The difficulty with the above justification is that it ignores the harmful consequences from the lower tax on debt that are unrelated to the limited liability subsidy: the waste in real resources and discouraging investment in growth projects and intangible assets. Furthermore, because limited liability is a subsidy only to the extent that risk can be externalized and many voluntary creditors, especially debtholders, protect themselves through higher interest rates, the correlation between risk and the value of the subsidy across firms is imperfect and might be weak. See Richard A. Posner, \textit{The Rights of Creditors of Affiliated Corporations}, 43 U. \textsc{Chi. L. Rev.} 499, 501-05 (1976). Another possible argument in favor of the corporate interest deduction analogizes corporate and individual taxpayers. The personal deduction for interest paid on business debts ensures an accurate measure of taxable income. To illustrate, consider an individual with an opportunity to receive $1000 next year by investing $800 today. If the individual invests $800, the individual will realize
According to Jane Gravelle, the double tax on corporate equity is highly distortionary. She estimates that every additional dollar of tax collected through the federal corporate income tax is accompanied by throwing away between $.50 and $1 in distortions. Accordingly, integration has become a crusade among tax policy specialists, producing a lengthy literature on corporate integration, to which this Article cannot do justice. My more modest goal is to address the extent to which the various integration proposals respond to the capital misallocation described in this Article.

1. Prototypes Examined in the Treasury Department Study

The Treasury’s corporate integration study outlines three options for restructuring the corporate tax system. The most extensive restructuring option is the Comprehensive Business Income Tax (CBIT). Under CBIT, shareholders and bondholders exclude dividends and interest from income, but neither payment is deductible by the corporation. Thus, CBIT taxes all corporate earnings at the corporate level. Treasury views CBIT as a long-term comprehensive means of equalizing the tax treatments of corporate and noncorporate investments as well as debt and equity.

Treasury considers the dividend exclusion prototype, which would eliminate the personal-level tax on dividends, the easiest restructuring option to implement. Corporations would continue to pay tax on their after-interest earnings. Investors would be taxed on interest received but not on dividends. Thus, the divi-

§200 profit, which the government will tax. If the individual only has $400 to invest and takes in a partner with whom the individual will split the profits, then each partner will realize a profit of $100, which the government will tax. Suppose that instead of taking a partner, the investor borrows $400, agreeing to repay $500. This leaves the investor with a profit of $100 and the lender with a profit of $100. Without the interest deduction, the investor’s profit would be $200 and the total taxable profit would be $300. Thus, without a personal deduction for interest on business loans, income would be overstated for tax purposes and the financing decisions of noncorporate entities would be biased in favor of equity over debt.

The above argument does not extend to the corporate tax because corporations are taxed as separate entities, which results in a double tax on corporate equity but a single tax on corporate debt. Accordingly, the corporate interest deduction turns debt into a device for reducing tax, thereby influencing corporate financing decisions.


192. This Article only considers the most basic of the integration proposals under the simplest of circumstances. A fuller treatment incorporating integration complexities, such as treatment of tax-exempt shareholders and effects of various withholding regimes must wait for another day.

dend exclusion prototype taxes the investor on interest and the corporation on dividends and retained earnings. The Treasury currently favors the dividend exclusion prototype.194

Under the third restructuring option, shareholder allocation, shareholders would include allocated amounts in taxable income, receive a credit for corporate taxes paid, and increase the basis in their shares by the income allocated. Distributions would be treated as a return of capital to the extent of basis and, thereafter, as capital gain.195 In contrast to CBIT, which eliminated the tax disparity between debt and equity by taxing the income from both at the corporate level, the shareholder allocation prototype has the effect of taxing debt and equity income at the shareholder-level.196

2. Effectiveness of Different Prototypes in Eliminating Investment Bias

The various integration proposals are not equally effective in eliminating the biases introduced by the corporate interest deduction. Although the tax law's tendency to discourage high-risk, high-growth projects that use intangible property can be eliminated by putting debt and equity on a par, that tendency is reduced, but not eliminated, when the tax treatment of equity is improved, compensating for its disadvantage inside the corporation, by reducing the investor-level tax.

Of the three prototype restructuring options studied by the Treasury, only CBIT would eliminate the subsidy on debt and therefore remove the bias against high-risk, high-growth projects using intangible assets. CBIT eliminates the bias because neither interest nor dividends are deductible. In addition, CBIT does not permit corporations to avoid taxes by issuing equity and retaining earnings because neither dividends nor interest are includible by the recipient. This effect can be illustrated using Figure 1. The

194. Id. at 15.

195. A fourth prototype, the shareholder credit prototype, is discussed in the section on roads not taken. This prototype was recommended in AMERICAN LAW INSTITUTE, REPORTER'S STUDY OF CORPORATE TAX INTEGRATION (March 31, 1993) (Alvin C. Warren, Jr., reporter). It is also the dominant form of integration abroad. Under the American Law Institute's shareholder credit proposal, shareholders, when they receive a dividend, include the dividend plus the corporate-level tax in income and receive a credit against personal-level taxes for corporate taxes paid. If the corporate tax exceeds the investor's tax rate, the excess credit can be used to shelter other income. Thus, the shareholder credit prototype taxes all corporate earnings at the individual level.

196. Although the shareholder allocation prototype effectively taxes corporate income at the investor level, it does not eliminate the corporate-level tax. Instead, it uses the corporate tax as a withholding tax.
downward-sloping marginal tax shield schedule is shifted down to the horizontal axis because the corporate-level tax advantage from debt is eliminated by CBIT. Similarly, that portion of the upward-sloping marginal cost schedule that represents the investor-level tax advantage from equity is also coincident with the horizontal axis. Thus, the capital structure decision is a function only of expected financial distress costs, so that corporate value is maximized by choosing the capital structure that minimizes these costs.

Encouraging managers to set capital structure to minimize expected financial distress costs is efficient and socially desirable. Such action would eliminate two disadvantages of the current tax system. First, setting capital structure to minimize expected financial distress costs eliminates the waste incurred when managers balance tax savings against increased financial distress costs. Because the former are transfer payments but the latter are real costs, the current law encourages managers to make such a balance. In this way, the current law reduces national wealth. Second, setting capital structure to minimize expected financial distress costs eliminates the misallocation of capital that arises because corporations with the largest debt capacities have the lowest tax rates and capital costs and therefore attract disproportionately large amounts of capital.197

The other two prototypes would reduce the tax benefits from leverage. However, because neither prototype would eliminate tax considerations from the capital structure decision, they would leave corporations with an incentive to balance reduced taxes against real costs. As a result, they would encourage waste and bias investment.

The dividend exclusion prototype would reduce the biases caused by the interest deduction, but it would not eliminate them. Under the dividend exclusion prototype, interest income is taxed at the recipient's level, but dividends and retained earnings are taxed at the level of the corporate payor. With the dividend exclusion prototype, corporations would have an incentive to issue debt as long as the effective corporate tax rate exceeds the tax rate of the marginal investor. However, as the corporation issues more debt, the effective tax rate will decline as the probability increases that the corporation will not be able to use all of its interest deductions currently. When the effective corporate and marginal inves-

197. An additional advantage to CBIT is that it reduces the bias against risk-taking from incomplete-loss offsets because eliminating the dividend deduction reduces the likelihood that a corporation will have suspended losses.
tor's tax rates are equal, the tax advantage from debt disappears, and thereafter, there is a tax disadvantage from issuing more debt.198

The third prototype, shareholder allocation, is probably the most effective of the three prototypes studied by the Treasury after CBIT in eliminating the biases caused by the corporate interest deduction.199 The shareholder allocation prototype requires each investor to include in income the investor's share of the corporation's pre-tax income after deducting interest payments made by the corporation and provides the investor a credit for the tax paid by the corporation. If the investor's tax rate exceeds the corporation's tax rate, the investor owes additional tax. If, however, the investor's tax rate is below the corporation's tax rate, the investor can use the excess credits to reduce its federal income tax bill.

By treating the corporation as a conduit, the tax benefits of financial structure are largely eliminated.200 Even so, the proposed shareholder allocation prototype does not eliminate taxes from the capital structure decision. This is a result of maintaining the corporate interest deduction and incomplete-loss offsets combined with no provision for passing losses through to investors. The effect of these provisions is to discourage corporations from issuing debt because the marginal value of the tax shield decreases with leverage. Thus, if debt can reduce agency costs, the corporation will have to pay a tax penalty for issuing debt.201

198. Corporations are more likely to have negative income with the dividend exclusion prototype than with CBIT. Thus, the dividend exclusion prototype does not reduce the bias against risk introduced by incomplete-loss offsets.

199. With the exception that investors include within income only that portion of the corporation's pre-tax income that is distributed as a dividend, the following comments about the shareholder allocation prototype also apply to the shareholder credit prototype recommended by the American Law Institute.

200. One advantage of the shareholder allocation prototype over the dividend exclusion prototype is that the shareholder allocation prototype eliminates the tax law's tendency to produce a clientele effect for bonds and stocks.

201. An example will help to illustrate this point. Assume there is a single investor and that both the investor and the corporation are taxed at 30%. If the corporation has income of $100 before the interest deduction, the investor should have an after-tax gain of $70. However, when the interest paid is greater than $100, it causes the investor's net gain to be less than $70. Assume the corporation paid $150 in interest. After the interest deduction, the corporation will have a $50 loss and thus no tax liability. The investor will pay $45 in taxes on his interest income of $150, leaving him with $105. However, the $50 loss does not pass through to the investor to offset other income. Therefore, the investor suffers a $50 loss in the value of his equity without receiving a corresponding tax benefit. The investor's $105 gain, coupled with the $50 loss in equity, results in the investor having only a $55 net gain. A tax penalty of $15 has been incurred for paying more that $100 in interest.
D. Other Potential Solutions

The tax code's favorable treatment of debt over equity biases investment and hampers economic growth. There are several tax reform proposals under consideration that proponents claim would stimulate investment and growth. These include the investment tax credit (ITC), the R&D tax credit and a reduction in the capital gains tax rate. In this section, I argue that none of these reforms would eliminate the identified bias.

1. ITC and R&D Tax Credit

One possible method of overcoming the biases against growth and risk-taking is to adopt either or both an ITC and R&D tax credit. Although there might be reasons for having such credits within the corporate tax, they cannot justify retaining the corporate interest deduction. There are two reasons for this. First, the overlap between the activities discouraged by the corporate interest deduction and those encouraged by the two credits is imperfect. If the overlap is weak, then the bias will not be remedied. Second, the tax credits would not eliminate the excess financial distress costs because the corporate interest deduction encourages corporations to increase their proportional leverage.202

2. Capital Gains Reduction

Capital gains reduction has become a partisan political issue. Proponents, including the Reagan and Bush administrations, argue that a capital gains reduction would increase investment. Opponents argue that it will do little to increase investment but much to reduce taxes on the wealthy. Whatever the merits of these two conflicting positions, the only effect of a capital gains reduction that is of consequence to my thesis is its effect on the relative effective total tax rates of debt and equity. Because capital gains account for a larger share of equity's total gain than of debt's total gain, a capital gains reduction would lower the effective total tax rate on equity relative to that on debt. This would reduce the bias towards debt, thereby reducing the magnitude of the distortion.203 However, it would not eliminate the bias, even if the capital gains rate were reduced to zero, because the effective tax rate on equity would still exceed the effective tax rate on debt.


203. I am indebted to my colleague, Alex Capron, for this observation.
VII. Conclusion

Because current tax law allows corporations to deduct interest but not dividends and retained earnings, debt financing is taxed more favorably than is equity financing. Thus, the existing tax law encourages corporations to increase leverage. However, not all corporations can increase leverage as easily. Because high-risk, high-growth projects employing intangible assets cannot support as much leverage as can low-risk, low-growth projects employing tangible assets, the existing corporate tax law discourages investment in the former in favor of investment in the latter. This misallocates capital within the corporate sector and discourages investment in precisely those industries and activities that many commentators consider to be critical to the economic future of the United States.