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## Tax Asymmetries and Corporate Income Tax Reform

Saman Majd and Stewart C. Myers

Under current (1985) tax law, corporate income is taxed asymmetrically. Because of the lack of full loss offsets, the government takes more on average from profitable firms than it hands back to nonprofitable ones. Although current losses allow the firm to claim a refund of taxes paid in the three preceding years, once refunds are exhausted, losses must be carried forward to offset future income. The “value per dollar” carried forward is less than the statutory rate for two reasons: (1) the firm may not earn enough to use the carryforwards before they expire, and (2) the carryforwards do not earn interest.

In previous work, we showed that tax asymmetries can be modeled and valued as contingent claims, using option pricing theory combined with Monte Carlo simulation. Tax asymmetries can drastically reduce the after-tax net present values (NPVs) of incremental investment outlays, although the extent of the reduction depends on the tax position of the investing firm and the volatility of its income. The asymmetries are irrelevant for investment by a firm with sufficient other income that it always pays taxes on a marginal dollar of income or loss. But asymmetries may be the dominant tax effect on the value of “stand-alone” projects, that is, in situations where the project and the firm are one and the same.

In this paper (see Martin Feldstein, ed., *The Effects of Taxation on Capital Accumulation* [Chicago: University of Chicago Press, 1987]), we focus on the *design* of the corporate income tax. We report the results of a series of experiments comparing current tax law with a

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stylized tax reform proposal. The reform reduces the corporate income tax rate to 33% but eliminates the investment tax credit and the ACRS depreciation schedules. Tax depreciation is set approximately equal to economic depreciation over estimated economic asset life. We also investigate the effects of indexing depreciation for inflation.

We find that this type of reform increases the present value of taxes on incremental investments by firms that always pay taxes, but *decreases* the present value of taxes on stand-alone investments, even when depreciation is not indexed for inflation. The additional tax burden due to tax asymmetries is dramatically reduced.

The magnitude of these shifts of course depends on the exact numerical assumptions used in the simulations. However, the direction of the effects holds over a wide range of assumptions about project risk, the rate of economic depreciation, and the ratio of fixed to variable cost.

However, tax reform would not fully eliminate the effects of tax asymmetries. Our experiments generate after-tax NPVs from stand-alone projects under the reformed tax rules that are up to 5% less than the after-tax value of the same investment under symmetric tax. In other words, the asymmetry may allow the government to capture an additional 5% of project investment.

Allowing interest on tax-loss carryforwards is sometimes suggested as a remedy for tax asymmetries. This is a complete solution only if the stand-alone firm or project is certain to regain tax-paying status in the future. If tax-paying status is uncertain, the government's tax option retains value, just as a call option retains value even if its exercise price increases at the interest rate. Thus we find reasonable examples in which less than half of the burden is eliminated.

The burden of tax asymmetries would be completely cancelled out only if the firm could add a life insurance premium as well as interest to unused loss carryforwards. The premium would equal the probability that the firm generating the carryforwards would pass away, taking its carryforwards with it, during the next tax year.

Actual tax reform proposals contain impurities not specifically addressed in our experiments. We point out that our results overstate the difference reform might make because most proposals continue to allow corporations to expense investment in intangibles such as outlays for research and development. The tax shields on investment in intangible assets can be front-loaded in the same way that accelerated depreciation and the investment tax credit front-load the tax benefits of investment in tangible assets. Front-loading helps tax-paying firms but not stand-alone firms or projects lacking immediate income. The riskier that stand-alone firm or project, the more it suffers, because the value of the government's tax option increases as risk increases.

This paper, since it focuses on a particular aspect of the corporate income tax, cannot trace out the full implications of simultaneous changes in corporate and personal income taxes. Nor do we pin down the actual average impact of tax asymmetries under either current or reformed tax rules—only their potential impacts. However, under current law the potential impacts are large enough to make significant distortions plausible. For example, the distortions could reduce the after-tax value of a risky, start-up venture to about 90% of the value of the same venture undertaken by a large, tax-paying firm. Under tax reform, that shortfall could be cut in half.

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