# Taxation and the Cost of Capital: The 'Old' View, the 'New' View, and Another View

by Hans-Werner Sinn

published in:
D. Bradford (Ed.)., *Tax Policy and the Economy* 5, 1991, National Bureau of Economic Research, pp. 25-54.

# TAXATION AND THE COST OF CAPITAL: THE "OLD" VIEW, THE "NEW" VIEW, AND ANOTHER VIEW

*Hans-Werner Sinn*
University of Munich and NBER

## EXECUTIVE SUMMARY

This paper is a critical survey and discussion of the recent literature on the tax effects on corporate finance and investment decisions. It corrects a common misinterpretation of the "new" view, emphasizes the cushioning effect of financial optimization, dismisses the view that optimizing firms behave as if they maximized their cost of finance, studies the role of immature firms, questions the alleged support of the old view by the occurrence of share repurchases, comments on the U.S. budget compromise, and suggests the idea of a political Miller equilibrium.

## I. INTRODUCTION

Economists agree that the cost of capital is an important analytical tool for predicting a country's intersectoral distortions, its growth perfor-

The paper has benefitted from very useful comments by David Bradford and Larry Goulder. It was written while the author was Research Scholar at the Center for Economic Policy Research, Stanford University, and Olin Visiting Fellow at the Woodrow Wilson School of Public and International Affairs, Princeton University. The paper is also part of the NBER's research program in Taxation. The support and hospitality of these institutions are gratefully acknowledged.

mance, or its attractiveness for international capital. However, there is no consensus as to how the tax influence on the cost of capital should be measured.

The cost of capital is defined as the minimum pretax rate of return an investment project must earn to be profitable. The controversy among tax economists is primarily concerned with the question of how the required rate of return is affected by personal and corporate income taxation, and the double taxation of dividends has received particular attention. While it is obvious that the double taxation creates a substantial tax burden for corporations, there is no agreement as to how much of the burden falls on marginal investment projects. The "old view" is that the total tax burden falls entirely on marginal investment projects and therefore implies a high cost of capital, far above the market rate of interest. By way of contrast, the so-called "new view" (which, in fact, is no longer so new) is that only the tax burden on retained earnings matters. The burden of the double taxation of dividends is seen to fall largely on inframarginal investment projects and is believed to have no effect on the cost of capital at the margin.

This note is an exposition and critical review of some of the arguments exchanged between the members of the two schools. It presents the basic theories, discusses the role of financial optimization, comments on immature firms, and includes an analysis of the role of share repurchases, attention to which has recently led to a revival of the "old" view among North American economists. It also presents the idea of a political Miller equilibrium.

The crucial reason for the different views on the way taxes affect the cost of capital is that authors make different assumptions about the firms' financial decisions, sometimes without explicitly mentioning them. The holders of the new view have pointed to the importance of these assumptions and they have emphasized that new share issues, debt, and, in particular, retained profits should be distinguished as alternative *sources of finance*. Three different cost of capital expressions are typically used by them, depending on which source of finance is assumed.

Equally important, however, is the distinction between alternative *uses of profits*. These uses are not only dividend and interest payments, as is usually assumed, but also profit retentions and share repurchases. The specification of the use of profits is as essential for the calculation of the cost of capital as the specification of the source of finance. Only when it is clear where an additional dollar used for investment comes from and where its returns are going, is it possible to calculate the tax burden on marginal investment and to find out which minimum pretax return is required to make this investment profitable.



**TABLE 1.**
***Taxation and the Cost of Capital***

| SOURCE OF FINANCE | USE OF PROFITS | | | |
|---|---|---|---|---|
| | Dividends | Interest | Retentions | Share repurchases |
| New share issues | $\frac{i}{1-\tau_d}$ | — | $> \frac{i}{1-\tau_d}$ * | $i\,\frac{1-\tau_i}{(1-\tau_c)(1-\tau_r)}$ |
| Retained earnings (dividend reductions) | $i\,\frac{1-\tau_i}{(1-\tau_c)(1-\tau_r)}$ | — | $i\,\frac{1-\tau_i}{(1-\tau_c)(1-\tau_r)} - \frac{\dot{q}/q}{1-\tau_r}$ | $i\,\frac{(1-\tau_d)(1-\tau_{dp})(1-\tau_i)}{(1-\tau_c)^2(1-\tau_r)^2}$ |
| Debt | — | $i$ | — | — |

*Sufficient conditions derived in Sinn (1988b, 1990).

Distinguishing retained earnings, debt, and new share issues as marginal sources of finance and retentions, dividends, interest income, and share repurchases as marginal uses of profit in principle gives up to 12 different expressions for the cost of capital. However, since interest payments are the marginal use of profits only when the marginal source of finance is debt, the number reduces to 7. The possibilities are depicted in Table 1. As will be shown, not all of them will be equally relevant to an optimizing firm: however, they will turn out to be a useful guide in the course of this paper.

## II. THE OLD VIEW

In the good old days economists distinguished just two financial alternatives: equity and debt, and equity was seen as being provided by the household sector. The term "old view" will be used to characterize this approach.

With equity finance, the conceptual experiment for determining the cost of capital was that shareholders inject an additional dollar into their firm by purchasing newly issued shares and compare the returns in the form of dividends with the returns they could have received by investing their money in bonds. Let $\pi$ be the annual dividend from marginal investment of one dollar and $i$ the annual rate of interest on bonds. Then, if there are no taxes, the shareholders would be willing to inject funds into their firm until, at the margin, $\pi = i$.

If taxes are levied, the decision is different. Suppose distributed earn-

ings are subject to a corporate tax of rate $\tau_d$ and in addition to a personal tax of rate $\tau_{dp}$, the frequently deplored "double tax." Assume that interest income on the other hand is taxed only once at the personal rate $\tau_i$. In this case, the marginal investment project is determined by equality of the dividend net of all taxes and the net-of-personal tax interest rate: $\pi(1-\tau_d)(1-\tau_{dp}) = i(1-\tau_i)$. In all OECD countries except Norway the personal tax on dividends is the same as that on interest income: $\tau_{dp} = \tau_i$. The equation can therefore be simplified to $\pi(1-\tau_d) = i$ or, solving for $\pi$, to

$$\pi = \frac{i}{1-\tau_d} \tag{1}$$

The right side of this equation is the pretax rate of return the firm must earn—that is, its cost of capital. This is represented in the box in the first column and first row of Table 1.

If the formula were true, the cost of capital would exceed the rate of interest significantly. Before 1986, when the U.S. corporate tax rate was 46%, the cost of capital would have exceeded the interest rate by 85% and presently, with a corporate tax rate of 34%, it would exceed the interest rate by 52%.

Clearly this signals substantial economic distortions. Too much of the available aggregate stock of capital would be allocated to the noncorporate sectors or to countries that do not impose a corporate tax on dividends (such as Norway, Germany, or Italy). Aggregate output would be lower than in the case where all investment projects had to satisfy the same profitability requirements. This is the traditional or "old" view of the role of corporate taxation that can be attributed to Harberger (1962,.1966) and McLure (1979) and, in an international context, to MacDougall (1960), Kemp (1962, 1964), and Hamada (1966).

It was clear to these authors that the cost of capital would be lower if firms could escape the double taxation of equity returns by choosing debt as the source of finance. An early writer who emphasized this point was Oberhauser (1963, pp. 67–68). He argued that, because of the deductibility of debt interest, a debt-financed marginal investment project is not affected by the tax rates and the cost of capital is simply equal to the market rate of interest. For a debt financed investment project, the dividend net of interest payments and net of all taxes is $(\pi-i)(1-\tau_d)(1-\tau_{dp})$. Obviously, the taxes reduce this dividend when it is positive, but they do not make it negative. All investment projects which are worth being carried out in the absence of taxation therefore retain this property despite taxation and



$$\pi = i \tag{2}$$

remains the marginal investment condition. This is the case captured by the box in the third row and second column of Table 1.

Debt financing is an important example of a situation where the corporate tax is a burden on inframarginal, but not on marginal, investment projects. Only inframarginal projects generate profits in excess of their interest cost; only they pay the tax. Marginal debt financed projects that just break even are tax exempt. This is the reason why, under debt finance, the set of profitable investment projects is not affected by the corporate tax and the cost of capital equals the interest rate. The neutrality of the corporate tax in the case of debt financing has been emphasized by many authors and is well accepted by holders of the "old" view of corporate taxation. Often the literature takes account of the role of debt financing by assuming that the cost of capital is a weighted average of equations (1) and (2).

## III. THE NEW VIEW

One of the problems with the "old" view is that it rests heavily on the assumption that new share issues are the marginal source of equity finance. This assumption does not harmonize well with the empirical fact that most corporate equity capital is generated by internal investment rather than new share issues. For example, in the period from 1980 to 1985, an average 67.8% of gross investment by U.S. nonfinancial corporations was internally financed, 31.0% was debt financed, and only 1.2% was financed with share issues.[1] Contrary to the assumption of the holders of the old view, these data suggest that corporations are self-perpetuating enterprises that rarely rely on equity injections by shareholder households but generate the needed equity capital primarily through profit retentions.

Probably the first to analyze the cost of capital consistently in the case of profit retentions was King (1974a,b, 1977). His contributions initiated a new literature that includes the contributions of Bradford (1980, 1981), Auerbach (1979, 1983), Fullerton and King (1984), Edwards and Keen (1984), Sinn (1985), and many others. The common element of this literature, which soon was labeled the "new view," was that it allowed with-

[1] See *Survey of Current Business*, volumes 57 (July 1977, p. 24n.), 61 (1981, special supplement, p. 10), 63 (July 1983, p. 30), 66 (July 1986, p. 33); and *Federal Reserve Bulletin*, Volumes 55 (November 1969, p. A 71.4), 60 (October 1974, p. A 59.4), 64 (June 1978, p. 433), 65 (December 1979, p. A 44). For a more extensive record see Gertler and Hubbard (1990, Table 1).

held dividends to replace new share issues as a marginal source of equity finance.

The modification is important in all cases where the personal tax on capital gains differs from that on dividends and where different corporate tax rates are applied to retained and distributed earnings. Let $\tau_r$ be the corporate tax rate on retained profits, $\tau_d$ (as before) the corporate tax on distributed profits, and $\tau_c$ the personal capital gains tax rate. In the classical system of corporate taxation that prevails in the United States and a few smaller countries (Australia, Luxemburg, Netherlands, New Zealand, Switzerland), $\tau_r$ equals $\tau_d$; there is only one corporate tax rate regardless of whether earnings are retained or distributed. However, in nearly all other OECD countries, $\tau_r$ exceeds $\tau_d$ because imputation systems are used which refund part of the corporate tax to shareholders. The statutory capital gains tax rate in the United States is currently—however, perhaps not for much longer—equal to the personal tax rate, but it is applied only to realized rather than accrued capital gains. It is a widely used approximation to model this preferential treatment by assuming an effective tax on accrued capital gains whose rate is smaller than the personal tax rate: $\tau_c < \tau_i$. A good guess is that, in the United States, $\tau_c$ is currently *half* the personal tax rate where the latter can be taken to be 28% for the typical shareholder.[2] In most other countries, the difference between $\tau_c$ and $\tau_i$ is even more pronounced for the simple reason that these countries do not have any personal capital gains tax rates worth mentioning. Currently, only one-third of the OECD countries impose personal taxes on capital gains that are realized after a holding period of more than one year!

Verbally deriving the cost of capital expression for the case where retained earnings is the source of finance is slightly more arduous than in the case where new share issues or debt are the sources of finance. Nevertheless the argument is straightforward. Consider a firm that decides to finance additional investment by retaining earnings and thus foregoing a potential dividend payment. From the shareholders' point of view, this policy is worthwhile if its rate of return on investment is sufficiently high to generate future dividends in excess of the interest income that they would have earned had they received the current dividend payment and invested it in bonds. The minimum pretax rate of return necessary to satisfy the shareholders is the cost of capital to the firm.

To calculate this cost of capital, it is important to realize that the

[2] In inflationary times, $\tau_c$ may, however, become larger, since nominal rather than real capital gains are taxed.



decision to retain more profits creates more capital gains and raises the shareholders' capital gains tax liability. Suppose, in toto, one dollar is given up by the shareholders in the form of additional capital gains taxes to be paid and net-of-tax dividends foregone. If all market participants know what is going on, this renunciation must be offset by an increase in the market value of shares by exactly one dollar. Thus the additional capital gains taxes equal $\tau_c$ and the foregone dividend net of the personal and corporate dividend taxes equals $1-\tau_c$. "Grossing up" the foregone dividend with the corporate and personal dividend taxes $\tau_d$ and $\tau_{dp}$ translates it into $(1-\tau_c)/[(1-\tau_d)(1-\tau_{dp})]$ units of before-tax profits or, after subtracting the corporate tax on retained earnings, into investable funds of size $(1-\tau_c)(1-\tau_r)/[(1-\tau_d)(1-\tau_{dp})]$. On the other side of the ledger, the flow of net-of-tax dividends resulting from this investment outlay has to be determined. If one additional dollar were invested in the firm, the resulting before-tax return would be $\pi$ and the corresponding net-of-all-tax dividend flow would be $\pi(1-\tau_d)(1-\tau_{dp})$. In this case, however, the additional amount invested is not one dollar but $(1-\tau_c)(1-\tau_r)/[(1-\tau_d)(1-\tau_{dp})]$ dollars. Hence the resulting net-of-all-taxes dividend flow is $\{(1-\tau_c)(1-\tau_r)/[(1-\tau_d)(1-\tau_{dp})]\} \cdot \pi\,(1-\tau_d)(1-\tau_{dp})$ or simply $\pi(1-\tau_c)(1-\tau_r)$. Comparing this amount with the interest income that the shareholders could have earned by not giving up the dollar but investing it in the capital market results in the break even condition $\pi(1-\tau_c)(1-\tau_r) = i(1-\tau_i)$. The solution of this condition for $\pi$ yields the expression for the cost of capital which was sought:

$$\pi = i\,\frac{1-\tau_i}{(1-\tau_c)(1-\tau_r)} \tag{3}$$

This is the value represented by the box in the second row and first column of Table 1.

With current U.S. tax rates of, say, $\tau_i = 0.28$, $\tau_r = 0.34$, and $\tau_c = 0.14$, the cost of capital implied by equation (3) would be 27% above the interest rate vs. 52% according to the old view. This still signals economic distortions, but, with the usual quadratic excess burden functions, the welfare loss from intersectoral distortions would only be one-fourth of that implied by the old view. Before 1986, when the maximum marginal personal tax rate (50%) exceeded the corporate tax rate (46%) and the effective tax rate on accrued capital gains may have been about one-fifth of the personal tax rate, it was even possible that $(1-\tau_c)(1-\tau_r) \approx 1-\tau_i$. With this constellation, the cost of equity finance would have equalled the interest rate under the "new" view, whereas, as argued above, it would have exceeded this rate by 85% under the "old" view.

In most OECD countries, including those in continental Europe, the practical nonexistence of capital gains taxes implies that equation (3) reduces to

$$\pi = i\frac{1-\tau_i}{1-\tau_r} \qquad \text{(European case)}$$

and the relative magnitudes of the personal and corporate tax rates alone determine the cost of capital. In the special case where both tax rates are equal, the tax system operates like a pure Schanz–Haig–Simons tax[3] and the cost of capital equals the interest rate—*as if debt rather than retained earnings were the marginal source of finance*. Basically, this is the fundamental neutrality result that European tax economists call the *Johansson–Samuelson Theorem*.[4]

The role of the personal income tax rate $\tau_i$ in equation (3) merits particular attention. Holders of the "old" view often argue that the corporate tax is a tax on investment and the personal income tax one on savings, largely irrelevant for the "investment wedge" as measured by the difference between the pretax rate of return to capital and the market rate of interest. In their opinion, all the personal tax does is create a "savings wedge" between the market rate of interest and the net rate of return the saver receives, but it has no implications for the investment tax wedge. Under the "new" view this argument seems highly misleading because equation (3) shows that both taxes are equally important for the investment tax wedge, perfectly offsetting each other when the tax rates are equal. It is true under the "new" view that the corporate tax is a tax on real investment and that the personal income tax is a tax on savings. However, the personal income tax is also seen as a subsidy on real investment because it reduces the opportunity cost of funds retained in the firm—after all, equation (3) was derived from a *portfolio* consideration where the shareholders' personal investment in bonds was compared with their company's investment in real assets. The higher the personal tax rate, the smaller is the investment tax wedge and the larger the firm's optimal level of investment with any given market rate of interest.

[3] On the definition and origins of this tax see Goode (1977).

[4] See Sinn (1985, Ch. 5) for further details. The theorem also gives a precise definition of true economic depreciation. When depreciation for tax purposes is accelerated relative to true economic depreciation, the cost of capital falls short of the interest rate, and, with an immediate write off, the cost of capital equals the rate of return the saver receives, $i(1-\tau_i)$. By way of contrast, under the "old" view of corporate taxation, the cost of capital with immediate depreciation equals the interest rate, $i$.



Apart from the fact that it implies lower intertemporal and intersectoral distortions than suggested by the "old" view, this particular role of the personal income tax results in paradoxical changes in the allocation of the available aggregate capital stock. An increase in the personal income tax rate for owners of corporate shares induces a reallocation of the aggregate stock of capital from the noncorporate to the corporate sector regardless of whether it is matched by a tax increase for the owners of noncorporate firms. And, provided the OECD's residence rules for the taxation of international interest income flows are kept, a unilateral increase in one country's personal income tax rate will induce capital imports. The higher the personal income tax rate, the more profits will be retained by domestic companies for the purpose of internal investment and the less capital is available for reinvestment in the capital market. The shortage of funds boosts the domestic interest rate and attracts foreign capital. Via a revaluation of the domestic currency and the subsequent current account deficit, the foreign capital succeeds in entering the domestic economy and makes an increase in aggregate domestic investment possible (see Sinn, 1988a, 1989).

It is obvious from equation (3) that capital gains taxes are the counterpart of personal taxes on interest income. A cut in the capital gains tax rate brings about the same portfolio effect as an increase in the personal tax rate does. The "compensation" of a cut in the capital gains tax rate with an increase in the personal income tax rate that has recently been considered as a potential U.S. budget compromise between Republicans and Democrats would therefore be strongly nonneutral with regard to international capital movements. It would create domestic investment incentives, raise the U.S. interest rate, support the dollar, and increase the American current account deficit.

An important aspect of equation (3) is that no dividend taxes appear in it. Economists have often been misled by this aspect into believing that the equation refers to the case where the profits generated by the marginal investment project ($\pi$) are retained in order to avoid the high burden of dividend taxes. In fact, holders of the "old" view often assume that equation (3) is the appropriate formula for the case where all proceeds of an investment are retained; and they often use a weighted average of equations (1) and (3) where the weights are determined by the dividend–payout ratio.[5] Unfortunately, however, it

[5] Cf. Miller (1977, pp. 266–267), Gordon and Malkiel (1981, pp. 141–143), or, to refer to more recent examples, Bernheim and Shoven (1987, 1989). On p. 18 of their 1989 article, the latter argue that, in the King–Fullerton model, "net earnings flowing from an investment financed with retained earnings must be entirely retained," deplore this assumption as counterfactual, and then seek greater generality by allowing the use of profits to be

seems that the formula has never been consistently derived from an optimization approach that would justify such a use or interpretation and, in fact, Section V will raise doubts that it ever can be derived.[6] Under the "new" view, the true interpretation of equation (3) is not that the profits from the marginal investment project are retained but, on the contrary, that they are fully distributed in the form of dividends. The message of the new view is not that the dividend taxes are neutral when the firm avoids them, but that they are neutral when, and in an important sense even *because*, it pays them. This exemplifies the more general point that the cost of capital depends as critically on the use of profits as on the source of finance.

The very fact that the firm pays dividends and dividend taxes in the investment phase implies that the marginal investment project is subsidized at the rate $1-(1-\tau_d)(1-\tau_{dp})$, which is the same rate at which its returns are taxed. This symmetry explains why the dividend taxes drop out of the equation and why they are neutral. The personal and corporate taxes on retained earnings that do appear on the right-hand side of equation (3) are *not* the taxes on the profits generated by the marginal investment project, they are taxes on the funds invested. This aspect is often overlooked, but it is obvious from the arbitrage calculus presented and it is essential for the new view.

The deeper economic reason for the neutrality of the dividend taxes is that dividend taxes are cash flow taxes that make the government a silent partner in the business. From the viewpoint of a single shareholder the government is very similar to another shareholder who claims a constant fraction of the distributed profits but does not make effective use of his voting rights. It is true that, unlike other shareholders, the government may have received its partnership in an unfair manner by establishing the tax law, but for a dividend paying firm this is merely a part of its miserable history. It is not an aspect that gives the shareholders incentives to vote for a policy other than the one they would prefer if they could claim the tax-inclusive fraction of dividends.

The neutrality properties of taxes on corporate distributions were emphasized by Bradford (1981) and induced the Meade Committee (1978) to propose a dividend tax as the only tax on corporate profits. Many economists believe that such taxes are among the most neutral ones available.

Although holders of the "new" view may have different opinions about the introduction of a dividend tax, most of them would object to the abolition of existing dividend taxes. They would argue that this abolition would reduce tax revenue, would create unjustified windfall gains for those who currently happen to hold their wealth in corporate shares, and would not induce firms to deviate from the investment behavior described by equation (3). The case is not as hypothetical as it may seem. A major reason for Congress not following the Treasury Department's (1985) proposal to integrate the corporate and personal tax systems in the course of the 1986 reform was the fear that this integration would incur substantial revenue losses without promising significant efficiency gains.[7]

## IV. FINANCIAL FLEXIBILITY AND REAL DISTORTIONS

The existence of at least three alternative cost-of-capital expressions poses severe problems for economic models designed to measure tax distortions, for the magnitude of the predicted distortions will obviously depend on the financial behavior assumed. Ideally, the financial behavior should be determined endogenously together with the firm's invest-

determined by an exogenous dividend–payout ratio. This ratio is used to calculate the weighted average expression mentioned. Admittedly, Fullerton and King's (1984, p. 23) derivation of equation (3) can indeed be misunderstood, because they begin their discussion of the retained earnings case with the marginal condition $\pi(1-\tau_c)(1-\tau_r) = i(1-\tau_i)$, which above was merely the last step in a chain of transformations. There can be no doubt, however, that only the interpretation given here reflects the literature summarized under the heading "new view" adequately—including the work of King and Fullerton. For formal proofs of equation (3) in the context of explicit optimization models of the firm that support this interpretation see Sinn (1985, Ch. 5, and 1989, appendix).

[6] Section VIIA will show, however, that equation (3) can also be derived in the case where the marginal profits are used for share repurchases and where new share issues are the source of finance. Note, moreover, that the equation is compatible with retentions where these are equivalent to dividend payments. The point that will be made in Section V is that equation (3) is inappropriate when retentions are *preferred* to dividend payments, because then the marginal value of equity, $q$, cannot be a constant [cf. equation (6) below].

To the best of my knowledge the consistently derived expression that comes closest to the weighted average of equations (1) and (3) is Poterba and Summers's (1985) equation (my notation)

$$\pi = \frac{\rho/(1-\tau)}{(1-\tau_{pd})\alpha + (1-\tau_c)(1-\alpha)}$$

where $\rho$ is the shareholders' discount rate, $\tau = \tau_r = \tau_d$, and $\alpha$ is the dividend–payout ratio. Poterba and Summers's equation is not a weighted average of (1) and (3) since $\rho$ is assumed to deviate from the net-of-tax interest rate $i(1-\tau_i)$ by an amount that is inversely related to the dividend–payout ratio $\alpha$. Moreover, these authors do not assume that marginal profits are retained. They assume that marginal profits are paid out in the form of share repurchases and dividends.

[7] This was communicated to the author by Charles McLure, the academic supervisor of the proposal.

ment behavior, and the cost of financial and real distortions should be aggregated to overall welfare measures. However, in the absence of sound theories of the firms' financial choices, this approach has rarely been taken in the literature and no simple solutions have been offered so far.[8]

Holders of the "old" view often solve the problem by neglecting it. Frequently, they simply run their models on the basis of equation (1), finding huge real distortions and writing alarming reports about the devastating effects of the tax system. The results are not overly surprising if one realizes that, with the classical system of corporate taxation, they are based on the implicit assumption that firms *maximize* their cost of finance.

A more promising approach may be that of Fullerton and King (1984). These authors provide a methodology for measuring tax distortions that is probably now the most frequently used by research institutes and tax authorities throughout the world. They assume that the cost of capital is a weighted average of the costs of debt, retained earnings, and new share issues where the weights are the fractions of debt, surplus capital, and original capital in a firm's assets. The King–Fullerton methodology has been criticized on the grounds that it equates average with marginal financial structures and imposes these structures exogenously on the firm.

Another possibility is Sinn's (1985) approach, which is based on the assumption that firms *minimize* their cost of finance subject to the constraint that a minimum marginal equity–asset ratio is required. The resulting cost of capital in this approach is a weighted average of the cost of debt finance and the lower of the cost of internal and external equity finance. Naturally, the economic distortions it predicts tend to be lower than those suggested by old-view models or models of the King–Fullerton variety. The approach includes an endogenous explanation of the equity–asset ratio along the lines suggested by DeAngelo and Masulis (1980). Among other things this explanation implies that the equity–asset ratio increases with the allowed acceleration of tax depreciation and with the firm's planned rate of growth.

The constrained cost-of-capital minimization approach rests on the assumption that the firm pays dividends and retains profits only to finance its investment in real assets. For a firm that does not pay dividends, the cost of capital may be determined according to different rules.

One reason for not paying dividends is the existence of a tax system

[8] Cf. Miller (1977), DeAngelo and Masulis (1980), and Gordon and Malkiel (1981).



that favors retentions over debt since $(1-\tau_c)(1-\tau_r) > 1-\tau_i$.[9] Stiglitz (1973) believed that such a system prevailed in the United States before the 1981 tax reform and he argued that it would induce firms to use the part of profits exceeding their real investment for financial investments in the capital market. A marginal decision to invest in real assets would under these circumstances require a reduction in the capital market investment and, as this would be equivalent to marginal debt finance, the cost of capital would equal the market rate of interest. Taxes on the returns from equity capital do not matter in this approach even though all real investment is equity financed.

Stiglitz's argument was recently used in the work of Howitt and Sinn (1989) who analyzed investment in the case of anticipated changes in dividend tax rates. These changes resulted in strong changes in the firm's financial behavior, but left its real investment unaffected. The cost of capital was invariant to tax rate changes.

The result emerging from this discussion is that the firms' financial flexibility is crucial for the amount of real distortions a tax system causes. Obviously, the financial decisions can serve as a cushion that protects the economy from the blows imposed by the tax system. The higher the degree of financial flexibility, the easier it is for firms to escape discriminatory taxation and the lower are the real distortions.[10] Models that are built on the assumptions of fixed financial structures, or even of maximizing the cost of finance, may miss an important economic self-protection device and are likely to overstate the economy's distortions.

## V. DO FIRMS MAXIMIZE THEIR COST OF CAPITAL?

Although the old view's assumption that firms maximize their cost of capital may at first look awkward to say the least, this assumption has recently been defended by Hansson and Stuart (1985) with an interesting argument. The argument rests on the widespread view that, unlike equity finance, debt finance involves invisible costs that, in a financial optimum, just compensate for its tax advantages at the margin (see Gordon and Malkiel, 1981). The invisible costs are similar to the costs of rent seeking in public choice models and can, for example, be taken to represent the cost of avoiding bankruptcy or, more generally, the differ-

[9] Another reason is that the firm may not have enough profits. See Section VI for an analysis of this case.

[10] Fullerton and Mackie (1989) estimate the welfare implications of the 1986 U.S. tax reform alternatively under the "new" and "old" view. Although their formal specification of these views is not exactly compatible with the interpretation given in this paper, they find that the "old" view implies larger distortions than the "new" view.

ential transactions costs resulting from the use of debt in lieu of equity capital. According to Hansson and Stuart, the presence of these costs implies that, although firms actually *minimize* their cost of finance, they make their real investment decisions *as if they maximized* the cost of finance with regard to the visible costs and as if they used only equity at the margin.

If correct, this argument would help rehabilitate models that neglect the role of financial decisions and would constitute a strong criticism of all models that allow for financial flexibility or that assume the cost of capital to be a weighted average of the direct, visible costs of different sources of finance.

To check the argument, neglect the difference between external and internal equity finance and assume that the invisible cost of debt finance can be described by a function $\varphi(K,D)$ where $K$ is the firm's stock of assets and $D$ its debt.[11] Let $e$ be the visible cost of equity finance as given in equation (1) or (3) and $i$ the (visible) cost of debt financing as given in equation (2). Assume that the tax system favors debt over equity and that $i < e$. An interior solution of the debt–equity choice that captures the Hansson-Stuart view is presumably characterized by

$$e = i + \varphi_D \tag{4}$$

where $\varphi_D$ is the marginal invisible cost of debt finance. The equation expresses that the sum of the marginal visible and invisible costs of debt finance equals the visible cost of equity, as the authors maintained. However does this mean that the cost of capital is equal to the cost of equity capital $e$?

Probably not. The general condition for an optimal marginal investment is that its rate of return, $\pi$, be equal to the marginal visible cost of a source of finance plus the marginal invisible cost where, because of the interior solution, it does not matter which source is chosen. Consider the case where retained earnings constitute the marginal source. In this case the condition becomes[12]

$$\pi = e + \varphi_K \tag{5}$$

with $\varphi_K$ as the change in the invisible cost resulting from a marginal equity-financed increase in the cost of capital.

[11] For a more detailed analysis see Sinn (1987).

[12] In the case of debt financing the marginal investment condition is $\pi = i + \varphi_D + \varphi_K$, which, because of equation (4), is the same as equation (5).



According to equation (5), the Hansson–Stuart proposition that $\pi = e$ is correct if, and only if, $\varphi_K = 0$. This, however, is a problematic assumption. If the invisible costs reflect bankruptcy or agency costs, as the authors suggested, then it seems very plausible that an increase in the firm's stock of equity reduces these costs and that $\varphi_K < 0$. If it were indeed true that $\varphi_K = 0$ for all levels of $D$, then the cross derivatives $\varphi_{KD}$ and $\varphi_{DK}$ would both be zero and the stock of debt that satisfies equation (4) would be independent of the firm's stock of assets. The firm could grow indefinitely, but there would never be an incentive to use more debt. Obviously, the Hansson–Stuart argument rests on the implicit assumption that equity is the only marginal source of finance. It is not surprising then that the cost of finance is not a weighted average of the costs of debt and equity finance, but equals the latter.

If these implausible implications are removed by using the more realistic assumption $\varphi_K < 0$ (and $\varphi_{DK} < 0$), then, despite the interior debt equity choice, the cost of capital is between the costs of debt and equity, just as weighted average models predict. Even in a Hansson–Stuart world, firms do not behave as if they were maximizing their cost of finance, they behave as if the weighted average formulations were correct!

## VI. THE ROLE OF IMMATURE FIRMS

It is certainly not reasonable to expect firms that have access to alternative sources of finance to behave as if they were maximizing their cost of finance, but neither is it true that the most attractive sources of finance are always available. This is obvious for debt financing, which is often subject to tight constraints imposed by the banking system. However, it is also true for retained earnings. Young and immature firms may not have enough profits to finance all available investment projects profitable enough to bear the cost of retentions given in equation (3).

This is a severe problem for the "new" view. Even in mature economies there are always inventors who try to found corporations to cash in on their ideas. Moreover, new investment opportunities that require more equity funds than the firm is able to generate by withholding its dividends show up regularly for existing firms. In all these cases the new view is not very helpful for predicting the firm's cost of capital, because its basic assumption that the firm can finance more investment by withholding more dividends is not satisfied.

At first glance this seems to rehabilitate the "old" view and its basic cost-of-capital expression, equation (1). After all, new share issues may be unavoidable when other sources of finance are not available. Unfortunately, however, there is no reason to be optimistic. In fact there hardly

seem to be any circumstances where equation (1) can possibly be true for value maximizing neoclassical firms when dividends are taxed more heavily than retentions $[(1-\tau_d)(1-\tau_{dp}) < (1-\tau_r)(1-\tau_c)]$.

The fundamental problem with equation (1) is that it is based on a conceptual mistake. The equation is derived from the assumption that marginal profits are paid out as dividends, but it implies that the firm prefers to retain them. To understand this inconsistency, suppose the firm followed equation (1) and stopped issuing shares at the point where the last dollar invested yielded a return equal to $i/(1-\tau_d)$. In this case there would be a set of unexploited investment opportunities with a rate of return above the cost of withheld dividends as given by equation (3). In the presence of such opportunities, dividend payments cannot be optimal. Instead, it is optimal for the firm to enter an extended period of purely internal growth where it retains its profits and does not pay dividends until all of the projects have been implemented.

To calculate the true cost of new share issues in the presence of a phase of purely internal growth is not an easy task, and a parametric cost of capital formula does not seem readily available. Nevertheless, it has been shown in Sinn (1988b, 1990) that the cost of new share issues, as well as the length of the period of internal growth, increases with an increase in the dividend tax rate and will, under extremely mild conditions, *exceed* the value given by the traditional formula (1).

The first of these results says that an increase in the dividend tax burden reduces a young firm's starting stock of capital and slows down its development to maturity. It is a potential explanation of Poterba and Summers's (1985) empirical finding that the frequent changes in the British dividend tax rate exhibited adverse effects on aggregate investment.[13]

The second result implies that even the "old" view underestimates the cost of capital for newly founded firms. These firms may be endowed with only a very small nucleus of original capital and may be forced to generate more capital through internal investment than a focus on equations (1) and (3) would suggest. The result is the net effect of two countervailing forces. On the one hand, the deferral of dividend payments reduces the present value of the firm's tax burden. This, in itself, would reduce the cost of capital if there were unlimited internal investment

[13] The authors' own explanation is a signaling argument. According to this argument, an increase in the dividend tax rate reduces the optimal volume of dividends which in turn increases the shareholders' discount rate (cf. also fn. 6). A third explanation could simply be that, for at least some of the periods considered, the overall tax burden on dividends fell short of that on retentions. In this case new issues of shares would be the cheapest source of equity finance and it would not be surprising that dividend taxes entered the cost of capital. This point was made in Sinn (1985, Ch. 7).



opportunities that the firm could use up to a predetermined point of time.[14] On the other hand, the possibility of generating "cheap" capital through profit retentions makes it wise to economize on new share issues and to start with only a nucleus of equity capital if the set of internal investment opportunities is limited and the time of dividend payments is endogenously determined. New share issues reduce the scope of profitable retentions, and this reduction is an opportunity cost that increases the cost of external equity funds beyond the value implied by the traditional equation (1). Table 1 reports this result in the box that is in the first row and third column.

The phase of internal growth, which should necessarily follow the issue of new shares, is a phase in which the firm neither issues new shares nor pays any dividends and in which retentions are both the only source of finance and the only use of profits. The careless holder of the *new view* who focuses simply on the firm's marginal source of funds might interpret this phase as one in which the firm's cost of capital is given by equation (3). Similarly, the careless holder of the *old view* might do the same because he focuses on the firm's use of profits and interprets equation (3) in the "old" way described in Section III (shortly after presenting the equation). However, they would both be wrong. As long as there is a strict preference for profit retentions, the firm's marginal investment projects will obviously have a rate of return above the value given by equation (3), and the economic distortions will be *larger* than this value suggests.

Formally, the phase of internal growth can be shown to result in a decline in $q$, the firm's marginal value of equity, from one to $(1-\tau_d)(1-\tau_{dp})/[(1-\tau_r)(1-\tau_c)]$, the value that the new view predicts for a dividend paying firm.[15] This decline is a capital loss that increases the cost of capital beyond the value given by equation (3). Let $\dot{q}$ measure the annual increment of $q$, $\dot{q}$ being negative in the phase of internal growth. A shareholder whose only

[14] This is the argument that those who argue that the mere possibility of a deferral of dividend payments reduces the cost of capital may have in mind. The argument covers only one side of the problem.

[15] The variable $q$ is the increase in the firm's market value resulting from a one dollar gift to the firm. Its value equals one when the firm issues new shares because the gift would be able to substitute a one dollar equity injection by the shareholders. To understand that $q = (1-\tau_d)(1-\tau_{dp})/[(1-\tau_r)(1-\tau_c)]$ if the firm pays dividends recall the arbitrage calculus given in Section III. There it was shown that one dollar that the shareholders give up in the form of dividend reductions and capital gains tax increases translates into investable funds equal to $(1-\tau_c)(1-\tau_r)/[(1-\tau_{dp})(1-\tau_d)]$. The inverse of this expression is the cash shareholders would receive if the gift were distributed or, equivalently, the capital gain they could enjoy if the gift were retained. See Auerbach (1979) for an early analysis of $q$ in the phase of dividend payments.

returns are capital gains would be indifferent between a policy of profit retentions and a personal capital market investment if the rate of capital gains on his shares equalled the net-of-tax interest rate, i.e., if $(1-\tau_c)[\pi(1-\tau_r) + \dot{q}/q] = (1-\tau_i)i$. Solving for $\pi$, the pretax rate of return to real capital, one obtains the following modified cost-of-capital expression:[16]

$$\pi = i\frac{1-\tau_i}{(1-\tau_c)(1-\tau_r)} - \frac{\dot{q}/q}{1-\tau_r} \tag{6}$$

As $\dot{q}/q < 0$, this expression indicates a higher cost of capital and higher distortions than equation (3). Its entry in Table 1 is in the second row and third column.

The work reported in this section has implications for the empirical literature on the tax influence on the cost of capital. Among others, two conclusions emerge. The first is that "new view" approaches of the King–Fullerton variety tend to underestimate the true cost of capital. These approaches use weighted averages of expressions (1)–(3) but do not take account of the facts that, when firms are immature, the cost of new share issues is likely to exceed the value given in equation (1) and the cost of retained earnings is likely to exceed that given in equation (3).

The second conclusion refers to "old view" approaches of the Harberger variety. It is the tradition of these approaches to explain the magnitudes of real distortions with the measurable income tax burden or, what amount to the same thing, to assume the cost of capital to be a weighted average of equations (1) and (3) where the dividend–payout ratio is used to construct the weights. In view of the above analysis of immature firms this procedure stands truth on its head. A high measurable tax burden signals that many firms are mature and pay dividends. The cost of capital is low, because investment can be financed with dividend reductions. On the other hand, a low dividend–payout ratio and a low measurable tax burden signal a shortage of funds. It means that many firms face the high cost of retained earnings as given by equation (6) or even a cost of new share issues in excess of the traditional value given in equation (1). In short, when it comes to a comparison of mature and immature firms, the true cost of capital is inversely related to that measured by "old view" approaches.

[16] See Sinn (1990). As profit retentions follow new share issues, this equation also applies to the case of new share issues. However, in itself, it does not reveal that this cost is above the traditional value $i/(1-\tau_d)$. The proof that the cost of new share issues will, under mild conditions, exceed $i/(1-\tau_d)$ is given in Sinn (1988b, 1990). It is based on a comparison of the time paths of the "true" $q$ and the $q$ implied by equation (1).



## VII. WHY SHARE REPURCHASES DO NOT REHABILITATE THE "OLD VIEW"

Share repurchases and acquisitions have long constituted an important aspect of U.S. corporate behavior. Scherer and Ravenscraft (1984) found that, from 1950 to 1975, at least 1800 independent firms were acquired by those 148 firms that persistently belonged to the set of the 200 largest U.S. firms. And Shoven (1986) reported that, in the years following 1983, corporate share repurchases, predominantly acquisitions, exceeded ordinary dividend payments.

As shown in Sinn (1985, Ch. 6) the excessive acquisition activity of U.S. firms can, in principle, be explained by the undervaluation of corporate shares resulting from the high burden of dividend taxes. Buying shares is a cheaper way of acquiring real assets than buying investment goods, is a method of distributing dividends that circumvents personal income tax, and, if debt financed, is a convenient way of enjoying the tax advantages of a higher degree of corporate leverage.[17]

Quite surprisingly, the observation of corporate share repurchases has recently led to a revival of the "old" view of corporate taxation among North-American economists. The puzzling aspect about this development in the history of economic thought is that although share repurchases are a way of avoiding the dividend taxes, they are nevertheless believed to reinstate the distortionary image of these taxes.

The "naive" interpretation of the empirical fact of share repurchases is that, if anything, they reduce the cost of capital because they constitute a less heavily taxed use for marginal profits than dividends. Consider two straightforward thought experiments to derive the implication of share repurchases for the cost of capital before the "puzzle" will be addressed.

### *A. Share Repurchases and the Cost of Equity Capital*

In the first experiment, the shareholders inject funds into their company in exchange for newly issued shares and receive the returns by gradually selling shares back to this company. The issue of new shares increases the market value of all shares simply because it injects money into the firm and has no immediate tax consequences when it occurs at the market clearing price. However, when the firm uses its profits to repurchase shares there are tax consequences. Although they avoid the per-

[17] To establish "acquisition neutrality" a removal of the affiliaton privilege or the introduction of a special tax on corporate acquisitions was recommended that under the present U.S. tax rate would have to be 52% of the purchase volume. For further discussion of the acquisition problem in the context of tax incentives see Poterba (1987), Auerbach and Reishus (1988), and Bagwell and Shoven (1988).

sonal income tax that the shareholder household would have to pay on ordinary dividends, the share repurchases do not prevent the firm from having to pay corporate tax on retained earnings and they in addition create a personal capital gains tax liability because the remaining shares are gaining in "weight."

To derive the corresponding cost of capital expression, suppose shareholders inject one dollar into their firm by purchasing new shares and this dollar generates a permanent annual return of $\pi$ before tax or $\pi(1-\tau_r)$ after the corporate tax on retained earnings. The total market value of outstanding shares will rise at the time of the equity injection, but it will not be affected thereafter if this net-of-tax return is used for distributions in the form of share repurchases.[18] Because of the profit distributions the investment does not generate perpetuated increments in the market value of outstanding shares as would have been the case had the profits been reinvested for the purpose of further internal investment. This does not mean, however, that there are no taxable capital gains. On the contrary, since a given overall market value is divided by a smaller number of outstanding shares, there are capital gains in every year after the investment. The capital gains compensate for the decline in the number of shares, and when the repurchases occur at the respective current market prices of shares, they will just equal the annual repurchase volume $\pi(1-\tau_r)$. The capital gains tax is therefore $\tau_c\pi(1-\tau_r)$ and the shareholders' net of-all-tax return is $\pi(1-\tau_c)(1-\tau_r)$. In the optimum, this return must equal the interest rate net of the personal income tax at which shareholders could invest in the capital market, $i(1-\tau_i)$. Solving for $\pi$ gives the corresponding value for the cost of capital in the case in which new share issues are the source of finance and share repurchases the use of profits:

$$\pi = i\frac{1-\tau_i}{(1-\tau_c)(1-\tau_r)} \tag{7}$$

Table 1 reports this (surprisingly familiar) value in the box in the first row and fourth column.

In the second thought experiment, retained earnings in the sense of dividend reductions are the source of finance and share repurchases the use of profits. As explained in Section III, one dollar given up by the shareholders via dividend cuts translates into $(1-\tau_c)(1-\tau_r)/[(1-\tau_d)(1-\tau_{dp})]$ dollars of investment. However, as the profits from this investment are channelled to the shareholders via share repurchases the net return per

[18] The same would be true for any other channel of corporate distributions.



dollar invested is $\pi(1-\tau_c)(1-\tau_r)$, as was shown in the previous paragraph. Multiplying the net return per dollar of investment with the number of dollars available for investment results in a return of $\pi(1-\tau_c)^2(1-\tau_r)^2/[(1-\tau_d)(1-\tau_{dp})]$ for the dollar given up by the shareholder. Equating this again to $i(1-\tau_i)$ and solving for $\pi$ gives

$$\pi = i\frac{(1-\tau_d)(1-\tau_{dp})(1-\tau_i)}{(1-\tau_c)^2(1-\tau_r)^2} \tag{8}$$

whereby, as mentioned in Section II, $\tau_{dp} = \tau_i$ in practically all OECD tax systems. Equation (8) shows the cost of capital in the case in which dividend cuts are the source of finance and share repurchases the use of profits. It is represented by the box in the fourth column and second row of Table 1.

Both equations (7) and (8) confirm the "naive" view that share repurchases reduce the cost of capital. The value given by (7) is exactly the same as that which follows from the new view for the case in which retained earnings are the source of finance and dividends the use for marginal profits. As argued above for the U.S. tax system ($\tau_d = \tau_r = 0.34$, $\tau_p = 0.28$, $\tau_c = 0.14$) it exceeds the interest rate by only 27% versus 52% as predicted by the "old" view formula (1).

A particularly low value of the cost of capital is implied by equation (8). With the same U.S. tax rates, it exceeds the interest rate by just 6%. In the pre-1986 U.S. tax system, the corporate tax rate was $\tau_d = 0.46$ and it may well have been possible that $(1-\tau_i)/[(1-\tau_c)(1-\tau_r)]$ approximated one. Under these circumstances, the cost of capital given by equation (8) would have been about 50% *below* the interest rate. The reason for this cost of capital being so low is the fact that, by reducing its dividends and repurchasing shares, the firm can twice take advantage of the preferential tax treatment of retained compared to distributed profits. It gains when it replaces dividends with retentions in the investment phase and it gains when it substitutes share repurchases for dividends in the return phase. Without preferential treatment of retained earnings, i.e., with $(1-\tau_c)(1-\tau_r) = (1-\tau_d)(1-\tau_{dp})$, equation (8) would coincide with both equation (1) and equation (3).

Note that in striking contrast to the "old" view, the possibility of share repurchases may even reverse the role of dividend taxation. According to equation (8), a cut in the corporate tax rate on dividends—say through the introduction of an imputation system—would actually *increase* the cost of capital if retained earnings were the source of finance and share repurchases the use of profits. The reason for this unusual result is that the tax cut reduces the tax saving in the investment phase

but does not imply a countervailing tax relief in the phase of profit distributions. This asymmetry induces a rational firm to invest less and to react in the opposite way as the "old" view suggests.

### B. Share Repurchases and Economic Model Building

What then is the explanation of the puzzle that holders of the "old" view defend their results with the allusion to share repurchases?

It is simply their assumption that dividends are a fixed fraction of profits while the remainder is used for net investment and share repurchases.[19] This seemingly innocuous assumption, which is currently spreading fast among new models with old views, implies that new share issues are the *only* marginal source of finance while dividends and share repurchases are the use of marginal profits. The cost of capital that the assumption generates is a weighted average of equations (1) and (7) where the dividend–payout ratio determines the weights.[20]

Although popular this approach is not, in this author's opinion, an ultimately convincing response to the important phenomenon of share repurchases. It may be a theoretical artifact with little economic meaning.

Holders of the new view could easily counter the trick by constructing models in which share repurchases are a fixed fraction of profits and the remainder is used for dividends and net investment. In these models, retained earnings in the sense of dividend reductions would be the *only* marginal source of finance and marginal profits would be used for share repurchases and dividends. The cost of capital would be a weighted average of equations (3) and (8) where the weights would again be derived from the dividend–payout ratio.[21] Obviously, the cost of capital would be much lower than in the popular specification, and the perverted role of the dividend tax rate that equation (8) implies would still be present.

An equally arbitrary, but less biased, assumption would be fixing the volume of share repurchases relative to dividend payments where the sum of these quantities exhaust the part of profits not needed for real investment. This specification would imply that new share issues and retained earnings are the marginal sources of finance and that share repurchases and dividends are the uses for marginal profits. It would be indistinguishable from a reduction of the dividend tax rate under the "new" view and would be fully neutral since it would mean a reduced subsidy in the investment phase, which is compensated for by a reduced tax in the return phase. The cost of capital would be a weighted average of the identical equations (3) and (7). It would be exactly what the "new" view suggests.

These considerations show that the "naive" interpretation of share repurchases may, after all, not be all that wrong. However, from a theoretical viewpoint, there is no reason to believe that share repurchases revalidate the "old" view of corporate taxation. On the contrary, the possibility of share repurchases conflicts sharply with the "old" view and, if anything, it supports the "new" view of corporate taxation. It is true that formal models that offer the "new" view often exclude the possibility of share repurchases. It is also true that the dividend puzzle—the question why firms pay dividends after all—cannot really be resolved by these models.[22] However, as was shown, this does not mean that the cost-of-capital expression [equation (3)] that the "new" view offers is no longer correct. Although this expression does not necessarily follow from the joint observation of share repurchases and dividend payments it is perfectly compatible with this observation when the relative composition of corporate distributions stays constant.

## VIII. THE POLITICAL MILLER EQUILIBRIUM

The previous analysis was concerned with the economy's reaction to the tax system; however, an equally important question is how the tax system reacts to the economy's behavior. All countries have their histories of tax reforms and certainly these reforms were largely introduced in response to unforeseen and unwanted economic developments caused by the preceding tax systems.

[19] See, e.g., Poterba and Summers (1985), Goulder and Summers (1989), or Jun (1989).

[20] Solving the problem with an explicit dynamic optimization approach shows that the weighted average takes the form

$$\pi = \frac{i}{\alpha(1-\tau_d) + (1-\alpha)\dfrac{(1-\tau_c)(1-\tau_r)}{1-\tau_i}}$$

where $\alpha$ is the dividend-pay-out ratio and $1-\alpha$ is the fraction of profits used for share repurchases and investment.

[21] The exact formula following from an explicit optimization approach is

$$\pi = i\,\frac{(1-\tau_d)(1-\tau_{dp})(1-\tau_i)}{(1-\tau_c)^2(1-\tau_r)} \cdot \frac{1}{\alpha\dfrac{(1-\tau_{dp})(1-\tau_d)}{1-\tau_c} + (1-\alpha)(1-\tau_r)}$$

where $1-\alpha$ is the fraction of profits used for share repurchases and $\alpha$ the fraction used for dividends and investment.



[22] The new view can explain why dividend taxes do not affect the timing of dividend payments but not why firms pay dividends instead of repurchasing shares. See Bradford (1981, 1989), Auerbach (1983, 1989), or Sinn (1985, Ch. 4).

One of the major issues in capital income tax reforms has always been the problem of financial distortions. Be it because financial reactions to tax reforms often come fast and strong, because politicians and lobbyists find it easier to understand financial rather than real distortions, or because differently leveraged firms called for "fair" comparative tax treatments, legislators have always paid particular attention to financial distortions and have sought to introduce tax reforms that are in harmony with the principle of financial neutrality. As a result of this type of behavior, many tax systems of OECD countries approximate what may be called a *political Miller equilibrium.*

The term Miller equilibrium usually refers to segmentation equilibria in which shareholders rather than legislators are the agents. However, for the economist the term does have the connotation of an adjustment process toward financial neutrality, and this is the sense in which it is used here.[23]

The political Miller equilibrium is a first, albeit crude, approximation to reality. Actual tax systems hover around the neutrality path deviating sufficiently from it to motivate papers like this one. However, there are forces that push the existing economies toward the Miller equilibrium and the deviation from this equilibrium may be less than what a focus on one country's tax system at one point in time would suggest.

Seen from an American perspective, it may seem obvious that the tax system discriminates heavily against corporate equity. After all, the returns to equity are taxed twice and the return to debt only once. However, as mentioned earlier, from a worldwide perspective the picture is not as clear as that. *Two of three OECD countries do not tax capital gains* realized after a holding period of more than 1 year, but *four of five countries tax dividends twice.* In most countries, there is only a double taxation of dividends, not a double taxation of corporate earnings in general.

It is true, of course, that the number of taxes imposed on the same base does not necessarily reveal the magnitude of the overall tax burden. Nevertheless, the rare occurrence of capital gains taxes is a fact and it shows that the tax discrimination against corporate equity capital may be more an Anglo-Saxon speciality than a phenomenon with worldwide significance. The double taxation of dividends *is* a worldwide phenomenon, but *it* merely discriminates against a particular way of generating equity capital, not against equity capital as such. For the vast majority of existing firms in mature economies, a balanced tax treatment of retained earnings and interest income is sufficient to ensure financial neutrality,

[23] See Miller (1977).



and the reality may often not be far away from that. The political forces operating toward a balanced treatment of retained earnings and interest income have always been strong. They explain why most countries do not have genuine capital gains taxes and why those that do offer substantial reliefs such as a less than full inclusion of the gains in the personal tax base or a taxation on realization rather than accrual.

By way of contrast, comparative forces demanding dividend tax cuts to facilitate the foundation of new firms and avoid the distortions described in Section VI do not seem to exist. The well-established lobbies of mature firms do not have an interest in pushing this particular path toward financial neutrality.

The United States, which has a long-standing tradition of double taxing retained earnings, is not free from the forces driving toward a political Miller equilibrium. In 1986, the capital gains tax base was increased from 40 to 100% of realized gains, but in 1990, after only 4 years, the government proposed reducing the tax burden again. At the same time, plans were being discussed for increasing the maximum average personal tax rate (and the marginal tax rate for very high incomes) from 28 to 33%. Both moves would have been steps toward a more balanced treatment of debt and retained profits, but the first one of them has been ruled out by a budget compromise. The issue is almost certain to come up again.

The 1981 U.S. tax reform can, in part, also be seen as a step toward financial neutrality. Before 1981, rich people's income tax rates exceeded the corporate tax rate sufficiently to create strong preferences for profit retentions. It was the time when doctors and baseball players incorporated to enjoy the privilege of accumulating their earnings under the rules of the corporate tax law. The 1981 reform reduced the maximum marginal personal tax rate to 50%, just four percentage points above the corporate tax rate, and largely abolished the preferences for retentions.

Anecdotal evidence that demonstrates the general dominance of financial over real distortions in political debates about tax reforms comes from the discussion preceding the German tax reform of 1977. The achievement of financial neutrality was the official goal of the reform and detailed numerical examples demonstrating the seeming nonneutrality of the previous laws were published in numerous reports and newspaper articles. Allocative arguments focusing on real rather than financial distortions had virtually no survival chances in debate.

To make a final point, note that many countries have recently reduced their capital income tax rates following the example of the United States. Typically, these reductions were not limited to one tax, but included both the personal *and* corporate tax rates. Surely this symmetry was

predominantly motivated by the attempt to avoid substantial deviations from financial neutrality.

These reflections on the political Miller equilibrium do not imply that there is no point in studying distortions resulting from differences in the tax treatment of retained earnings, dividends, and interest income where such differences occur. However, they do suggest a stylized tax model that has the same overall tax rates on interest income and retained profits, but allows for a discriminatory taxation of dividends. This model may be a good first-order approximation to the tax laws of many countries and may serve well in many economic applications. It would imply that the cost of capital for mature firms equals the market rate of interest, and it would have various technical advantages. It would be simple and avoid the unsatisfactory task of modelling financial constraints when mature firms are considered. It would allow focusing on the distortion that the double taxation of dividends causes for immature firms. And it would pave the way for an analysis of provisions of the tax laws that may cause more severe distortions than mere tax differentials, examples being the ITC, accelerated depreciation allowances, accounting practices in the presence of inflation, or discriminatory treatments of border crossing interest and dividend flows.

## IX. CONCLUSIONS

This paper discussed the influence of statutory capital income tax rates on the cost of capital, starting with a comparison of the "old" and "new" views of corporate taxation. It corrected a common misinterpretation of the "new" view, emphasized the cushioning effect of financial optimization, dismissed the view that firms behave as if they maximized their cost of finance, studied the role of immature firms, questioned the alleged support of the old view by the occurrence of share repurchases, and suggested the idea of a political Miller equilibrium. Various conclusions emerge from the discussion.

1. For mature firms, the distortionary effects of the corporate tax may not be very large, because they are mitigated by the firms' financial decisions and by compensatory tax reforms that aim at establishing conditions of financial neutrality. Seen from a worldwide perspective, these tax reforms have reduced or even abolished the double taxation of retained corporate profits and may have driven the allocation of resources close to that implied by an integrated corporate tax system (which, of course, is not free from distortionary effects either).
2. When mature and immature firms are considered, the double taxation of corporate dividends is a more severe problem than the "new" view suggests, but does not generate the distortions exactly where the "old" view suspects them. It is not true that firms that pay dividend taxes suffer from a high cost of capital. On the contrary, those that do not pay these taxes because they are immature and retain their profits suffer most. The dividend tax burden expected in the future makes it wise to economize on new share issues and to invest even less capital than the "old" view's cost of capital formula suggests. The possibility of a deferral of dividend taxes increases the cost of outside equity finance.
3. Share repurchases are a more severe problem for the "old" view than for the "new" view, for if they are the way through which companies channel their marginal profits to shareholders, the cost of capital will be equal to that implied by the "new" view or even below this value, depending on whether new share issues or dividend cuts are the marginal source of finance. The cost-of-capital expression resulting from the "new" view harmonizes perfectly with share repurchases when corporate distributions split in fixed proportions into share repurchases and ordinary dividend payments.
4. Under the "new" view, both an increase in the personal income tax rate and a decrease of the personal capital gains tax rate stimulate corporate investment demand with any given market rate of interest. In an open economy that taxes cross-border interest income flows according to the OECD's residence principle, the substitution of personal income taxes for capital gains taxes results in a domestic investment boom, higher domestic interest rates, a revaluation of the domestic currency, and a capital import.
5. The fact that an interior debt–equity choice implies marginal costs of debt and equity finance does not legitimate the assumption that firms invest as if they used only equity at the margin. Despite the interior solution, the firm's cost of capital remains between the costs of debt and equity finance if debt and equity participate in financing marginal investment projects.

Arguably, the first two of these results are the most important. They suggest that tax distortions are to be found not in established corporations that currently suffer most from the high burden of dividend taxes. They are to be found with young and immature firms and with firms that as yet do not exist. These firms do not currently suffer from a high tax burden, but the prospect that they will makes them overly timid in the present. Holders of the "old" and "new" views alike have concentrated on the behavior of firms that pay dividends and dividend taxes.

How the tax system affects the foundation and development of new firms is a question that merits equal professional attention.

## REFERENCES


Auerbach, A. J. (1979). "Wealth Maximization and the Cost of Capital." *Quarterly Journal of Economics* 94, 433–436.

Auerbach, A. J. (1983). "Taxation, Corporate Financial Policy and the Cost of Capital." *Journal of Economic Literature* 21, 905–940.

Auerbach, A. J. (1989). "Tax Policy and Corporate Borrowing." In R. W. Kopcke and E. S. Rosengren, eds., *Are the Distinctions between Debt and Equity Disappearing?*, pp. 136–162. Federal Reserve Bank of Boston.

Auerbach, A., and D. Reishus. (1988). "The Effects of Taxation on the Merger Decision." In A. Auerbach, ed., *Corporate Takeovers: Causes and Consequences*. Chicago: University of Chicago Press.

Bagwell, L. S., and J. B. Shoven. (1989). "Cash Distributions to Shareholders." *Journal of Economic Perspectives* 3, 129–140.

Bernheim, B. D., and J. B. Shoven. (1987). "Taxation and the Cost of Capital: An International Comparison." In Ch. E. Walker and M. A. Bloomfiled, eds., *The Consumption Tax: A Better Alternative?*, pp. 61–86. Cambridge, MA: Ballinger.

Bernheim, B. D., and J. B. Shoven. (1989). "Comparison of the Cost of Capital in the U.S. and Japan: The Roles of Risk and Taxes." Center for Economic Policy Research, Stanford University, working paper No. 179.

Bradford, D. F. (1980). "The Economics of Tax Policy toward Savings." In G. M. von Fürstenberg, ed., *The Government and Capital Formation*. Cambridge, MA: Ballinger.

Bradford, D. F. (1981). "The Incidence and Allocation Effects of a Tax on Corporate Distributions." *Journal of Public Economics* 15, 1–22.

Bradford, D. F. (1989). "Tax Policy and Corporate Borrowing," Discussion of Auerbach (1989). In R. W. Kopcke and E. S. Rosengren, eds., *Are the Distinctions between Debt and Equity Disappearing?*, pp. 163–168. Federal Reserve Bank of Boston.

DeAngelo, H., and R. W. Masulis. (1980). "Optimal Capital Structure under Corporate and Personal Taxation." *Journal of Financial Economics* 8, 3–29.

Edwards, J. S. S., and M. J. Keen. (1984). "Wealth Maximization and the Cost of Capital: A Comment." *Quarterly Journal of Economics* 99, 211–214.

Fullerton, D., and M. King. (1984). *The Taxation of Income from Capital. A Comparative Study of the United States, the United Kingdom, Sweden and West Germany*. Chicago: University of Chicago Press.

Fullerton, D., and J. M. Mackie. (1989). "Economic Efficiency in Recent Tax Reform History: Policy Reversals or Consistent Improvements?" *National Tax Journal* 42, 1–13.

Gertler, M., and R. G. Hubbard. (1990). "Taxation, Corporate Capital Structure, and Financial Distress." *Tax Policy and the Economy* 4, 43–71.

Goode, R. (1977). "The Economic Definition of Income." In J. A. Pechman, ed., *Comprehensive Income Taxation*. Washington D.C.: Brookings Institution.

Gordon, R. H., and B. G. Malkiel. (1981). "Corporation Finance." In H. J. Aaron and J. A. Pechman, eds., *How Taxes Affect Economic Behavior*, pp. 131–198. Washington, D.C.: Brookings Institution.





Goulder, L. H., and L. H. Summers. (1989). "Tax Policy, Asset Prices, and Growth." *Journal of Public Economics* 38, 265–296.

Hamada, K. (1966). "Strategic Aspects of Taxation on Foreign Investment Income." *Quarterly Journal of Economics* 80, 361–375.

Hansson, I., and Ch. Stuart. (1985). "The Taxation of Income from Capital. A Comparative Study of the United States, the United Kingdom, Sweden, and West Germany." review article, *Journal of Political Economy* 93, 826–831.

Harberger, A. C. (1962). "The Incidence of the Corporation Income Tax." *Journal of Political Economy* 70, 215–240.

Harberger, A. C. (1966). "Efficiency Effects of Taxes on Income from Capital." In M. Krzyzaniak, ed., *Effects of Corporation Income Tax*. Detroit: Wayne State University Press.

Howitt, P., and H.-W. Sinn. (1989). "Gradual Reform of Capital Income Taxation." *American Economic Review* 79, 106–124.

Jun, J. (1989). "Tax Policy and International Direct Investment." National Bureau of Economic Research, working paper No. 3048.

Kemp, M. C. (1962). "Foreign Direct Investment and National Advantage." *Economic Record* 38, 56–62.

Kemp, M. C. (1964). *The Pure Theory of International Trade*. Englewood Cliffs, NJ: Prentice Hall.

King, M. A. (1974a). "Taxation and the Cost of Capital." *Review of Economic Studies* 41, 21–35.

King, M. A. (1974b). "Dividend Behaviour and the Theory of the Firm." *Economica* 41, 25–34.

King, M. A. (1977). *Public Policy and the Corporation*. London: Chapman and Hall; New York: Wiley.

MacDougall, G. D. A. (1960). "The Benefits and Costs of Private Investment from Abroad: A Theoretical Approach." *Oxford Bulletin of Economics and Statistics* 22, 189–211.

McLure, Ch. E. (1979). *Must Corporate Income Be Taxed Twice?* Washington D.C.: Brookings Institution.

Meade Committee (1978). *The Structure and Reform of Direct Taxation*. Report of a committee chaired by J. E. Meade, The Institute for Fiscal Studies, London: Allen & Unwin Ltd.

Miller, M. H. (1977). "Debt and Taxes." *Journal of Finance* 32, 261–275.

Oberhauser, A. (1963). *Finanzpolitik und private Vermögensbildung*. Köln: Westdeutscher Verlag.

Poterba, J. M. (1987). "Tax Policy and Corporate Saving." *Brookings Papers on Economic Activity*, 455–515.

Poterba, J. M., and L. H. Summers. (1985). "The Economic Effects of Dividend Taxation." In E. Altman and M. Subrahmanyam, eds., *Recent Advance in Corporate Finance*. Homewood, IL: Irwin.

Scherer, F. M., and D. Ravenscraft. (1984). "Growth by Diversification: Entrepreneurial Behavior in Large-scale United States Enterprises." *Zeitschrift für Nationalökonomie*, Supplement 4 (Schumpeter conference, Bonn 1983), 199–218.

Shoven, J. B. (1986). "New Developments in Corporate Finance and Tax Avoidance: Some Evidence." National Bureau of Economic Research, working paper No. 2091.

Sinn, H.-W. (1985). *Kapitaleinkommensbesteuerung*. Tübingen: Mohr. English edi-

tion: *Capital Income Taxation and Resource Allocation*. Amsterdam, New York: North Holland, 1987.

Sinn, H.-W. (1987). "Do Firms Maximize their Cost of Finance." University of Munich, discussion paper No. 87-14.

Sinn, H.-W. (1988a). "The 1986 U.S. Tax Reform and the World Capital Market." *European Economic Review* 32, 325–333.

Sinn, H.-W. (1988b). "The Vanishing Harberger Triangle." University of Munich, discussion paper No. 88-05, and National Bureau of Economic Research, working paper No. 3225, 1989. Forthcoming in *Journal of Public Economics*.

Sinn, H.-W. (1989). "The Policy of Tax-Cut-cum-Case-Broadening: Implications for International Capital Movements." In M. Neumann and K. Roskamp, eds., *Public Finance and Performance of Enterprises*. Proceedings of the 43rd Congress of the International Institute of Public Finance, Paris, 1987, Detroit: Wayne State University Press.

Sinn, H.-W. (1990). "Taxation and the Birth of Foreign Subsidiaries." University of Munich, discussion paper No. 90-30, and National Bureau of Economic Research, working paper No. 3519, 1990.

Stiglitz, J. E. (1973). "Taxation, Corporate Financial Policy, and the Cost of Capital." *Journal of Public Economics* 2, 1–34.

U.S. Department of the Treasury (1984). *Tax Reforms for Fairness, Simplicity, and Economic Growth*. Washington, D.C.: U.S. Government Printing Office.